CITY OF PHOENIX, ARIZONA

ENGINEERING & ARCHITECTURAL SERVICES DEPARTMENT

PROJECT SPECIFICATIONS AND CONTRACT DOCUMENTS

100%

SA-884163

19TH AVENUE LANDFILL ENVIRONMENTAL CLEANUP

19TH TO 15TH AVENUE AT THE SALT RIVER

ACTING MAYOR

THELDA WILLIAMS

CITY COUNCIL

DISTRICT NO. 1 - THELDA WILLIAMS
DISTRICT NO. 2 - FRANCES BARWOOD
DISTRICT NO. 3 - PEGGY BILSTEN
DISTRICT NO. 4 - CRAIG TRIBKEN
DISTRICT NO. 5 - JOHN NELSON
DISTRICT NO. 6 - SAL DICICCIO
DISTRICT NO. 7 - SALOMON LEIJA
DISTRICT NO. 8 - CODY WILLIAMS

CITY MANAGER — FRANK FAIRBANKS
CITY ENGINEER — KENNY W. HARRIS, P.E.

100% SUBMITTAL - SEPTEMBER 23, 1994

CITY OF PHOENIX, ARIZONA

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PREBID CONFERENCE AND QUESTIONS ON PLANS AND SPECIFICATIONS

A Pre-Bid Conference will be held in the Conference Room _____, seventh floor, Phoenix City Hall, 200 West Washington Street, Phoenix, Arizona on _____, 1994.

The purpose of this conference will be to discuss questions you may have on the project and clarify the plans and specifications.

Neither the _____ nor the City of Phoenix shall be held responsible for any oral instructions. Any changes to the plans and specifications will be in the form of an addendum which will be furnished to all plan holders.

Should you desire additional information prior to submitting your bid, please call the following for questions on:

Plans, Technical/Special Provisions, Proposal or Specifications: Project Manager, _____.

General Conditions, Bid Bonds, Insurance, Payment and Performance Bonds and Contracts: 262-4951.

Equal Employment Opportunities and Affirmative Action Programs: Human Relations Division, 262-6790.

MBE/WBE Utilization:

Bids and Specifications Section:

Federal Labor Standards/Davis-Bacon Act: Labor Compliance Officer, Diane Flatten, 261-8287

Site Examination:

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SEAL

CALL FOR BIDS

BIDS WILL BE DUE: _____, 1994 AT 2:00 P.M., MST
BIDS WILL BE OPENED: _____, 1994 AT 2:00 P.M., MST

INDEX NO. SA-884163

Sealed bids will be received at the Engineering and Architectural Services Department's Central Records Counter, Second Floor, Phoenix City Hall, 200 West Washington Street, Phoenix, Arizona, 85003, until the hour indicated for the 19th Avenue Landfill Environmental Cleanup.

Prospective bidders may examine and/or purchase plans, special provisions and proposal pamphlets at the City Engineer's office. All Contractors will be provided one set of free plans and specifications upon request. Additional sets may be purchased for $ _____ per set. There will be no refund made for additional sets purchased.

This project is subject to the City of Phoenix's Code, Chapter 18, Article IV, as amended pertaining to nondiscrimination in employment by Contractors and subcontractors. The Affirmative Action Requirements are included as a part of the specification on page A.A.R. - 1.

Bid Security. No proposal will be read unless accompanied by a proposal guarantee of cash, certified check, or on the surety bond provided, for an amount not less than ten (10%) percent of the amount bid included in the proposal as a guarantee that the contractor will enter into a contract to perform the proposal in accordance with the plans and specifications. Notwithstanding any other statute, the surety bond shall be executed solely by a surety company or companies holding a certificate of authority to transact surety business in this state, issued by the Director of the Department of Insurance pursuant to Title 20, Chapter 2, Article 1. The surety bond shall not be executed by an individual surety or sureties even if the requirements of Section 7-101 are satisfied. The cash, certified check, or surety bond shall be returned to the contractors whose proposals are not accepted, and to the successful contractor upon the execution of a satisfactory bond and contract.

Minority and Woman Owned Business Enterprises (MBE and WBE). This project is subject to the City of Phoenix Code, Chapter 18, Article VI, (Ordinance Number G-3694) pertaining to participation of MBE and WBE firms. Only firms whose physical business is located within the Phoenix Metropolitan Statistical Area (Maricopa County) are eligible to meet the MBE/WBE goals on this project. Goals have not yet been set for this project. They will be issued in a future addendum.

The minimum MBE goal is _____ %

The minimum WBE goal is _____ %

These goals must be met in order to have your bid considered. For further information contact the Engineering and Architectural Services Department at (602) 262-6652.

The Council of the City of Phoenix reserves the right to award the contract to the lowest and/or best responsible bidder or all bids will be rejected, as soon as practicable after the date of opening bids.

FRANK FAIRBANKS
City Manager

By:_____
KENNY W. HARRIS, P.E.
City Engineer

Published: Arizona Business Gazette

INFORMATION FOR BIDDERS

.01 REFUNDS FOR PLANS AND SPECIFICATIONS

Prospective bidders may examine and/or purchase plans, special provisions and proposed pamphlets at the City Engineer's office. All Contractors will be provided one set of free plans and specifications upon request. Additional sets may be purchased for $ _____ per set. There will be no refund made for additional sets purchased.

.02 SUBMITTING BIDS

No proposal will be read unless accompanied by a proposal guarantee of cash, certified check, cashier's check or on the surety bond provided, for an amount not less than ten (10) percent of the amount bid.

The completed proposal with the ten (10) percent proposal guarantee shall be submitted in a sealed envelope. The outside, lower right hand corner of which shall be marked as follows:

Bid of (Firm's Name, Address and Phone Number) _____
For 19th Avenue Landfill Environmental Cleanup
City of Phoenix Index Number: SA-884163

Sealed bids shall be submitted to the Engineering & Architectural Services Department's Central Records Counter, Second Floor of the Phoenix City Hall Building, 200 West Washington, Phoenix, AZ 85003, prior to the time and date specified for bid opening.

As this is a Federally-assisted project, it is subject to the requirements of Executive Order 11246 pertaining to Equal Employment Opportunity.

This project is subject to the City of Phoenix's Code, Chapter 18, Article IV, as amended pertaining to nondiscrimination in employment by Contractors. The Affirmative Action Requirements are included as a part of the specification on page A.A.R. - 1.

.03 REQUEST FOR SUBSTITUTIONS

Paragraph A, B, and C or MAG Section 106.4 are deleted and the following paragraphs substituted:

A. The Architect will consider written request(s), by a prime bidder only, for substitution(s) which is/are considered equivalent to the item(s) specified in the contract documents. The written request will be considered only if it is received at least twelve (12) calendar days prior to the established date. Normally, the substitution will be discussed at the Pre-Bid Conference.

B. The prime bidder, at his own expense, shall furnish the necessary data to substitute and validate that the physical, chemical, and operational qualities of each substitute item is such that this item will fulfill its required function.

C. The substitution, if approved, will be authorized by a written addendum to the contract documents and will be made available to all bidders. The bid date and the scheduled completion time will not be affected by any circumstances developing from this substitution.

D. Five (5) copies of this request will be submitted or delivered to the following address: Engineering and Architectural services Department, Attention Mr. _____, Seventh Floor, Phoenix City Hall, 200 West Washington Street, Phoenix, Arizona 85003-1611.

.04 PERMITS

The Contractor shall obtain and pay for the building permit. The plans review fee and occupational development fee have already been paid by the City. Log number ___.

.05 CONTRACT AWARD

Contract award will be made based on the lowest total base bid or on the lowest combination of the total base bid and the additive alternate(s), whichever is in the best interest of the City.

.06 CANCELLATION OF CONTRACT

All parties hereto acknowledge that this agreement is subject to cancellation by the City of Phoenix pursuant to the provisions of Section 38-511, Arizona Revised Statutes.

.07 SURVEY

The Contractor shall set the construction stakes establishing lines, grades and elevations to include necessary utilities and appurtenances and shall be responsible for their conformance with plans and specifications. Construction staking shall be done in accordance with the applicable provisions of the Engineering & Architectural Services Department's "Standard Requirements for Staking, As-Builts, and Quantity Calculations", dated January 1, 1980. The Engineer will establish or designate a control line and bench work of known location and elevation for use as a reference.

The Contractor shall furnish the Engineer a certified set of calculations and measurements to fully support the derivation of all pay quantities. This information will be prepared by a registrant of the Arizona State Board of Technical Registration.

The Contractor shall furnish the Engineer a set of "Record Drawings" on mylar tracings. Record drawings shall be certified by a registrant of the Arizona State Board of Technical Registration.

.08 RECORD DRAWINGS

The Contractor shall maintain a record set of plans at the job site. These shall be kept legible and current and shall show all changes or work added in a contrasting, reproducible color. When the project is substantially complete, the Contractor shall submit these plans to the Engineer for approval. When landscaping is included, the Contractor shall submit, prior to final inspection, corrected landscape drawings showing the location of all utility services, controller, pipe, valves and wiring. The Engineer shall be the sole judge as to the acceptability of the record plans and receipt of an acceptable set is a pre-requisite for final payment.

.09 WAGE DETERMINATION

In the event that the wage determination decision of the Secretary of Labor, which is attached hereto and made a part hereof, has been superseded by any subsequent wage determination decision(s) published up to and including ten (10) days prior to bid opening, the most recent applicable wage decision shall be incorporated by reference, and the successful bidder agrees to be bound by it, regardless of what is contained in the specifications. State or local wage rates will not apply if the state or local wage rate exceeds the corresponding Federal Wage Determination rate.

.10 SECTION 3 REQUIREMENT

A. Labor Force Disclosure

Prior to contract award, the Contractor will complete the Statement of Work Force Needs (page I.B. - ____ indicating the labor trades to be used and the number of vacancies which could be filled from lower income sources within the Section 3 area. A copy of this form is included in the specification for information only.

B. Section 3 Boundaries

On page CDBG - 4 is a map defining the boundaries which are the corporate limits of the City of Phoenix, however, the primary consideration should be given to the persons living in or carrying out their businesses in the three primary target areas.

The City of Phoenix's Minority Procurement Advisor, telephone (602) 262-6790,will provide the Contractor with a list of the Minority Business Enterprises that may be utilized on this project and will aid the Contractor in containing specific minority firms for sub-contractors or material supplies.

.11 EQUAL ECONOMIC OPPORTUNITY CLAUSE

Pursuant to City of Phoenix Code, Chapter 18, Article IV as amended, on Equal Employment Opportunity, all prime Contractors and subcontractors are required to take affirmative action toward equal employment opportunity. All prime Contractors must have Affirmative Action reports on file with the Equal Opportunity Department prior to bid.

.12 DBE PARTICIPATION

DBE goals have been established for this project and the instructions for compliance are included in the Minority Business Enterprise Section. The written statement that must be submitted with your bid is included on the proposal page. Failure to complete the information included on the proposal page may be just cause for declaring your bid non-responsive.

Submit the following written statement: "This will certify that, of the total amount of bid, $_____ ____ will be accomplished by Disadvantaged or Women Business Enterprise which have been certified, or by those expected to be certified, which amount is a minimum of ten (10) percent of the total amount of the bid submitted.

.13 LABOR STANDARD CONFERENCE

On all Federally-assisted projects, a Labor Standards Conference must be held after project award and prior to the established of the Notice to Proceed.

The successful bidder shall schedule the conference by calling the Labor Standard Officer at 261-8287. Minimum attendance shall be corporate officer, who is authorized to execute and sign documents for the firm and the payroll representative.

.14 PRECONSTRUCTION CONFERENCE

After completion of the contract documents, to include bonds, insurance and signatures and prior to the commencement of any work on the project, the Project _____ (telephone_____), will schedule a Pre-Construction Conference. This will be held at _____ _____. The purpose of this conference is to establish a working relationship between the Contractor, utility firms and various City agencies. The agenda will include critical elements of the work schedule, submittal schedule, cost breakdown of major lump sum items, payment application and processing, coordination with the involved utility firms, emergency telephone numbers for all representatives involved in the course of construction and establishment of the notice to proceed date.

Minimum attendance by the Contractor shall be a responsible company/corporate official, who is authorized to execute and sign documents on behalf of the firm and the job superintendent and the Contractor's safety officer.

.15 ALLOCATION OF ADD/DEDUCT PROPOSAL ITEM

Determination of proportionate distribution of add/deduct will be calculated as follows and unit prices will be adjusted accordingly. Adjusted unit prices will be used to determine payments for all units of work completed under that item.

A. Total sum of extended unit bid prices for item _____.

B. Divide extended unit bid prices for each item number by the sum of these items to determine the percentages of the lump sum, add or deduct, adjustment which will be applied to the individual bid item number.

C. The new unit price for each affected item will be determined by adding or subtracting the lump sum adjustment for that time from the total extended amount listed in the bid for that item. this amount will then be divided by the number of "quantity units" listed in the bid proposal for that item to determine the new adjusted unit bid price for that item.

D. Any minor deviation in total bid cost using new unit prices may be corrected by adjusting any one or more of the items to correct deviation.

SUB-TOTAL (Items _____ through _____, inclusive)

$ _____

*ADDITION (+) OR DEDUCTION (-): $ _____

*Provision is made for the bidder to include an addition or deduction in his bid, if he wishes, to reflect any last minute adjustment in prices. The addition or deduction, if made, will be proportionately applied to the prices bid for items _____, and payment made therefore.

TOTAL AMOUNT OF BID, ITEMS _____ THROUGH _____, INCLUSIVE,

$_____

_____

_____&____/100 Dollars
Written Words

.16 IMMIGRATION REFORM AND CONTROL ACT

Compliance with the Immigration Reform and Control Act of 1986 (IRCA) Required. Contractor understands and acknowledges the applicability of the IRCA to him. Contractor agrees to comply with the IRCA in performing under this agreement and to permit City inspection of his personnel records to verify such compliance.

.17 CONTRACTOR'S LICENSE AND PRIVILEGE LICENSE

Each bidder shall include, on the proposal sheet, his Contractor's License Classification and Number (ARS Title 32, Chapter 10). In addition, the bidder must include his City of Phoenix Privilege License Number (ARS 42-1305). Failure to provide this information will be just cause for declaring the bid non-responsive.

.18 CONTRACTOR'S TAX LIABILITY

The successful bidder shall be liable for payment of all State of Arizona and Maricopa County Transaction Taxes (ARS 41-1305) and City of Phoenix Privilege Taxes (Phoenix City Code 14-415) on the successful bidders' construction contracting receipts. Failure to remit the proper taxes to the City may result in the withholding of payment until all delinquent privilege taxes, interest and penalty have been paid.

.19 SECURITY CHECKS

The Contractor is responsible for obtaining security clearance from the Police Department for all employees, subcontractors or materialmen having access to restricted areas. The Contractor grants the right to the Police Department to conduct background checks of all employees, subcontractors and materialmen entering designated restricted areas. The background checks shall be conducted prior to any employee, subcontractor or materialmen entering in a restricted area and will be based upon information provided to the Police Department including, but not limited to, name and date of birth. THE INFORMATION WILL BE PROVIDED TO THE POLICE DEPARTMENT'S REPRESENTATIVE AT LEAST 24 HOURS IN ADVANCE OF THE NEED FOR ACCESS. THE REPRESENTATIVE WILL BE IDENTIFIED AT THE PRE-CONSTRUCTION CONFERENCE AND WILL PROCESS ALL SECURITY CHECKS. IN NO CASE SHALL THE SECURITY CHECK BE CONDUCTED BY ANY

PERSON OTHER THAN THE DESIGNATED POLICE DEPARTMENT REPRESENTATIVE. The City of Phoenix may, in its sole discretion, refuse to allow an employee, subcontractor, or materialmen, access to a restricted area for any of the following reasons:

- conviction of a felon
- conviction of a misdemeanor (not including traffic or parking violations and petty offenses)
- a person is under current investigation OR PENDING TRIAL involving criminal activity
- any outstanding warrants (including traffic and parking violations)
- a person currently on parole or probation

The Contractor shall include the processing of this paragraph in any subcontract he enters into for performance of the work on this project.

There will be no additional payment for this procedure, the cost will be included in the lump sum/unit prices in the proposal.

THE CITY OF PHOENIX RESERVES THE RIGHT TO CHANGE THE RESTRICTED AREAS AS THE WORK PROGRESSES OR AS POLICE OPERATIONS MAY DICTATE.

.20 PROTEST PROCEDURES (FTA ONLY)

Any interested party who has an objection to the awarding of a materials, commodities or services contract to any bidder by the City of Phoenix, pursuant to competitive bid procedures, shall lodge that protest, in writing, prior to award by the City Council. The protest shall clearly state the grounds for the protest and the relief sought.

This is a Federal Transit Administration (FTA) funded project and is subject to FTA rules and regulations. FTA only accepts protest alleging that a grantee fails to have written protest procedures or has violated such procedures. Written protest procedures are available from the City of Phoenix, City engineer, at the second floor, 125 East Washington Street, Phoenix, Arizona, 85004, upon receipt of the written protest.

.21 UTILITY-RELATED CONSTRUCTION DELAY DAMAGES CLAIM PROCEDURES

The following procedure is intended to provide a fair and impartial process for the settlement of construction delay claims associated with unknown or improperly located utility facilities.

The Contractor shall immediately notify, in writing, the Project Engineer of any potential utility-related delay claim. The Project Engineer will immediately notify the Utility Coordination Section of the Engineering & Architectural Services Department.

The Contractor shall immediately notify the appropriate liaison of the affected utility verbally, followed by a written notification.

The Contractor shall coordinate the investigation with the affected utility of the situation and provide the City with written notification of their decision on the settlement of the claim.

If the affected utility makes a decision to handle negotiations for a claim, their personnel will be responsible for monitoring the project and all negotiations with the Contractor regarding the claim.

The Contractor shall determine to document requirements of the affected utility for their acceptance of responsibility for the claims. The Contractor shall provide four (4) copies of the required documentation to the utility involved and two (2) copies of this documentation to the Project Engineer. The Contractor shall obtain written confirmation from the utility company involved of their documentation requirements.

.22 MBE/WBE UTILIZATION

The minority and women participation goals for this project are as follows:

MBE = _____% WBE = _____%

ONLY firms certified by the City of Phoenix under Chapter 18, Article VI, Section 18-106. A. (1) of the Phoenix City Code are eligible to fulfill MBE/WBE subcontracting goals for City of Phoenix projects.

The City of Phoenix Construction Directory for Maricopa County dated ___ contains the complete listing of those firms which may be used on this project. If the name of a MBE/WBE firm does not appear in this directory, they will be ineligible to satisfy the subcontracting goals for this project.
If the awarded contract is less than $250,000 a certified MBE/WBE prime contractor may meet the respective MBE/WBE goal by claiming credit for the value of the work actually performed by its employees. No MBE/WBE prime contractor may claim credit towards the MBE/WBE subcontracting goals if the awarded contract is greater than $250,000. If the project proposal contains alternates which could shift the value of the awarded contract above $250,000, the bidder should plan their MBE/WBE subcontracting utilization accordingly.

Each Bidder shall submit a sealed Bid Envelope and a sealed Subcontracting Goals Envelope at the time and place designated on page C.B.1. The Subcontracting Goals Envelope will be reviewed and evaluated to determine if the Bid Envelope will be opened and read at a later specified time.

The **Subcontracting Goals Envelope** shall contain the following items:

- A completed "Bidder's Statement of Proposed MBE/WBE Utilization" form. The information requested on the form must be supplied for all MBE and WBE firms proposed to be contracted for this project. The proposed MBE and WBE firms may be subcontractors, suppliers and/or, joint ventures. More information on the value of the of subcontracts to be credited toward the goal is contained in Section 18-106 of the City Code. The numbers entered in the "total boxes" will be used to determine if the bidder has met the goals. This form is attached at the end of this Section. When completed, detach the form, and insert it into the Subcontracting Goals Envelope.

- If the bidder is unable to meet the MBE/WBE goals, the bidder may request a waiver of the goals by completing the "Request for Waiver of MBE/WBE Goals" form, and inserting it in the Subcontracting Goals Envelope, along with the "Bidder's Statement of Proposed MBE/WBE Utilization" form described in the previous paragraph.

- Attachments to the "Request for Waiver of MBE/WBE Goals" shall clearly state the reasons why a waiver should be granted and shall include the additional evidence and records required in Article VI, Section 18-106 C. of the Phoenix City Code.

The **Bid Envelope** shall contain all other information and documents required with the bids such as bids, bonds, powers of attorney, lists of equipment vendors, lists of subcontractors, bidders questionnaires, etc..

.23 BID OPENING PROCEDURES

The Bid Envelope and Subcontracting Goals Envelope will be due at the time and place specified. Late submissions will be rejected.

A Bid Panel composed of Engineering and Architectural Services Department (EASD), Equal Opportunity Department (EOD), and the operating department staff will open the Subcontracting Goals Envelopes and process them as follows:

The Subcontracting Goals Envelopes will be sorted by project, opened, and further sorted into the following categories:

CATEGORY A. The bidders have met the MBE and WBE subcontracting goals, and have completed the "Bidder's Statement of Proposed MBE/WBE Utilization" form.

CATEGORY B. The bidders have not met the subcontracting goals, and have completed a "Bidder's Statement of MBE/WBE Utilization" form, and have submitted a "Request for Waiver of MBE/WBE Goals" form, along with the supporting data described in the previous Section, MBE/WBE UTILIZATION.

CATEGORY C. The bidders have not met the subcontracting goals, and have not submitted a "Request for Waiver of MBE/WBE Goals" form.

CATEGORY "A": If all the project bidders fall into Category "A", the bids will be publicly opened, and read the following day. Processing and recommendation for award will proceed in the traditional manner.

CATEGORY "B": All Subcontracting Goals Envelopes in Category "B" will be reviewed and evaluated by the Bid Panel. If the Panel rejects a waiver request, that bidder will be notified by FAX, and will have until 10:00 a.m. the following day to file a written notice of appeal with the Bids and Specification Section of the EASD. All other bidders will be notified by FAX that opening the Bid Envelopes, and reading of the bids will be delayed until 2:00 p.m. the following Wednesday. If a notice of appeal is not received by 10:00 a.m. the following day, that bid will be rejected, and opening of the remaining bids will proceed at 2:00 p.m. the following Wednesday.

If one waiver request is deemed valid, all bids for the project will be rejected, and the project will be re-advertised with revised goals. If at least one bidder meets the subcontracting goals, subject to City review and confirmation, the subcontracting goals will be deemed reasonable and attainable, and no waiver will be granted. If no bidder meets the subcontracting goals, all bids will be rejected, and the project will be re-advertised with revised goals.

If the bid opening does not occur on Wednesday, or any of the subsequent days fall on a legal holiday, the schedule will be adjusted accordingly, and the bidders will be notified by FAX.

If a notice of appeal of the Bid Panel's decision is timely received, staff will schedule a hearing for 10:00 a.m. the following Friday. The Hearing Officer's decision shall be final, and no further appeal will be considered.

If, the Hearing Officer denies the waiver request, the remaining bids will be opened and read the following Wednesday at 2:00 p.m. If the Hearing Officer grants a waiver request, all bids for the project will be rejected and the project will be re-advertised with revised goals.

CITY OF PHOENIX
BIDDER'S STATEMENT OF PROPOSED MBE/WBE UTILIZATION

INDEX NO. SA-884163
DESCRIPTION: 19TH AVENUE LANDFILL ENVIRONMENTAL CLEANUP

C.O.P. USE		FIRM AND CONTACT NAME	MBE OR WBE	PHONE NUMBER	SERVICES TO BE SUPPLIED	% OF BASE BID
V	M					

MINORITY-OWNED BUSINESSES - TOTAL: %

WOMAN-OWNED BUSINESSES - TOTAL: %

I hereby certify by signing below that the foregoing M/WBE businesses shall be contracted to work on the trades identified above or supply material and/or equipment for this project. The information shown is a true reflection of the proposed subcontracts expressed as a percentage of the **base bid**.

BIDDER: _____
SIGNATURE: _____ DATE: _____
NAME AND TITLE: _____

CITY OF PHOENIX

Contractor's Statement of MBE/WBE Utilization

Report Period _____ **to** _____ Sheet ____ of ____

PROJECT DESCRIPTION: _____ BASE BID: $_____

INDEX NO. _____ CONTRACT NO. _____ UTILIZATION GOALS: MBE - _____ WBE - _____

Business Name, Representative Name & Telephone No.	MBE or WBE	Product or Service to be Supplied	Procurement Amount Proposed (As-Bid)	Contract Adjustments Affecting Procurement Amount	Revised Procurement Amount Proposed	Procurement Amount to Date	Procurement Amount This Period	% to Date
MINORITY OWNED BUSINESS TOTALS								
WOMEN OWNED BUSINESS TOTALS								

CONTRACTOR: _____

AUTHORIZED SIGNATURE: _____ DATE: _____

NAME AND TITLE: _____

CITY OF PHOENIX

REQUEST FOR WAIVER OF MBE/WBE GOALS

INDEX NO. SA-884163

DESCRIPTION: 19TH AVENUE LANDFILL ENVIRONMENTAL CLEANUP

I hereby request a waiver of the ☐ MBE subcontracting goal and/or ☐ the WBE subcontracting goal for this project.

My bid reflects ____ % MBE subcontractor participation and/or ___ % WBE subcontractor participation.

The documentation prescribed by Chapter 18, Section 106C of the City Code is attached and submitted as part of this request for waiver of the MBE and/or WBE goal.

I understand if one or more bidders meet the required subcontracting goals, the goals will be considered reasonable and attainable under this circumstance. Requests for waivers will be granted for only the most extreme or unusual circumstances.

BIDDER: _____

SIGNATURE: _____

NAME AND TITLE: _____

CATEGORY "C". All bidders in the "C" category will be rejected. The Bid Envelopes and Subcontracting Goals Envelopes will be returned with no further action. No appeals to this action will be permitted or considered.

.24 PAY WHEN PAID

The contractor shall make partial payment, for work completed and accepted by the City through the preceding month, to their subcontractor(s) or supplier(s) within seven (7) calendar days of receipt of payment from the City of Phoenix.

.25 QUALITY ASSURANCE/QUALITY CONTROL PLAN

These project specifications and contract documents will function entirely as the Quality Assurance/Quality Control ("QA/QC") Plan for Remedial Action activities for Index SA-884163. The QA/QC Plan for Remedial Action activities is a requirement of the Consent Decree and Agreement between the State of Arizona and the City of Phoenix, signed on June 18, 1992. The said Consent Decree and Agreement is considered as a part of the Contract and will be provided to the Contractor by the City of Phoenix.

The QA/QC Plan is integral to these project specifications. Appropriate QA/QC procedures, testing methods, and verification procedure are noted where appropriate and inferred in these specifications and in the standard specifications and details applicable to SA-884163 (see SUPPLEMENTARY CONDITIONS: .01 STANDARD SPECIFICATIONS AND DETAILS, page S.C.1). The Contractor shall abide by the QA/QC Plan for inspections, testing of materials and equipment, methods of construction, and references to other specifications and criteria from nationally recognized organizations.

Should the Contractor fail to conform to the requirements of the Consent Decree and Agreement and other applicable rules and regulations, the City reserves the right to perform the work necessary to conform to the requirements and the cost of such work will be deducted from any monies due or become due to the Contractor.

SUPPLEMENTARY CONDITIONS

.01 STANDARD SPECIFICATIONS AND DETAILS

Except as otherwise required in these specifications, construction of this project shall be in accordance with all applicable Maricopa Association of Governments' (MAG) Uniform Standard Specifications and Uniform Standard Details, latest revision, and the City of Phoenix Supplements, latest revision to the MAG Uniform Standard Specifications and Details.

.02 PRECEDENCE OF CONTRACT DOCUMENTS

The City of Phoenix Supplements will govern over the MAG Standard Specifications and Details. In case of a discrepancy or conflict, plans will govern over both the City of Phoenix Supplements and MAG Standard Specifications and Details; Supplementary Conditions, Technical Provisions, Special Provisions, will govern over the City of Phoenix Supplements, the MAG Standard Specifications and Details and Plans.

.03 PARTIAL PAYMENTS

The contracting agency will make a partial payment to the Contractor on the basis of an estimate prepared by the Engineer for work completed and accepted through the preceding month. The notice to proceed date, which is designated for the specific project involved, will be used as the closing date of each partial pay period. Payment will be made no later than fourteen (14) days after the work is certified and approved.

PAYMENT WITHHOLDING

Payrolls, including subcontractor's payrolls, must be submitted weekly no later than seven (7) days after each pay period ending date. Payments withheld in part or in full until payrolls are received and reviewed to assure compliance of the Federal Labor Standards.

Failure to clarify, when requested, discrepancies between hourly wages paid individual workers and the minimum hourly wages required by the Federal Wage Decisions contained in the contract documents may also affect the complete or timely release of payments.

.04 INDEMNIFICATION OF CITY AGAINST LIABILITY

The Contractor agrees to indemnify and save harmless the City of Phoenix, its officers, agents and employees, and any jurisdiction or agency issuing permits for any work included in the project, their officers, agents and employees, hereinafter referred to as indemnitee, from all suits, including attorney's fees and cost of litigation, actions, loss, damage, expense, cost or claims of any character or any nature arising out of the work done in fulfillment of the terms of this contract or on account of any act, claim or amount arising or recovered under Workmen's Compensation Law or arising out of the failure of the Contractor to conform to any statutes, ordinances, regulation, law or court decree. It is the intent of the parties to this contract that the indemnitee shall, in all instances except for loss or damage resulting from the sole negligence of the indemnitee, be indemnified against all liability, loss or damage of any nature

whatever for or on account of any injuries to or death of person or damages to or destruction of property belonging to any person arising, out of or in any way connected with the performance of this contract, regardless of whether or not the liability, loss or damage is caused by, or alleged to be caused in part by the negligence, gross negligence or fault of the indemnitee. It is agreed that the Contractor will be responsible for primary loss investigation, defense and judgement costs where this contract of indemnity applies.

.05 CONTRACTOR'S INSURANCE REQUIREMENTS

Concurrently with the execution of the contract, the Contractor shall furnish the City of Phoenix a Certificate of Insurance on a standard insurance industry ACORD form. The minimum limits of liability shall be $1,000,000.00 for General Liability and Automobile Liability and statutory amounts for Workmen's Compensation (Employer's Liability with a minimum limit of $100,000.00 each accident). The ACORD form shall be issued by an insurance company authorized to transact business in the State of Arizona, or one that is named on the List of Qualified Unauthorized Insurers maintained by the Arizona Department of Insurance.

The Contractor shall maintain during the life of the contract such public liability and property damage insurance, both general and automobile liability, as shall protect him and any subcontractor performing work under the contract from all claims for bodily injury, including accidental death, as well as for property damage arising from operations under the contract--whether such operations be by himself or by any subcontractor or by anyone directly or indirectly employed by either of them. These policies shall not expire until all the work has been completed and the project has been accepted by the City of Phoenix. If a policy does expire during the life of the contract, the Contractor shall provide a renewal certificate of the required insurance coverage to the City of Phoenix not less than five (5) days prior to the expiration date.

The City of Phoenix, a municipal corporation, its officers, agents and employees shall be named as additional insured on all Public Liability and Property Damage Insurance and Builder's Risk/Course of Construction Insurance (new buildings and additions to old buildings only) and this shall also be indicated on Certificates of Insurance issued to the City. The Contractor's coverage shall be primary for any and all losses arising out of the performance of this contract.

.06 PERFORMANCE AND LABOR AND MATERIAL BOND

Prior to the execution of the Contract, the successful bidder must provide a performance bond and a labor and materials bond, each in an amount equal to the full amount of the contract. Each such bond shall be executed by a surety company or companies holding a Certificate of Authority to transact surety business in the State of Arizona, issued by the Director of the Arizona Department of Insurance. A copy of the Certificate of Authority shall accompany the bonds. The Certificate shall have been issued or updated within two years prior to the execution of the Contract. The bonds shall be made payable and acceptable to the City of Phoenix. The bonds shall be written or countersigned by an authorized representative of the surety who is either a resident of the State of Arizona or whose principal office is maintained in this state, as by law required, and the bonds shall have attached thereto a certified copy of Power of Attorney of the signing official. If one Power of Attorney is submitted, it shall be for twice the total contract amount. If two Powers of Attorney are submitted, each shall be for the total contract amount. Personal or individual bonds are not acceptable. Failure to comply with these provisions will be cause for rejection of the bidder's proposal.

.07 BONDING COMPANIES

All bonds submitted for this project shall be provided by a company rated A- or better by the A.M. Best Company. A bid security is necessary at the time of bid opening. An A- or better bid security shall be submitted to the Bids and Specification Section no later than 5:00 P.M. on the third day following the bid opening. Failure to replace a substandard bond with an A- or better bond within this time frame will result in bid rejection.

.08 MODIFICATION TO MAG UNIFORM STANDARD DETAIL 240, VALLEY GUTTER

Reference Note 1 which reads, "All concrete to be Class 'B' unless otherwise approved. (Section 725)"

Change this note to read:

"All concrete to be Class 'A' unless otherwise approved. (Section 725)"

.09 PRESSURE MANHOLE COVERS

MAG Detail 523, change the note (upper right corner) that reads, "For a 30-inch manhole opening...noted on the sheets.", to read:

"For a 30-inch manhole opening, use the standard watertight 30-inch manhole frame and cover in accordance with Notes 1 through 12 listed below this sheet.

.10 ALUMINUM MANHOLE COVERS

The Water Services Department has the following stated policy, "MAG Standard Detail 425 - 24-inch aluminum manhole frame and cover is not approved by the City of Phoenix.

.11 DISPOSAL OF SURPLUS MATERIAL

All routine surplus material not classified as hazardous or special, may be disposed of at the Contractor's discretion subject to the following conditions:

A. If the City landfills are used, the Contractor shall pay the normal dumping fee.

B. If private property within the City limits is used, the Contractor shall obtain written permission from the property Owner and deliver a copy of this agreement to the Engineer prior to any hauling or dumping. All disposal and grading shall be in strict conformance with the City of Phoenix Grading and Drainage Ordinance. The Contractor shall obtain and pay for the necessary permit(s).

C. If the surplus material is disposed of outside the City limits, the Contractor shall comply with all applicable laws/ordinances of the agency concerned and be responsible for all cost incurred.

No measurement or direct payment will be made for the hauling and disposal of surplus and/or waste material, the cost shall be incidental to the cost of the project.

.12 MODIFICATION TO MAG UNIFORM STANDARD DETAIL 522, MANHOLE SHAFT

Reference Note 5, which calls for installation of manhole steps as required by the agency. The Engineering & Architectural Services Department has adopted the policy that manhole steps are NOT to be installed in any storm sewer manhole. If steps are provided, they shall be removed and the hole filled with Class "B" concrete.

.13 HAUL PERMIT

On any project, when the quantity of fill or excavation to be hauled exceeds 10,000 C.Y. or when the duration of the haul is for more than twenty (20) working days, the Contractor shall:

A. Obtain a written (no fee) haul permit from the Development Services Department.

B. Obtain approval of the proposed haul route, number of trucks, etc., by the Street Transportation Department.

NOTE: Obtaining the haul permit and the approval by Street Transportation does not release the Contractor from strict compliance with MAG Subsection 108.5, Limitation of Operations.

.14 DEFINITIONS - MAJOR ITEMS

Section 101, page 10A of MAG Specifications - The definition of major item is changed to read:

MAJOR ITEM: A major item is any bid item for work having an original dollar value equal to or greater than the amount shown below.

CONTRACT AMOUNT	MAJOR ITEM IS DEFINED AS ANY ITEM EQUAL TO OR GREATER THAN THE FOLLOWING
Up to $1 million	$15,000 or 3%, whichever is greater
$1 million to $3 million	3% of the original contract amount to a maximum of $75,000.00
$3 million to $5 million	2.5% of the original contract amount to a maximum of $90,000.00
Over $5 million	1.5% of the original contract amount to a maximum of $125,000.00

CONTINGENCY ITEMS

Contingency items which fall under the definition of a major item are subject to negotiation if decreased by more than twenty (20) percent.

Contingency items shall not increase more than twenty (20) percent without being subject to renegotiation, regardless of the percentage of that item relative to the total contract amount.

.15 MAG SUBSECTION 105.15(B) FINAL ACCEPTANCE

Delete this subsection and substitute the following:

B. Substantial Completion

The work may be judged substantially complete when the entire construction, not per trade or per subcontractor, has been completed with the possible exception of final inspection punch list work. The purpose of granting or acknowledging substantial completion is to stop contract time. This is particularly important to the Contractor if contract time is exhausted or nearly so and/or punch list work is anticipated to extend beyond the allotted time. Granting of substantial completion will eliminate the possibility of incurring liquidated damages or additional liquidated damages beyond the substantial completion date, whichever case may apply.

In the event that the Engineer grants substantial completion, the Contractor shall have thirty (30) days thereafter to complete punch list work, unless additional time is granted--in writing--by the Engineer. In no case shall a Contractor be granted more than thirty (30) days to complete punch list work, unless there are extenuating circumstances such as delay in shipment of a specialized piece of equipment, labor strike, or other circumstances beyond the Contractor's control which would necessitate a further time extension.

C. Penalty for Failure to Complete Punch List Work Within Specified Time

In the event the Contractor fails to complete the punch list work within thirty (30) days following the contract completion date, or in the case of specialized situations within the additional time allotted by the Engineer, the Contractor may be declared in default, and the Engineer may order the work completed by others.

In the event of default, as described herein, the Engineer shall withhold from the Contractor's final payment, an amount equal to at least twice the estimated cost of the remaining work. In addition, the Engineer shall withhold the retention deducted from contract progress payments until all punch list work has been satisfactorily completed, whereupon twice the amount of the actual cost of completing the work shall be deducted from the Contractor's final payment and the remaining funds, if any, including the contract retention, shall be released in accordance with the conditions set forth in contract retention.

D. Contract Retention

This project shall not be considered complete until all work has been completed, including punch list work. Under no circumstances shall a Contractor receive any portion of the legally retained progress payments until the City has granted a final acceptance and/or acknowledged substantial completion. The following conditions shall apply to each case:

1. Substantial Completion: The Engineer may reduce outstanding contract retention to not less than one (1) percent of the total contract amount, upon granting substantial

completion, if the value of the punch list work is estimated to be less than one (1) percent of the total contract.

2. Project Acceptance: Project acceptance implies that all punch list work is done and the improvements have been accepted by the City. Under these conditions, the retention will be fully released to the Contractor subject only to the signing of the standard claims affidavit and hold harmless clause required for all contracts.

3. Final Release of Contract Retention and/or Release of More Than Ninety (90) Percent of the Contract Funds: Prior to final payment and release of monies retained and/or in the case of substantial completion where the Contractor has requested a reduction in contract retention, the Contractor will be required to sign a claims affidavit agreeing to hold the City harmless from any and all claims arising out of the contract.

.16 UNDERGROUND FACILITIES

The Contractor will make whatever investigation it deems necessary to verify the location of underground utility facilities. If such facilities are not in the location shown in the drawings, then (regardless of whether this is discovered prior to or during construction) the contractor's remedies, if any, pursuant to Art. 6.3, Chapter 2, Title 40, A.R.§. (A.R.§. 40-360.21 through 40-360.32, "Underground Facilities"), shall be the contractor's sole remedy for extra work, delays and disruption of the job, or any other claim based on the location of utility facilities. Locations of utility facilities shown on drawings furnished by the City are to be regarded as preliminary information only, subject to further investigation by the contractor. The City does not warrant the accuracy of these locations, and the contractor, by entering into this contract, expressly waives and disclaims any claim or action against the City under any theory for damages resulting from location of utility facilities.

SPECIAL PROVISIONS

DIVISION A

GENERAL REQUIREMENTS

CONTENTS

A.01 TRAFFIC CONTROL

Add the following to MAG Subsection 401.7, Payments:

Payment for traffic control will be paid for on a lump sum basis for traffic control devices.

A.02 TRAFFIC REGULATIONS

A. The following shall be considered major streets:

19th Avenue
Broadway Road
Durango Road
Lower Buckeye Road
15th Avenue

B. All traffic and/or traffic control devices on this project shall be provided, maintained and/or controlled as specified in the City of Phoenix Traffic Barricade Manual, latest revision.

C. Permission to restrict City streets, sidewalks and alleys (street closure permits) shall be requested as specified in Section III of the Traffic Barricade Manual.

D. Unless otherwise provided for in the following "Special Traffic Regulations," all traffic on this project shall be regulated as specified in Section IV of the Traffic Barricade Manual.

E. All traffic on this project shall be regulated as specified in Section IV of the Traffic Barricade Manual.

F. No deviation to the "Special Traffic Regulations" will be allowed or implemented unless submitted to the Engineer for review and approval two (2) weeks prior to proposed work.

A.03 SPECIAL TRAFFIC REGULATIONS

A. The Contractor shall restrict traffic in no more than one lane, as required for access and hauling on 19th Avenue between Broadway Road and Lower Buckeye Road.

B. Contractor's access to the site shall be from the east side gate of 15th Avenue north of Broadway, for Cell A-1 and from 19th Avenue and Lower Buckeye Road for the main 19th Avenue Landfill (Cell A).

C. No hauling of excavated solid wastes shall be allowed on public streets unless authorized by the Engineer. The excavated cover soil from Cell A-1 shall be transported to Cell A across the Salt River channel bottom, unless specified otherwise herein.

A.04 WATER, LIGHT, POWER, HEAT, TELEPHONES

All water for construction purposes, drinking water, lighting, temporary electric power, heat, cooling and telephone service shall be arranged for and provided for the requirements of the work by the Contractor at his expense.

A.05 CONTRACTOR/ENGINEER OFFICE FACILITIES

The Contractor shall provide a temporary field office building for use by himself and subcontractors. In addition, a separate temporary field office shall be provided for use by the Owner and the Engineer.

A. The field offices shall consist of a temporary building or trailer providing a minimum of 600 S.F. of enclosed space. These buildings shall be provided with adequate lighting, ventilation and means of ingress and egress suitable to the intended use.

B. The offices shall be equipped with heating and cooling equipment capable of maintaining an ambient air temperature of 70 degrees F, $\pm$ 5 degrees.

C. The Contractor shall provide hook-ups and continuous service for the following: electrical service, sanitary sewer facilities or waste disposal, telephones, air conditioning, heating and potable water. Also a parking area sufficient for a total of eight (8) vehicles, protected by a security fence, shall be provided by the Contractor. The security fence shall be six feet high and a minimum of 400 feet in length (100 ft per side). There shall be one 24-foot gate with a lock. The Contractor shall provide at least two light locations, each location emitting approximately 16,000 lumens from dusk to dawn. The Contractor shall provide dust control inside the fence.

The following items shall be provided as part of this item for the Engineer's office:

- 1 copy machine capable of making 2,000 copies of 8½"x11", 8½"x14" and 11"x17" copies per month.
- 2 telephones with separate lines for use by the Engineer.
- 1 FAX machine.
- 1 personal computer, 486-66 or better with a minimum of 340 MB hard disk, equipped with a 2,400 baud modem or better. The personal computer shall be loaded, at minimum, with the latest version of Lotus 1-2-3, Wordperfect and Microsoft Window.
- 1 refrigerator with a minimum capacity of 15 cubic feet.
- A drafting table and stool, two (2) 4-drawer file cabinets, desk and swivel chair and a conference table with chairs for (10) persons.
- An alarm system tied into the City of Phoenix Police Department.
- Weekly cleaning service.
- Bottled water service.

The Engineer will designate the location of the offices. The offices shall remain on the project site for up to 30 calendar days following the completion and acceptance of the work by the Engineer. The offices shall be fully equipped with all utilities in service and shall be acceptable to the Engineer prior to the commencement of any construction activity.

The Contractor shall be responsible for maintaining the offices and all facilities and equipment therein in good working condition. Utility costs shall be the responsibility of the Contractor.

Upon completion of the project and following removal of the offices and any appurtenant structures, utilities, surfacing, etc., the affected areas shall be either restored to their former condition or an improved condition.

A.06 SITE ACCESS

The work is being done with the approval of various State and Federal regulatory agencies. Regulatory personnel and/or their agent shall have complete access to the site to observe the work in progress and/or conduct testing they deem appropriate. The Contractor shall be responsible for providing protective

clothing and safety instructions for all visitors. Visitors shall be required to check in at the construction office with the project superintendent prior to site access. The Contractor shall maintain a log which he records the time, date, individual's name and reason for visit. The Contractor shall not be responsible for costs associated with any additional testing desired by the regulatory agencies that would not otherwise be required. The Contractor may, at the direction of the Engineer, be required to perform or assist in the additional tests.

A.07 ENVIRONMENTAL REQUIREMENTS

The Contractor shall adhere to the following procedures for preventing water pollution within the Salt River Channel; environmental pollution through inappropriate storage of refuse, hazardous, or otherwise unsuitable materials; and environmental damage through needless or excessive disruption or destruction of existing vegetation and/or riparian habitat.

A. No material of either a hazardous nature, or excavated or obtained from a landfill or other dump site may be stored, stockpiled or placed in the floodway of the Salt River, or stored in such a manner that it could reasonably be expected to enter the floodway of the Salt River.

B. No roadway material such as asphalt, contaminated dirt (by oil, grease, landfill materials, or other objectionable/deleterious substances), and concrete rubble, etc. may be stockpiled in the floodway such that it may be washed away by high flows whether due to upstream releases of water, storm-water runoff, or water from any other source.

C. No construction equipment shall be used or parked within or adjacent to the floodway which leaks gas, diesel fuel, oil or any substance capable of polluting the environment as defined by the Arizona Department of Environmental Quality. Pollution from the operation of equipment in the construction area shall be removed from and properly disposed out of the 100-year floodplain. Spills shall be cleaned up and properly disposed of. In no case shall there be an exceedance of the limits of the State Water Quality Standards, Title 18, Chapter 11, Articles 1 and 2.

D. The Contractor shall take precautions such that no free cement or fly ash pollutes the channel, or is washed downstream during subsequent flows.

E. The Contractor may be required to use the Salt River channel bed for hauling the excavated existing landfill cover soil from Cell A-1 to Cell A. The existing landfill cover of Cell A-1 is scheduled to be removed in order to provide the needed volume for the relocation of the existing landfill refuse around and under the proposed soil cement banks. The Contractor shall make all reasonable efforts to avoid disturbing or damaging existing vegetation or riparian habitat within the Salt River channel. The Contractor's activities in the channel of the Salt River are confined to the limits of construction, approved haulage routes, and approved borrow areas. Practices to avoid damage to floodplain ecosystems, including riparian zones, should be considered during project construction and operation consistent with the Final Report and Recommendations of the Governor's Riparian Habitat Task Force of October, 1990 and Executive Order 84-16.

F. The Contractor shall not use Public Roadways or Roadway Rights-of-Way to transport materials classified as Special Materials, hazardous, suspicious or otherwise regulated materials encountered during excavation operations without the approval of the Engineer.

G. The Contractor shall comply with the conditions of the approved Materials Handling and Disposal Plan.

H. No disposal of construction or demolition wastes, wastewater, contaminated water, or any other pollutant is authorized except as expressly provided in the U.S. Army Corps of Engineers 404 Permit.

I. The water quality of any water discharged into the channel of the Salt River shall comply with the requirements of Sections A.08 and A.20 of the Special Provisions, Groundwater and Surfacewater Discharge Requirements and Handling Plan.

J. Contractor activities within the existing and proposed 100-year floodplain of the Salt River shall be planned and executed in a manner that will protect the channel from pollution by hazardous, toxic, or other polluting substances, including fuels, oils, cement, fly ash, calcium chloride, and bitumens.

K. Any oil, gas, fuel, hydraulic fluid, or other flammable, toxic, or hazardous material spilled within the project limits, or resulting from project activities, shall be promptly removed and disposed of. The Contractor shall fence, secure, and properly sign, flammable and hazardous materials at a location outside of the 100-year floodplain of the Salt River.

A.08 GROUNDWATER AND SURFACEWATER DISCHARGE REQUIREMENTS

It is anticipated that storm, surface and ground or other waters will be encountered at various times and locations during the work herein contemplated. The Contractor, by submitting a bid, acknowledges that he has investigated the risk from such waters and has prepared his bid accordingly, and Contractor by submitting a bid assume all of said risk. The Contractor may be required to provide temporary protection measures/devices to protect his work from surfacewater prior to its acceptance by the City.

It shall be the Contractor's responsibility to make provisions for the removal of groundwater through dewatering operations and to control or divert surfacewater flow during the course of construction. The Contractor shall perform these activities under the conditions of all required permits and will be required to assure compliance with surfacewater quality standards. These requirements include the following:

A. Runoff and seepage from roadways, embankments, and other alterations of the natural environment should not cause a violation of Arizona Surface Water Quality Standards A.A.C. Title 18, Chapter 11.

B. Water for dust suppression, if used, should not contain contaminants that could violate surface water or aquifer standards. Any water used for dust suppression which is allowed to run off into the channel of the Salt River shall meet all applicable surfacewater standards.

C. If groundwater is encountered during excavation, the following procedures will be employed:

1) A water sample will be obtained from each excavation in which water occurs.

2) Water samples will be taken using EPA sample protocol including chain of custody.

3) Samples will be tested by a State certified laboratory.

4) One copy of sample test results will be sent to ADEQ, Point Source and Monitoring Unit, another to the Engineer, and the Contractor shall retain another in his records.

5) Until sample results are received and evaluated by ADEQ, the assumption will be made that the water is contaminated and does not meet Arizona Water Quality Standards.

6) Water, except surfacewater, determined by sampling and testing to contain toxic or hazardous substances exceeding limits found in A.A.C. R18 11-205 and R18-11-Appendix B, shall be treated as a hazardous material and either treated to acceptable limits prior to discharge into the Salt River, or otherwise disposed of properly.

As specified in Special Provisions A.19, the Contractor shall prepare a Groundwater and Surfacewater Handling Plan to be submitted to the City during the preconstruction meeting for approval.

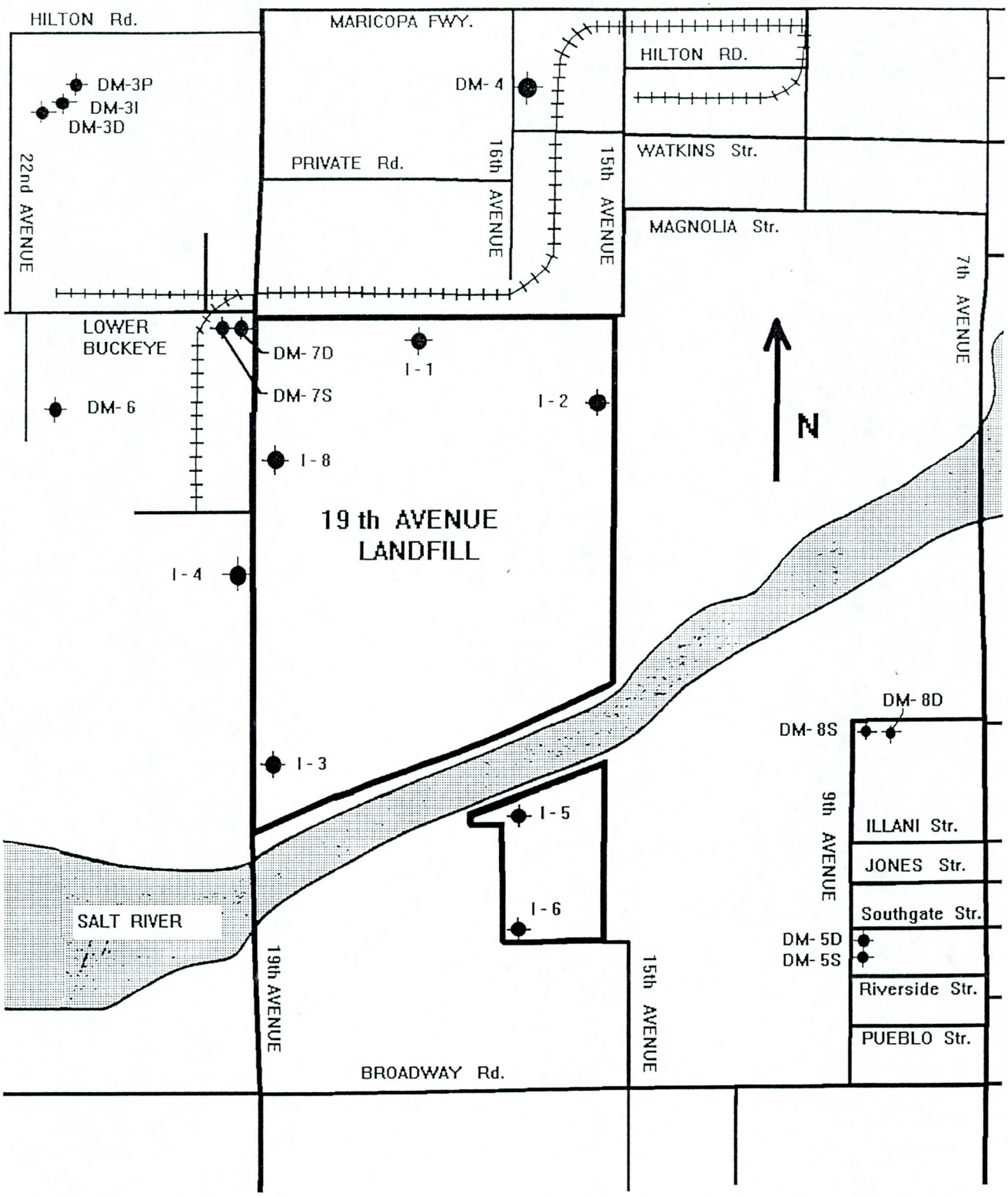
There are several groundwater monitoring wells operated by the City of Phoenix in and adjacent to the 19th Avenue Landfill. The following figure shows the approximate location of these wells. Groundwater elevations found at these wells for the period of June 1990 to July 1994 are summarized in the following table for information only. These groundwater elevations are made available for the convenience of the bidder or Contractor. It is expressly understood and agreed that the Owner assumes no responsibility whatsoever in respect to the sufficiency or accuracy of the measurements thus made, or the records thereof, and there is no warranty or guarantee, either expresses or implied, that the conditions indicated by such measurements or records thereof are representative of those existing throughout such areas, or any part, or that unforeseen developments may not occur.

A.09 SUBSURFACE INFORMATION DISCLOSURE

The indicated location, depth, extent and characteristics of waste, refuse, buried debris and other similar material within the project area is based on existing records, tests, borings, and observations. While the information regarding this buried or concealed material has been provided in good faith, it may not completely describe the extent or characteristics of the material encountered during excavation operations. The Contractor is advised that potentially hazardous waste material may be encountered while excavating solid waste, and removing incidental liquids from Cells A and A-1. These cells were in use prior to existing hazardous waste regulations, and the nature and amount of hazardous material, if any, disposed in Cells A and A-1 is unknown. Initial sampling indicates the presence of minimal amounts of such materials. However, solid waste excavation may uncover additional materials.

A.10 EXISTING UTILITIES

The location of existing or suspected utilities and subsurface features has been provided using the best available information. This does not, however, guarantee either the completeness or the accuracy of the information. It shall be the Contractor's responsibility to verify all utility locations by contacting BLUE STAKE at 263-1100 at least 48 hours prior to commencing excavation activities. Failure to notify BLUE STAKE in a timely manner, or to comply with provided utility locates will result in the Contractor assuming full and complete liability for any damage caused.


HILTON Rd.
MARICOPA FWY.
HILTON RD.
DM-3P
DM-3I
DM-3D
DM- 4
22nd AVENUE
PRIVATE Rd.
16th AVENUE
15th AVENUE
WATKINS Str.
MAGNOLIA Str.
7th AVENUE
LOWER BUCKEYE
DM- 7D
DM- 7S
I - 1
DM- 6
I - 2
N
I - 8
19 th AVENUE LANDFILL
I - 4
DM- 8D
DM- 8S
I - 3
I - 5
9th AVENUE
ILLANI Str.
JONES Str.
Southgate Str.
SALT RIVER
I - 6
DM- 5D
DM- 5S
19th AVENUE
15th AVENUE
Riverside Str.
PUEBLO Str.
BROADWAY Rd.

CITY OF PHOENIX: 19th AVE. LANDFILL
Groundwater Elevations in feet above mean sea level

DATE	I - 1	I - 2	I - 3	I - 4	I - 5	I - 6	I - 8	DM - 4	DM - 5S	DM - 6	DM - 7S	DM - 8S
06/08/90	990.15	999.46	995.30	990.95	1003.95	1004.55	988.97	986.65	1008.52	982.70		
06/19/90										981.03		
06/21/90								984.92				
06/22/90				990.16					1063.62			
06/25/90			994.81		1003.46							
06/26/90		996.89				1003.75						
07/19/90	986.30											
07/23/90							985.00					
05/15/91	996.58	1005.75	1004.57	1000.18	1012.14	1010.65	996.12	993.08	1012.98	989.81		
05/24/91								992.30		998.47		
05/25/91		1004.87										
05/28/91												
05/29/91									1012.42			
05/30/91				996.54	1011.27		994.30					
05/31/91	994.76					1009.93						
06/03/91			1001.71									
12/02/91								996.37				
12/03/91				998.79	1007.06		997.70					
12/04/91	998.38	1004.24	1001.20	998.79	1006.97	1006.55	997.81	996.42	1009.57	994.61		
12/05/91										994.63		
12/06/91			1001.16									
12/09/91		1004.31							1010.34			
12/10/91												
12/11/91	998.23					1006.45						
02/10/92	1008.85	1014.73	1013.73	1010.49	1019.18	1015.26	1009.12	1005.43	1016.39	1000.72		
02/14/92												
02/18/92												
02/19/92			1016.13	1012.75				1007.31				
02/20/92	1011.28	1018.06					1011.62					
02/21/92					1021.62	1017.40			1018.00	1007.56		
02/24/92												
05/04/92	1008.61	1018.97	1014.77	1010.78	1019.15	1016.77	1008.71	1003.49	1019.17	1001.95		

S.P. A8

CITY OF PHOENIX: 19th AVE. LANDFILL

Groundwater Elevations in feet above mean sea level

DATE	I - 1	I - 2	I - 3	I - 4	I - 5	I - 6	I - 8	DM - 4	DM - 5S	DM - 6	DM - 7S	DM - 8S
05/05/92												
05/06/92												
05/07/92										1002.17		
05/08/92			1013.82	1005.67								
05/11/92	1009.79	1018.94						1005.14				
05/12/92							1010.75		1019.04			
05/13/92					1019.90	1017.45						
07/27/92	1001.51	1011.43	1011.93	1005.87	1018.13	1015.79	1001.91	997.22	1018.11	995.29		
07/29/92									1017.99			
07/30/92					1017.80	1015.63						
07/31/92			1011.50	1005.31								
08/03/92		1010.26					1009.52					
08/04/92	1001.03											
08/05/92												
08/06/92								996.02				
08/07/92										994.63		
10/13/92	1010.05	1015.48	1013.78	1010.91	1018.33	1016.21	1009.70	1007.83	1018.32	1006.90	1007.24	1018.73
10/14/92									1018.26			1018.72
10/15/92					1019.50	1019.03						
10/16/92			1013.86	1010.95			1009.77					
10/19/92								1008.35			1007.61	
10/20/92										1006.93		
10/21/92												
10/22/92	1010.38	1015.88										
01/15/93	1018.73	1025.38	1025.17	1020.94	1028.29	1023.69	1019.26	1015.61	1024.32	1017.80	1019.47	1025.45
01/19/93			1026.21									
01/20/93									1024.32			
01/21/93					1029.62	1025.30				1020.46		
01/22/93		1027.44					1021.26					
01/25/93												
01/26/93											1019.47	
04/16/93	1016.69	1024.32	1018.19	1016.24	1021.87	1019.35	1014.98	1013.50	1021.57	1009.71	1010.67	1024.53

CITY OF PHOENIX: 19th AVE. LANDFILL

Groundwater Elevations in feet above mean sea level

DATE	I - 1	I - 2	I - 3	I - 4	I - 5	I - 6	I - 8	DM - 4	DM - 5S	DM - 6	DM - 7S	DM - 8S
04/19/93					1020.76	1018.70						
04/20/93			1017.24	1015.89								
04/21/93								1011.53			1007.55	
04/23/93										1007.04		1023.57
04/26/93	1012.87						1011.99					
04/27/93		1021.75										
04/28/93												
04/29/93									1020.75			
07/16/93	1003.39	1012.80	1011.10	1005.99	1018.35	1015.91	1003.03	999.89	1018.25	993.84	997.47	1018.97
07/19/93								999.58		996.54		
07/20/93						1015.26						1018.42
07/21/93			1010.71	1005.51							997.00	
07/22/93												
07/23/93							1002.26					
07/24/93												
07/25/93					1015.82							
07/26/93	1002.27	1011.45										
07/27/93									1015.82			
10/21/93	1009.25	1014.70	1012.51	1009.89	1020.60	1015.10	1008.89	1008.20	1017.04	1006.13	1006.71	1017.92
10/22/93												1064.45
10/25/93									1017.14			
10/26/93			1012.96	1010.44								
10/27/93					1017.48	1015.53						
10/28/93							1009.55	1009.29				
10/29/93	1011.62	1015.48										
11/01/93												
11/02/93												
11/03/93										1003.47		
11/04/93											1008.19	
01/24/94	1013.22	1017.30	1013.36	1012.32	1016.30	1014.07	1011.97	1013.50	1014.82	1010.31	1010.96	1016.48
01/25/94												
01/26/94				1012.19								1016.33

CITY OF PHOENIX: 19th AVE. LANDFILL

Groundwater Elevations in feet above mean sea level

DATE	I - 1	I - 2	I - 3	I - 4	I - 5	I - 6	I - 8	DM - 4	DM - 5S	DM - 6	DM - 7S	DM - 8S
01/27/94							1011.92	1013.50		1010.34		
01/28/94	1013.12	1017.15							1014.13			
01/31/94					1015.63	1013.26					1011.04	
02/01/94												
02/02/94			1013.46									
04/04/94	1005.89	1013.85	1011.55	1007.63	1017.05	1015.11	1005.32	1003.71	1016.57	999.99	1000.66	1017.46
04/05/94								1003.40				
04/06/94	1005.31	1013.42					1004.93			999.48		
04/07/94				1006.79					1015.57		999.94	
04/08/94					1016.36	1014.11						
04/12/94			1009.94									1015.58
07/01/94	997.32	1006.50	1005.53	1000.16	1017.50	1013.28	996.95	993.66	1014.97	991.13	990.57	1014.36
07/12/94	996.41								1014.43			1013.29
07/13/94		1005.76	1005.19	999.61	1014.65	1012.79	996.01					
07/14/94								992.53			989.33	
07/18/94										989.75		
07/19/94												

A.11 HEALTH AND SAFETY REQUIREMENTS

The Contractor shall comply with Subsection 107.5 of the Standard Specifications regarding worker safety. The Contractor shall submit evidences showing that he or his Superintendent has completed the 40-hour OSHA Health and Safety Training Course prior to beginning work. In addition, the Contractor shall hire a qualified Industrial Safety Consultant (firm or individual) to instruct the Contractor on special on-site safety measures associated with the nature of the site and the potential for handling hazardous materials.

The Industrial Safety Consultant (ISC) shall select protective clothing, instruct personnel in the proper use of required safety equipment, and develop a site safety plan which is described in Section A.22 of these Special Provisions. The ISC shall be responsible for overall coordination of safety matters on the job site and be on-site during all refuse excavation and relocation operations. The ISC shall provide proper training and safety instruction to all workers who will handle or potentially be exposed to hazardous wastes. Safety procedures shall be consistent with current published regulations of OSHA, the Arizona Industrial Commission, the Arizona Department of Health Services, and the United States Environmental Protection Agency.

The Contractor shall submit the name and qualifications of the Industrial safety Consultant one week after bid opening and shall secure the City's approval of said consultant prior to beginning work. A list of individuals or firms that may be qualified to act as the Industrial Safety Consultant is available at the office of the City Engineer.

The ISC shall be a qualified individual with demonstrated practical experience on similar projects. For example, the ISC can be either an industrial hygienist who specializes in safety, waste disposal and toxicology; a toxicologist; an engineer or a similarly qualified individual.

The ISC shall be responsible for sampling of suspect hazardous materials as described in Section A.21 of these Special Provisions. The ISC shall not be responsible for daily verification sampling. This shall be the responsibility of the Engineer.

A temporary construction fence shall be installed and maintained along the entire perimeter of the construction site to prevent unauthorized entries. In addition, smoking should not be allowed at the construction site nor at field offices.

A.12 ODOR AND VECTOR CONTROL

Odor and vector control shall be achieved by minimizing the size of the exposed face of landfill materials and by covering the exposed face at the end of each work day with an approved physical and/or chemical cover. At a minimum, the Contractor shall provide a 6" of daily cover and a 12" intermediate cover, or as directed by the Engineer. The size of the exposed face shall be limited to an area equal to the amount of cover material readily available on-site. All covers used shall be as recommended by the manufacturer to prevent the release of odors and gases and shall be approved by the Engineer. In addition, application of lime per manufacturer's recommendation may be required.

A.13 DUST CONTROL

The Contractor shall comply with Subsection 104.1.3 of the Standard Specifications regarding dust control. The Contractor shall furnish all labor, equipment, and means required to carry out effective measures wherever and as often as necessary to prevent his operations from producing dust in amounts damaging to property, cultivated vegetation and domestic animals, or which would cause a nuisance to persons living or occupying buildings in the vicinity, or which would obstruct visibility on any public roadways or private parking areas or access ways.

A maximum allowable 24-hour particulate count of 1.6 mg/m^3 shall be maintained at the perimeter of the work area during the contract. Local regulatory requirements may be more stringent than the maximum allowable stated above. The Contractor is responsible to identify and comply with all applicable regulatory levels. The Industrial Safety Consultant is required to report the results of the dust monitoring program to the Engineer. The Contractor shall be responsible for any damage resulting from any dust originating from activities on or around the landfill sites. Dust abatement measures shall be continued until the Contractor is relieved of further responsibility by the Engineer. The Contractor shall take the following measures, at a minimum, to control and prevent a dust problem:

1. Roadways on and around the site shall be treated, as required, with dust suppressants approved by the Engineer.

2. Minimize the excavation of dust producing materials and waste on windy days.

3. Plan temporary access roads so travel on unpaved roads is minimized.

The Engineer may direct the Contractor to increase dust control activities or relocate excavation operations until the dust is abated.

A complete dust control plan shall be submitted for the Engineer's approval as specified in Section A.17 of the Special Provisions, at the preconstruction conference, for approval. The plan shall include a description of equipment required, manpower and methods for dust monitoring and control. Any chemical additives used must be approved by the Engineer. The Contractor shall also address a method to keep public thoroughfares free of mud, dust and debris at all times.

Both the Office of Air Quality Management with the Arizona Department of Health Services and the Maricopa County Bureau of Air pollution Control shall be notified by the Contractor prior to submitting the Contractor's Work Plan to the City. Any specific requirements related to air quality monitoring shall be incorporated into the Contractor's Work Plan. The Contractor shall be responsible for obtaining any necessary permits.

A.14 LITTER CONTROL

The Contractor shall be responsible for litter control on the site. This includes Cell A-1, Cell A and the Salt River. Litter fences shall be used to reduce blowing litter from leaving the site. A temporary fence shall be placed across the Salt River downstream of the haul road to prevent floatable debris from moving downstream in the event a truck spills part of its load or overturns. Should a truck spill part of its load or overturn, the Contractor shall immediately pick up and dispose of the spilled materials. Should the Engineer determine that high winds are a problem, the Contractor shall take the appropriate steps to reduce blowing litter (e.g., tarp cover on loads, cover refill and excavation area with tarps or soil). Some

litter will likely occur even when litter control procedures are followed. This litter must be collected as noted below:

1. Litter shall be removed from along litter fences at least once each day. The Engineer may require that fences be cleaned several times during the day, particularly on windy days when large quantities of litter accumulate.

2. Litter occurring along on-site roads shall not be permitted to accumulate and shall be cleaned up several times each week depending upon the amount of litter present.

3. The site entrance and exit roads shall be inspected by the Engineer at least once per day. The roads shall be kept clear of litter, by the Contractor to the satisfaction of the Engineer.

A.15 NOISE CONTROL

All work performed in conjunction with the project shall comply with the City Noise Regulations. The Engineer may request that the Contractor revise his procedures or hours of work to comply with regulations.

A.16 CONSTRUCTION SCHEDULE

The contract time limit allotted for this contract is Three Hundreds and Sixty Five (365) calendar days. The Contractor's attention is directed to the rules, regulations, requirements, and stipulations contained in the Consent Decree between the State of Arizona and the City of Phoenix. The Contractor will be liable for any penalties and/or fines resulting from his non compliance/performance of any rules, regulations, requirements, and stipulations related to construction activities.

The Contractor shall provide a graphic construction schedule indicating the various subdivisions of the work and the dates of commencing and finishing each task. The schedule shall show the time allowed for testing and for other procedures which must be completed prior to the work being put into operation. The schedule will take into account the time of completion given in Section .10 of the Information for Bidders.

At the pre-Construction Conference, the Contractor shall submit the construction schedule. The submittal shall consist of a reproducible original and four copies.

Within 7 calendar days after receipt of the submittal, the Engineer shall review the submitted schedule and return one copy of the marked up original to the Contractor. If the Engineer finds that the submitted schedule does not comply with specified requirements, the corrective revisions will be noted on the submittal copy returned to the Contractor.

Revisions to the accepted construction schedule may be made only with the written approval of the Contractor and City.

Project status review and update shall be provided each month as specified in Section .13 of the Supplementary Conditions.

A.17 CONTRACTOR'S WORK PLAN

The Contractor shall prepare and submit a work plan to the Engineer during the Pre-construction meeting. This plan will detail proposed construction and excavation sequencing including proposed dust, odor, litter, noise control elements. The plan shall include, at the least, the following:

1) Details of pre-excavation procedures which shall consist of the timing of submittals of required plans, details, specification and designs for review, construction or location of all facilities required in the specifications, erection of site fencing, and details of proposed site security.

2) The sequence of excavation activities.

3) A description of a system for monitoring and surveillance of excavation activities to provide appropriate administrative, technical and procedural mechanisms for classification of excavated materials and for action if suspicious materials and/or hazardous materials are encountered.

4) A detailing of methods to excavate all materials while maintaining safe excavation areas which shall include a design for a supporting system, i.e. piling, shoring, etc., if required.

5) Equipment descriptions, comprising the size, type, make and model number of all equipment that will be used. This includes all rental equipment.

6) A description of procedures to be employed near property boundaries, buildings and fences.

7) A complete detailing of the load-slip tracking system that will be used.

8) A detailed listing of all permits that the Contractor will need to obtain.

9) A comprehensive plan for dust control with mention of methods of suppression and description of procedures and make and model numbers of equipment for monitoring of dust levels in compliance with Section A.13 of the Special Provisions.

10) Methods of odor control, including description of the physical or chemical cover that shall be placed during non-working hours if required by the Engineer as specified in Section A.12 of the Special Provisions. Proposal for artificial covers shall include manufacturers specifications and recommendations for application as per the Special Provisions.

11) Final grading and clean-up with mention of removal of stock piles, temporary fencing, other facilities and litter.

12) A discussion of abandonment of water wells, citing methods for compliance with Arizona Department of Water Resources Administrative Rules and Regulations Title 12, Chapter 15, Article 8, R12-15-816.

13) Method of disposal for tires to comply with Section A.21 of the Special Provisions.

14) Details of litter control procedures to comply with Section A.14 of the Special Provisions.

Clearing, grubbing, and excavation shall not begin until the Contractor's Work Plan has been approved by the Engineer.

A.18 HAUL PLAN

The Contractor shall prepare a haul plan which will be presented during the pre-construction meeting. This plan is subject to the approval of the Engineer. The plan shall address the following haulage requirements:

1) Structural Excavation
2) Cement and Fly Ash
3) Aggregate for Soil Cement
4) Borrow (if required)
5) Imported Borrow (if required)
6) Soil Cement
7) Hazardous Waste
8) Special Materials
9) Other Waste/Debris

The Contractor's haul plan shall minimize the use of Public roadways.

All roads on the construction site, including haul roads shall be constructed and maintained without cost to the City, to widths suitable for safe operation of vehicles in two directions and at speeds proposed by the Contractor and approved by the Engineer. All curves shall have open-sight line and as great a radius as practical. Maximum allowable grades shall be 12 percent, except where approval from the Engineer is obtained to exceed this limit for specific operations. No vehicle or mechanized equipment shall be moved upon any haul road, access way, or grade unless the roadway and grade are constructed to safely accommodate the movement of the vehicle and equipment involved.

The design of all haul roads shall be submitted for approval by the Engineer at the Pre-Construction meeting.

All roadways, including haul roads, shall be routinely maintained in safe condition including the elimination or control of debris, ruts, dust and similar hazards.

If transportation of excavated materials via City streets is required, the Contractor shall submit an amended haul plan to the Engineer for review and approval and obtain a Haul Permit as specified in Section .09 of the Supplementary Conditions. The plan must be approved prior to hauling any excavated waste from the site.

The Contractor shall take necessary measures to prevent spillage on City streets. In addition to minimizing the use of public streets, these measures shall include, at least the following:

A. Make provisions on site to remove excess material from haul trucks prior to their entry onto the City streets system.

B. Provide a pick-up type street sweeper capable of suppressing dust and sweep streets in the vicinity of the project a minimum of once after each shift for such distances as tracking and/or spillage occurs as a result of hauling activities.

C. Provide such additional sweeping as may be required in the opinion of the Engineer to maintain the streets in an adequately dust-free condition.

D. Provide continuous supervision of the haul routes so that spillage can be cleaned up immediately and be responsible for all spillage and clean any storm drains plugged as a result of spillage.

Failure to comply with these requirements shall be cause for shutdown of the project until satisfactory compliance is obtained. Any time lost will not be considered for an extension of Contract Time.

The Contractor shall develop and prepare a contingency plan for cement and fly ash spills. This plan shall include measures to prevent such spillage, as well as cleanup measures if spills occur. Any cement, fly ash, or soil cement spilled within the 100-year floodplain, or spilled in a location where it could subsequently enter the Salt River shall be promptly removed and properly disposed. The contingency plan shall be reviewed and approved by the Engineer prior to the beginning of construction activities.

Should the Contractor fail to meet the construction schedule due to an inability to utilize the channel of the Salt River for a haul route due to high flows, he may submit an alternative haul plan utilizing City streets. The unit cost of Cover Materials Handling shall be adjusted in accordance with Section 109.4.2 if it is determined that the Contractor was unable to meet his schedule through no fault of his own. The Contractor may request an alternative haul plan using City streets if, through his own deficiencies, he is unable to meet his schedule although he will be due no adjustment in unit prices.

A.19 STORM WATER POLLUTION PREVENTION PLAN

The Contractor shall prepare a Storm Water Pollution Prevention Plan (SWPPP), subject to approval by the Engineer, and submit it during the Preconstruction conference. The SWPPP shall comply with all applicable regulations and rules of a National Pollutant Discharge Elimination System (NPDES) permit. The Contractor shall retain at the construction site, and implement a SWPPP per NPDES requirements.

This plan shall describe the measures to be taken by the Contractor to avoid polluting the Salt River and to prevent the unauthorized release of solid or liquid materials into the 100-year floodplain of the Salt River. A detailed description of work scope and requirements is presented in Section B01807 of the Special Provisions.

A.20 GROUNDWATER AND SURFACEWATER HANDLING PLAN

The Contractor shall prepare a Groundwater and Surfacewater Handling Plan consistent with Section A.08 of the Special Provisions, subject to the approval of the Engineer and submit it during the Pre-Construction meeting. This plan shall include the Contractor's provisions for sampling, storing, treating, or otherwise assuring that all waters discharged into the Salt River will meet relevant quality standards and all work is protected from flows in the Salt River.

PAYMENT FOR DELAY DUE TO FLOWS IN THE SALT RIVER.

Due to construction activities and periodic releases occurring at upstream impoundments, there can be no assurance that significant flow within the Salt River will not occur during the course of construction activities. Additionally, water released from the dewatering process of the upstream mining operation and storm water runoff may occur which will prevent the continuation of certain construction activities for some unspecified period of time.

A. EXTENSION OF CONTRACT

The contractor shall notify the Engineer in writing if flow in the Salt River is such that his construction activities are delayed. In the case that it appears that there will be substantial flows for a significant time, the Engineer may request that the Contractor revise his work plan accordingly. The contractor shall resume construction activities as soon as it is practicable to do so. The Contractor shall be entitled to an extension of his contract equal to the time he was unable to work due to flows in the Salt River. If the owner, or Engineer determines that construction activities may be safely and practicably resumed prior to notification by the contractor, then the Contractor will be so notified and the date of this notification shall conclude the time of contract extension.

B. PAYMENT FOR DELAY

The Contractor is not entitled to any payment for delay due to flows in the Salt River regardless of source except as specified in Section A.18 of the Special Provisions. The Contractor is not entitled to payment for any work, materials, or equipment damaged or lost due to flows in the Salt River. The Contractor shall be responsible for removing all damaged materials from the Salt River. The City will not consider claims for damage to or loss of materials or equipment caused by river flows of any magnitude from any source. The Contractor has complete responsibility for the project, and any damage due to flooding and storms during the course of construction shall be borne solely by the Contractor.

The Contractor should plan his excavation and refuse relocation operation assuming all excavated solid waste from Cells A and A-1, will be hauled to the respective cells for disposal. Hauling of the excavated solid wastes across the Salt River channel bed is prohibited unless otherwise authorized in writing by the Engineer. Flow in the channel is unpredictable. It shall be the Contractor's responsibility to accommodate minor river flows into his work plan. Large flows of long duration shall be the basis for time extension of the contract or modifications of the hauling plan to allow travel on City streets as indicated in Section A.18 of the Special Provisions. The appropriate action will be determined by the Engineer.

Should it become necessary to transport excavated cover materials from Cell A-1 to the designated site in Cell A via Broadway, 19th Avenue, 15th Avenue or the Freeway access road (Durango) because of sustained high river flows, the Contractor shall comply with Section A.18 of these Special Provisions, and submit a revised haul plan.

The Contractor shall conduct his operations so that the hydraulic capacity of the river channel at all times will be no less than its capacity at the time work begins on the project.

The Contractor shall maintain daily contact with Salt River Project to identify water releases which may impact his work. The Salt River Project can be reached at:

River Flow Recording	602-236-5929
Administration & General Office	602-236-5900

A.21 MATERIALS HANDLING AND DISPOSAL PLAN

GENERAL:

The proposed bank protection alignment crosses through an area designated as an EPA superfund cleanup site. A portion of the existing landfill refuse will have to be removed by the Contractor and relocated into the existing landfill Cells A and A-1 from their respective cells and subsequently covered with compacted fill material as specified in Section B01211.

The Contractor will not be permitted to utilize Public roadways, or roadway rights-of-way to transport the excavated existing landfill cover materials and/or special materials encountered during construction unless authorized in writing by the Engineer. The purpose of the Materials Handling and Disposal Plan is to assure the safe removal, handling, and disposal of any landfill refuse, suspicious, hazardous or special materials that may be encountered.

Any materials encountered which are defined as being hazardous substances—hazardous substances is given the meaning provided for that term in Section 101 (14) of CERCLA, 42 U.S.C. § 960 (14); pollutant or contaminant is given the meaning provided for that term in Section 101 (33) CERCLA, 42 U.S.C.—or by reason of extreme toxicity, radioactivity, volatility, or similar reason are unsuitable for disposal within Cells A and A-1, will be handled, and disposed of as specified in Section B01804 of the Special Provisions.

Special Materials shall be disposed of in the designated refuse relocation site(s) within Cells A and A-1, or as directed by the Engineer. Payment for the excavation, hauling, and disposal of this material is on a cubic yard basis as specified in Sections B01803 and B01804 of the Special Provisions.

The newly generated debris from clear and grubbing operation and all other construction activities will have to be removed from the project site and disposed of at appropriated active landfill or dump sites arranged by the Contractor. Upon request, the Contractor shall submit the written consent of the owner of the property upon which he intends to dispose of such material.

Routine Materials unsuitable for incorporation into the project shall be disposed of as follows:

1. If the currently operating City Landfills are used, the Contractor shall pay the normal dumping fee.

2. If private property within the City limits is used, the Contractor shall obtain written permission from the property owner and deliver a copy of this agreement to the Engineer prior to any hauling or dumping. All disposal and grading shall be in strict conformance with City of Phoenix Grading and Drainage Ordinance. The Contractor shall obtain and pay for the necessary permit(s).

3. If the surplus material is disposed of outside the City limits, the Contractor shall comply with all applicable laws/ordinances of the agency concerned and be responsible for all cost incurred.

The Contractor is solely responsible for all costs and permits associated with routine material disposal.

DESCRIPTION:

Routine Materials requiring disposal are classified as follows:

1. Construction Debris - Rubbish. Materials which can be attributed to routine construction, demolition, or maintenance activities, exclusive of vehicle maintenance, will be considered construction debris. Construction debris can be further classified as rubbish and inert construction debris.

   A. Rubbish is the organic fraction of ordinary construction debris which may include wood reels, boards, landscape rubble, grass clippings, yard trimmings, palm fronds, tree trunks, logs, and material dredged from canals. Any such material contained within municipal solid waste shall be classified as such.

      Rubbish shall be transported to the designated disposal site within Cells A and A-1, as shown on the plans or as directed by the Engineer.

   B. Inert construction debris may include bricks, Portland cement concrete rubble, metal, and glass shards. Inert construction debris which cannot be efficiently separated from rubbish during excavation will be treated as rubbish.

      Existing inert construction debris found at landfill may be placed on-site in engineered fills in compliance with the Standard Specifications as modified herein. The Contractor shall anticipate the need to process and/or blend this construction debris with suitable material to produce a uniform fill material prior to placement in engineered fills. The resulting fill material shall contain less than 25% of pieces larger than 6 inches in greatest dimension. Newly generated construction debris from Contractor's activities is not allowed to be landfilled at 19th Avenue landfill. The Contractor will be required to remove new construction debris as stipulated in these Special Provisions.

2. Rock/Soil Fill. Rock/soil fill is inert rock and soil fill that has been deposited in former gravel pits or on natural surfaces by man or through deposition during flood events. To be classified as rock/soil fill, excavated materials must be essentially free of inert construction debris, rubbish, trash, or other materials deleterious for its use as embankment fill as defined in the Standard Provisions. Rock/soil fill must not contain suspicious or hazardous materials, as defined herein.

   Rock/soil fill may be reused on-site in engineered fills in compliance with Standard Specifications as modified herein. The Contractor shall anticipate the need to process and/or blend rock/soil fill material with suitable material prior to placement in engineered fills. If the characteristics of the Rock/Soil Fill are such that they are unsuitable for use in engineered fills, the Contractor may treat such material as rubbish subject to the approval of the Engineer.

3. Burned glass ash. During the construction of storm drains on 15th Avenue, the Contractor shall excavate and remove the existing burned glass ash stockpile located along the easterly edge of the 15th Avenue. The excavated burned glass ash shall be disposed of at the designated refuse disposal site in Cell A, or as directed by the Engineer.

4. Tires. All tires encountered during the construction shall be disposed of at the designated refuse disposal site in Cells A and A-1. All disposed tires shall not be placed within 2 feet of the subbase soil of the landfill cover (see Section B01211 for landfill cover definition).

Anticipated Special Materials include the following:

1. Municipal Solid Waste (MSW). MSW includes household, commercial and other waste comprised of trash, clothing, plastic, paper, glass, animals and animal remains, and wastes resulting from the processing, handling, preparation, cooking, and serving of food or food materials. MSW may contain hazardous wastes as defined herein, but separation of this fraction prior to disposal will be required.

   MSW shall be transported to the designated disposal site within Cells A and A-1, as shown on the project plans or as instructed by the Engineer.

2. Other Special Materials are materials that have been contaminated by the spillage of petroleum fuels, oils or greases to levels above the ADEQ cleanup level of 100 milligrams per kilogram (mg/kg) total petroleum hydrocarbons (TPH) or materials that contain greater than 1 percent asbestos as determined using polarized light microscopy. Special materials are not hazardous, but are regulated, and landfill disposal is restricted to the designated disposal site within Cells A and A-1, as shown on the plans, or if specifically directed by the Engineer, to other facilities that have made special arrangements with ADEQ.

Suspicious Materials include materials of unknown or uncertain hazard which may be encountered during excavation. Through identification and separation they may be further classified as hazardous, special or routine. Suspicious materials which may be encountered include, but are not limited to:

a. Casting sands and foundry slag
b. Transformers
c. Containers: tubs and drums
d. Stained sand
e. Batteries
f. Liquids stored in containers or drums
g. Medical and/or hospital wastes
h. Asbestos containing materials - non friable
i. Materials that cause abnormal readings in field environmental monitoring instruments.

Should suspicious materials be encountered, excavation and removal activities shall be suspended until it can be determined if the materials include Hazardous Materials and the Contractor may be required to implement Emergency Response Procedures, as outlined in the Health and Safety Plan and the Materials Handling Plan. All efforts will be made to allow the Contractor to continue excavation at other uncontaminated portions of the project. Identification of suspicious material shall be immediately communicated to the Industrial Safety Consultant and the Engineer. Excavation by the Contractor shall not resume until so directed by the Engineer.

6. Hazardous Materials. Hazardous materials consist of hazardous substances as defined in Section 101 (14) of CERCLA, 42 U.S.C. § 960 (14). Such material, if encountered, shall be communicated to the Engineer immediately.

Only specially trained, licensed, and supervised personnel shall handle, remove or dispose hazardous materials. These operations shall be carried out in accordance with all applicable local, State and Federal regulations. This work will either be performed by others or by the Contractor, if he is so qualified, on a time and materials basis. Disposal of such material shall be in a Hazardous materials landfill approved by the Engineer. Excavation by the Contractor shall not resume until so directed by the Engineer. If removal and disposal of hazardous materials is performed by others, the Contractor shall examine the area to assure himself of safe working conditions for his personnel.

CONTENT:

The Contractor shall prepare a Materials Handling and Disposal Plan and present it to the Engineer for approval at the Preconstruction meeting. Approval by the Engineer will be required prior to the initiation of construction activities. This Plan shall include the following, at a minimum:

Organizational Structure and Personnel Responsibilities
Proposed Suspicious Material Monitoring Procedures
Company Safety Procedures for Handling and Transporting Special/Hazardous Wastes
Hazardous Wastes Handling, Transport and Disposal Plan
Special Materials Handling, Transport and Disposal Plan
Routine Materials Handling Plan
Extended Investigations and Remedial Actions
Emergency Response Procedures
Proposed Waste Containment and Isolation Procedures
Designated Company Officer Responsible for the Administration of the Plan

The Plan shall incorporate all relevant elements of the Remedial Action Plan, and other available reports and studies that will be made available to the Contractor.

The Plan shall detail procedures to be taken to identify materials being excavated as either routine or suspicious. Safety precautions for handling suspicious materials, and identification, separation and isolation procedures for any hazardous fraction shall also be included.

APPLICATION:

All of the Contractor's employees, subcontractors and assigns working with, or potentially working with, suspicious, special, or hazardous wastes shall be provided with a copy of the Materials Handling and Disposal Plan, and will be required to be familiar with the requirements and responsibilities contained within that plan. The Contractor shall have at least one Industrial Safety Consultant (ISC) onsite at all times that clearing, grubbing, excavation, or excavation of suspicious materials is occurring or reasonably expected to occur. The ISC shall be in possession of a copy of the Materials Handling and Disposal Plan, and a copy will be kept with each set of Plans onsite. The Contractor shall notify the Engineer immediately if conditions become evident that are not adequately handled in the plan. In this case, or if the Engineer makes this determination without notification from the Contractor, the Engineer shall

decide how to proceed. Conditions contained in Section 109.8 of the Standard Specifications shall govern additional payment and contract extension from such a delay.

ENFORCEMENT:

The Engineer shall immediately stop work if the Contractor fails to properly handle suspicious, special or hazardous materials, or fails to abide by the conditions of this section of the Special Provisions or handles, transports or disposes of landfill refuse, suspicious or hazardous materials in an unsafe manner. In this case, the Contractor will not be due any monetary damages, or additional time to complete work in conformance with Section 104.2.5 and 109.4.5 of the Standard Specifications. Additionally, the Contractor will be liable for any fines, damage or injury resulting from his actions.

MATERIAL STORAGE:

Aggregate and other earthen materials that are displaced from their original location shall be stockpiled as follows to avoid or minimize water pollution from earthen material stockpiles during construction activities.

1) Stockpiles of excess materials shall be removed within 30 days of completion of material use.

2) Stockpiles of unprocessed materials shall be placed outside the 25-year floodplain of the Salt River, and not cause blockage of flow.

3) Stockpiles of processed materials with less than ten (10) percent of particles that are finer than 0.25 mm diameter (passing a No. 60 Sieve, on a dry weight basis) shall be placed outside the 50-year floodplain.

4) Stockpiles of processed materials containing ten (10) percent or more of particles that are finer than 0.25 mm diameter (passing a No. 60 sieve, on a dry weight basis) shall be placed outside the 100-year floodplain and stabilized to prevent subsequent runoff into the Salt River.

5) All other construction or aggregate residues should be removed from the 100-year floodplain and stabilized to prevent subsequent runoff into the Salt River.

A.22 HEALTH AND SAFETY PLAN

The Contractor shall prepare a site health and safety plan and submit it to the City for review no later than two weeks after the bid opening date and shall secure the City's approval of said plan prior to beginning waste excavation. The preparation of the site health and safety plan is a non-pay item.

The site health and safety plan must be developed for all phases of the operations (excavation, relocation, removal of hazardous wastes) and made available to all personnel. The plan must be written and posted on the job site at all times.

The purpose of the site health and safety plan is to establish requirements for protecting the health and safety of all on-site personnel and public. It should present, in a logical format, information about the work to be done and instructions for preparing for and responding to potential health and safety hazards.

The plan should include procedures for accommodating site visitors (e.g., check in procedures, protective clothing requirements, access restrictions, etc.). The site health and safety plan must also address emergency medical treatment of personnel, including possible exposures to toxic substances and injuries due to accidents or physical problems. The following items should be included as a minimum in the emergency care provisions:

1. The name, address, and telephone number of the nearest ambulance and medical treatment facility.

2. The ability of the facility to provide care and treatment of personnel exposed or suspected of being exposed to toxic (or otherwise hazardous) substances. If the facility lacks toxicological capability, arrangements should be made for consultant services.

Standard procedures shall be developed to ensure that important site inspections, equipment check lists and other safety activity are accomplished in an orderly manner. On each shift the Contractor shall designate a specially-trained employee to handle and relocate suspect hazardous materials to the temporary storage area. If the use of highly specialized equipment or containerization of the material becomes necessary, a fully permitted hazardous waste transportation and disposal firm shall be on call to containerize and remove the waste.

All personnel involved at the site must be familiar with the safety plan, or the parts that pertain to their specific activities. Daily safety meetings shall be held to keep all informed about site hazards, changes in operating plans, modifications of safety requirements and for exchanges of information. It is the responsibility of all personnel at the site, workers or visitors, to comply with the requirements in the plan. It is the responsibility of the Contractor to implement and enforce the provisions of the health and safety plan. The Contractor is responsible for the site safety of all persons, including visitors, on site.

The Contractor is referred to the Environmental Protection Agencies publication "Guidance on Remedial Investigations Under CERCLA", "EPA Standard Operating Guides and "OSHA Occupational Safety and Health Guidance Manual" as a guide in preparing the site safety plan. A copy of these publications is available for review in the City of Phoenix Engineering Department office. Contact Christopher Cornell (262-4953) to make arrangements to review these publications.

A.23 EARTHWORK QUANTITIES

Existing ground elevations within Cells A and A-1 shown on the plans, and used for the purposes of landfill earthwork volume calculations were computed from topographic maps produced by Brooks-Hersey, Inc. from aerial mapping flown by Kenny Aerial Mapping Inc. in January, 1991. Existing ground elevations in and adjacent to the Salt River channel shown on the plans, and used for the purpose of channel earthwork volume calculations were computed from topographic maps produced by Brooks-Hersey, Inc. from aerial mapping flown by Kenny Aerial Mapping Inc. in July, 1994. Due to natural occurrences, manmade activities, and other factors, the topography shown on the plans may not accurately represent the topography encountered at the time of construction. The quantities of earthwork pay items may be recalculated by the Engineer by a method which in his opinion is best suited to obtain an accurate determination.

A.24 CONSTRUCTION SIGNS

The Contractor shall provide five (5) construction signs, prior to any construction activities, that state the project title, project owner, engineer, contractor, construction progress bar chart, City logo, and City project information phone number. One sign shall be located on City property or right-of-way at each of the following locations: 19th Avenue and Lower Buckeye; Well I-5 and 19th Avenue; 15th Avenue and Broadway; and 15th Avenue and Lower Buckeye. The remaining sign shall be kept at the Engineer's office for use in reserve. Each sign shall be one-quarter inch thick aluminum plate, 5 feet long and 3 feet wide. The City of Phoenix will provide to the Contractor additional sign specifications (paint, color, lettering height, etc.) prior to construction. The Contractor shall provide to the Engineer prior to commencement of construction activities a shop drawing of the sign layout and dimensions for approval. Full compensation for sign fabrications and posting of signs shall be considered as included in the prices bid for the various Contract items of work involved, and no additional compensation will be allowed therefor.

SPECIAL PROVISIONS

DIVISION B

BANK PROTECTION
LANDFILL GRADING AND DRAINAGE
15TH AVENUE STORM DRAIN

CONTENTS

SECTION B01101
ABBREVIATIONS AND DEFINITIONS

101.2 DEFINITIONS AND TERMS

Replace the following terms of Section 101.2 of the MAG Standard Specifications with:

Engineer: The person from a specialized consulting firm appointed by the City of Phoenix to act as Resident Engineer for the subject project. The Engineer's determination shall be final in all matters related to the subject project.

Inspector: The City Inspector appointed by the City of Phoenix for the subject project. The Inspector will inspect all work items and reports to the Engineer for final determination.

END OF SECTION

SECTION B01104
SCOPE OF WORK

104.1.1 GENERAL

Add the following to Section 104.1.1 of the MAG Standard Specifications:

The 19th Avenue Landfill is an EPA Superfund site regulated by various State and Federal regulatory agencies. All work included in this project shall be conducted in accordance with all applicable regulations, codes, and laws.

The work covered by the Division B consists of:

1. Construction of soil cement bank protection along Salt River, from 19th Avenue to 15th Avenue, approximately; and a soil cement grade control structure immediately downstream of 19th Avenue bridge.
2. Removal, relocation, and disposal of the existing concrete rubble located in the Salt River 100-year floodplain and along the existing Salt River Banks.
3. Removal, relocation, and disposal of the landfill refuse along and adjacent to the soil cement banks and grade control structure, and other construction items.
4. Grading of Cell A and Cell A-1 of 19th Avenue Landfill, including the construction of a clay cap in Cells A and A-1.
5. Construction of a perimeter drainage channel system and sediment basins.
6. Construction of the 15th Avenue storm drains and other miscellaneous drainage facilities.
7. Installation and maintenance of a temporary construction fence along the outside perimeter of project site with warning signs.
8. All other work items shown on the A, B and C sets of construction plans and as specified herein.

The work covered by the Divisions C and D can be found in their respective sections of these Special Provisions.

END OF SECTIONS

SECTION B01201
CLEARING AND GRUBBING

201.1 DESCRIPTION

Replace Section 201.1 of the MAG Standard Specifications with:

This work shall consist of removing objectionable material from that portion of the right-of-way within the limits of construction, grading, excavation, or borrow as shown on the plan sets as may be required during the course of construction, or as directed by the Engineer. Clearing and grubbing shall be performed in advance of grading operations. This work does not include material otherwise covered under Section B01803 "SPECIAL MATERIALS HANDLING" of these Technical Provisions.

201.3 CONSTRUCTION METHODS

Replace Section 201.3 of the MAG Standard Specifications with:

The construction site within that portion of the right-of-way containing the grading, excavation, or borrow limits as shown on the plans or as directed by the Engineer, shall be cleared of all trees, stumps, shrubs, brush, roots, rubbish, debris, and other objectionable material, as may be required for construction activities, except as limited elsewhere in the Supplementary Conditions, and Special Provisions.

In all areas of the floodway of the Salt River which are subject to clearing and grubbing, no stump, root, debris, or other vegetative material shall be left at an elevation above the toe of bank elevation as indicated on the profile, or the existing channel elevation, whichever is at a lower elevation.

In embankment areas all stumps shall be grubbed to a depth of at least 18" below existing grade. In excavated areas which will form the subgrade for soil cement bank protection or other structures, all stumps shall be grubbed to a depth of at least 36" below the base of the structure. Cavities left by removal of stumps or roots shall be backfilled in conformance with the Special Provisions.

In all areas of the Cells A and A-1 of the 19th Avenue Landfill which are subject to clearing and grubbing, no stump, root, debris, or other vegetative material shall be left within the 5' thick layer (landfill cover layer) below the finished grade as indicated on the plans.

Any tree branches extending over the construction site which are at a height that will interfere with, or may be broken by, normal construction activities shall be cut off close to the trunk or stem of the tree in a neat and workmanlike manner. The Contractor shall remove additional tree branches under the direction of the Engineer, in such a manner that the tree will present a balanced appearance. Scars resulting from the removal of branches shall be treated with a heavy coat of an approved tree sealant.

All tree trunks, stumps, limbs, roots, vegetation and other debris removed in the clearing and grubbing shall be removed from the project site and disposed of, as approved by the Engineer, so as to leave the construction site and adjacent areas in a neat and finished

condition, free from unsightly debris. All concrete, asphalt, aggregate, sand base material, cement block, metal, and other construction debris resulting from the construction activities shall be removed from the project site and disposed of at appropriated active landfill or dump sites arranged by the Contractor. Upon request, the Contractor shall submit the written consent of the owner of the property upon which he intends to dispose of such material.

Any existing landfill refuse, hazardous materials, or any other material not deemed suitable by the Engineer for such routine disposal shall be disposed of in accordance with the Materials Handling and Disposal Plan as described in the Special Provisions.

201.5 PAYMENT, CLEARING AND GRUBBING

Replace Section 201.5 of the MAG Standard Specifications with:

No payment will be made for clearing and grubbing as such; the cost thereof shall be included in the bid price of soil cement bank protection. Payment for the handling, transport and proper disposal of landfill refuse, hazardous materials, or any other material not deemed suitable by the Engineer for routine disposal will be as otherwise specified in the Supplementary Conditions and Special Provisions.

Delete Sections 201.6 and 201.7 of the MAG Standard Specifications.

END OF SECTION

SECTION B01206
STRUCTURAL EXCAVATION AND BACKFILL

206.2 FOUNDATION MATERIAL TREATMENT

Replace the last sentence of the second paragraph of Section 206.2 of the MAG Standard Specifications with:

> . . . Except when over-excavation is directed by the Engineer or results from the removal of unacceptable material, excavation below grade shall be replaced at the Contractor's expense either by compacted fill or soil cement compacted as required in the Special Provisions.

206.3 INSPECTION

Replace the last sentence of Section 206.3 of the MAG Standard Specifications with:

> . . . No soil cement or other structure shall be placed until the excavation has been approved by the Engineer.

206.4 STRUCTURAL BACKFILL

Replace Section 206.4 of the MAG Standard Specifications with:

> Backfilling operations shall conform to the following requirements: Structural backfill against soil cement shall comply with provisions contained in Section B01801 "SOIL CEMENT BANK PROTECTION AND GRADE CONTROL STRUCTURE".
>
> Structural backfill placed in the Salt River channel in such a location that it will not serve as the subgrade for a structure, or underlie a structure, may be placed without compaction, subject to limitations of the Special Provisions.
>
> All structural backfill shall be compacted to the minimum density of 95%, unless otherwise stated on the Plans or in the Standard Specifications, Supplementary Conditions, and Special Provisions.
>
> Structural backfill material shall be selected from excavation or from a source selected by the Contractor and approved by the Engineer. It shall not contain frozen lumps, stones larger than three inches in diameter, chunks of clay or other objectionable material. The plasticity index shall not exceed 12 when tested in accordance with the requirements of AASHTO T90.

END OF SECTION

SECTION B01210
BORROW EXCAVATION

210.1 LOCAL BORROW

Replace Section 210.1 of the MAG Standard Specifications with:

Local borrow shall consist of material excavated and used in the construction of fills. Local borrow shall be obtained by excavating from areas identified on the project plan set or earthwork sections as borrow sites or cut areas, subject to the approval of the Engineer and the conditions of the Supplementary Conditions and Special Provisions. Local borrow shall be obtained in a manner that will minimize the damage to, or destruction of, trees, other significant vegetation, and riparian habitat, and shall be excavated to the lines and grades established by the Engineer and shall be subject to his approval.

In Cell A-1, the existing landfill cover may need to be excavated to a maximum depth of 12 inches above the solid waste in order to provide volume needed to accommodate the excavated solid waste resulting from the construction of soil cement bank protection. The excavated landfill cover material, if approved by the Engineer, shall be stockpiled and used as engineered fill in Cell A-1. Any surplus cover material shall be hauled to Cell A for the construction of engineered fill in Cell A.

210.2 IMPORTED BORROW

Replace Section 210.2 of the MAG Standard Specifications with:

Imported borrow shall consist of **Salt River alluvium material** required for the construction of fills. The Contractor shall make his own arrangements for obtaining imported borrow and he shall pay all costs involved, including laboratory testing. The material shall comply with all of the requirements governing its specific use as contained in the Standard Specifications as modified by the Special Provisions.

The Contractor shall notify the Engineer sufficiently in advance of potential shortage of the existing on-site fill materials. Imported borrow shall be obtained from sources approved by the Engineer. The Contractor shall notify the Engineer sufficiently in advance of opening any material sites so that the cross section elevations and measurements of the ground surface after stripping may be taken and sufficient time for testing the material will be allowed. The Contractor shall submit material certification to the Engineer 7 days prior to the scheduled import operation.

Borrow pits/sites shall be excavated to regular lines, and the side slope shall be dressed to such slope and condition as may be directed, leaving the borrow pit/site area in a clean and safe condition.

Any non-native soil or aggregate utilized by the Contractor shall be obtained under valid and current permits under the Federal Clean Water Act (Sec. 402 (NPDES)) and 404 (Dredge and Fill) and State Aquifer Protection Program.

Delete Section 210.4 of the Standard Specifications.

210.5 PAYMENT

Replace Section 210.5 of the MAG Standard Specifications with:

No payment will be made for borrow excavation as such; the cost thereof shall be included in the price bid for the fill construction.

No payment will be made for excavation, stockpile and hauling Cell A-1 cover material. The cost thereof shall be included in the bid price for the grading of the landfill and relocation of solid waste.

END OF SECTION

SECTION B01211
FILL CONSTRUCTION

211.1 DESCRIPTION

Replace Section 211.1 of the MAG Standard Specifications with:

> Fill construction shall consist of constructing embankments on which soil cement will be placed, landfill cover, and the sub-base for the construction of landfill clay cap, except as may otherwise be specified, including the preparation of the areas upon which they are to be placed; the construction of dikes and landfill cover; the placing and compacting of approved material within areas where unsuitable material has been removed; and the placing and compacting of material in holes, pits, and other depression. The 3' thick landfill clay cap and the 12" thick topsoil are excluded from this work item.

211.2 PLACING

Add the following to Section 211.2 of the MAG Standard Specifications:

> Bituminous type pavement, if encountered during clearing, grubbing or excavation operations, may be used as fill subject to the conditions of the Standard Specifications, except that it shall be covered by a minimum of 2 feet of compacted material, unless otherwise directed by the Engineer.

211.3 COMPACTING

Change the second sentence in the fifth paragraph of Section 211.3 of the MAG Standard Specifications to read:

> . . . Each layer shall be compacted in accordance with the following requirements to a uniform density of not less than **95%**.

211.6 PAYMENT

Delete the second paragraph of Section 211.6 of the MAG Standard Specifications and replace with:

> Payment will be made at the unit bid price for all fill construction required to form the embankment on which soil cement will be placed, fill pits or depressions resulting from the excavation of soft or yielding materials, landfill refuse, hazardous materials, other materials specified in the Materials Handling Plan or as directed by the Engineer. Unless specifically directed by the Engineer, the limit for payment will be two feet below the base of any structure which will overlie the excavation. No payment will be made for fill required if the Contractor excavates beyond the limits shown on the plans, as specified herein, or as directed by the Engineer.

END OF SECTION

SECTION B01212
LANDFILL CAP

212.1 DESCRIPTION

This work shall consist of construction of a 3-foot thick landfill clay cap covering the entire 19th Avenue Landfill Cells A and A-1. The Contractor shall furnish all labor, materials and equipment necessary for the construction of the landfill cap in accordance with Section 211 of the MAG Standard Specifications and these Special Provisions, and in conformity to the lines, grades, thickness and details indicated by the plans or as established by the Engineer. All tests shall be performed by a laboratory approved by the Engineer.

212.2 MATERIALS

The Contractor's attention is directed to the existing stockpiles of clayey materials located in the northern area of Cell A. These stockpiles are to be used **exclusively** for the construction of landfill Cells A and A-1 clay cap only, unless otherwise authorized in writing by the Engineer. Any unauthorized use of these stockpiles which causes shortage of materials for the construction of clay cap should be remediated by importing quality clayey materials at the Contractor's expense.

The Contractor shall notify the Engineer sufficiently in advance of potential shortage of the existing on-site fill materials. Imported clayey materials shall be obtained from sources approved by the Engineer. The Contractor shall notify the Engineer sufficiently in advance of opening any material sites so that sufficient time for testing the material will be allowed. The Contractor shall submit material certification to the Engineer 7 days prior to the scheduled import operation.

Borrow pits/sites shall be excavated to regular lines, and the side slope shall be dressed to such slope and condition as may be directed, leaving the borrow pit/site area in a clean and safe condition.

212.3 CONSTRUCTION REQUIREMENT

The landfill cap shall cover the entire landfill Cells A and A-1 continuously. The clayey material used in the construction of landfill clay cap shall be compacted to a uniform density of not less than 95%, having a permeability smaller than 10^{-4} centimeters per second and a plasticity index of 15 to 20. Testing for proper compaction, permeability, and plasticity shall be done at least once in any given 100'x100' plot of the finished clay cap.

212.4 TESTS

Unless otherwise provided in the plans the fills shall be thoroughly compacted to not less than the stated densities when tested and determined by AASHTO T-99, Method A, and T-191 or ASTM D-2922 and D-3017. The permeability of the compacted clay cap shall be determined by AASHTO T-215-70 or ASTM D-2434. The plasticity index of the compacted clay cap shall be determined by AASHTO T-90 or ASTM D-4318.

212.5 MEASUREMENT AND PAYMENT

Payment will be made at the contract unit price per cubic yard of: 1) landfill cap constructed with on-site stockpiled clayey material, and 2) landfill cap constructed with imported clayey material; measured on

a complete-in-place basis at the landfill site. The Engineer shall compute the quantity of imported clayey material by a method which in his opinion is best suited to obtain an accurate determination. Such price shall include excavating, sloping and cleaning borrow area, hauling, depositing, spreading and compacting the material complete in place, and disposal of surplus material. Payment for the sub-base beneath the 3' clay cap will be made under Section B01211 - Fill Construction of these Special Provisions. Payment for the 12" thick topsoil will be made under Division D - Landscaping and Irrigation of these Special Provisions.

END OF SECTION

SECTION B01350
REMOVAL OF EXISTING FACILITIES

350.2 CONSTRUCTION METHOD

Add the following to Section 350.2 of the MAG Standard Specifications:

The existing access barriers on storm drains are to be removed for salvage. The Contractor shall repair any damage, regardless of cause, clean, and paint the barriers to meet standards referenced on COP drawing P-1563.

350.4 PAYMENT

Add the following to Section 350.4 of the Standard Specifications:

Payment for removal of existing outlet structure includes the salvage and refurbishing of the existing outlet barriers.

END OF SECTION

SECTION B01801
SOIL CEMENT BANK PROTECTION AND GRADE CONTROL STRUCTURE

801.1 DESCRIPTION

This work shall consist of the construction of soil cement bank protection and grade control structure construction at the locations and in accordance with the details shown on the project plans and the requirements of the Special Provisions, including processing and mixing aggregate, Portland cement, fly ash and water; and spreading and compacting the mixture.

801.2 MATERIALS

801.2.1 PORTLAND CEMENT

Cement shall comply with Subsection 725.2 of the Standard Specifications for low alkali: Type II Portland Cement.

801.2.2 FLY ASH

Fly ash shall comply with Subsection 725.2.1 of the Standard Specifications with the exception that twenty five (25) percent of the total weight of cement may be replaced.

801.2.3 AGGREGATE

Aggregate shall be excavated from Salt River channel alluvium. It may be obtained from excavation of the existing alluvium that it is to replace, or from sites meeting the requirements of BORROW EXCAVATION, as contained herein for either LOCAL BORROW or IMPORTED BORROW.

Gradation: Aggregate shall conform to the following gradation requirements when tested in accordance with Arizona Test Method 201:

	Percent Passing
3"	100
#4	30-65
#200	0-10

The material should be free of organic or other deleterious material. The plasticity index shall be no greater than 10 in accordance with the requirements of AASHTO T-90.

Clay lumps larger than 1" shall be screened out of the raw soil prior to mixing.

Stockpiling of Alluvium Aggregate: Before placing aggregates intended for use upon the stockpile site, the site shall be cleared and grubbed in accordance with the Special Provisions.

Stockpiles shall be constructed upon prepared sites. The piles when completed shall be neat and regular in shape. The stockpile height shall be limited to a maximum height of 24 feet.

Stockpiles in excess of 200 cubic yards shall be built up in layers not more than 4 feet in depth. Stockpile layers shall be constructed by trucks, "clamshells", or other methods approved by the Engineer. Pushing aggregates into a pile with a bulldozer will not be permitted. Each layer shall be completed over the entire area of the pile before depositing aggregates in the succeeding layer. The aggregate shall not be dumped so that any part of it runs down and over the lower layers in the stockpile. The method of dropping from a bucket or spout in one location so as to form a cone shaped pile will not be permitted. Any method of placing aggregates in stockpiles, which, in the opinion of the Engineer, breaks, degrades, or otherwise damages the aggregate will not be permitted.

No equipment other than pneumatic tired equipment shall be used on stockpiles of processed or manufactured aggregates in constructing the stockpiles.

Aggregate shall not be deposited where traffic, vehicles, or Contractor's equipment will either run over or through the piles, or in any way cause foreign matter to become mixed with the other aggregates.

Aggregates shall be removed from stockpile in a manner so as to avoid separation of sizes or inclusion of admixtures such as dirt or foreign material.

No equipment other than pneumatic tired equipment shall be used on stockpiles of processed or manufactured aggregates in removing the materials from the stockpiles. When removing materials from the face of the stockpile, the equipment shall be operated in such a manner as to face-load from the floor to the top of the stockpile to obtain maximum uniformity of material.

801.2.4 WATER

Shall comply with SECTION 725.5 of the Standard Specifications, WATER.

801.2.5 ADMIXTURES

Admixtures of any type, except as otherwise specified, shall not be used unless written authorization has been obtained from the Engineer. No direct payment for any admixture will be made unless otherwise noted.

801.2.6 STRENGTH REQUIREMENTS

Soil Cement Classes Minimum Compressive Strength Requirements		
Class	Use	@ 7 Days psi
A	Bank Protection	750
B	Grade Control Structure	1,000

The compressive strength shall be determined in accordance with the requirements of Arizona Test Method 241. At least one compressive strength test (two cylinders) shall be made for each 1500 cubic yards of soil cement placed. Any soil cement that does not meet the above seven-day strength requirements shall be removed and disposed of in a manner acceptable to the Engineer at the Contractor's expense subject to conditions contained in the Subsection 801.5 "PAYMENT".

801.3 CONSTRUCTION REQUIREMENTS

801.3.1 MIX DESIGN

The Contractor shall determine the mix proportions of the aggregate, fly ash, cement and water, and shall furnish soil cement conforming to the requirements specified herein. The job-mix design with the supporting test results shall be submitted to the Engineer for approval, prior to incorporating any of the material into the work. The mix design shall be performed in accordance with Arizona Test Method 220 to determine the cementitious (cement plus fly ash) content necessary for the strength required for Class A and Class B soil cement. The optimum moisture content for compaction of the soil cement mixture, including an additional 2% cementitious material for durability and material variations, shall be determined in accordance with AASHTO T134, Method B. The additional 2% cementitious materials shall be a mixture of cement and fly ash in the same proportions as that utilized in the mix design to meet the strength requirements for Class A and Class B soil cement, respectively.

The Contractor shall follow the test procedures in accordance with Arizona Test Method 220 with the following exception. The Contractor shall determine the maximum density-optimum moisture relation for compaction of the soil cement in accordance with AASHTO T134 Method B.

The mix design objective is to provide the minimum cement plus fly ash (C+P) content, with the appropriate w/c ratio and mix proportions to meet the specified strength requirement while providing a dry (stiff) enough to mix to support heavy placing and compaction equipment, yet wet enough to permit effective distribution of the paste binder throughout the soil cement mass during the mixing and vibration process. The job-mix design shall be tested and the supporting test results shall be submitted to the Engineer for approval, at least two weeks prior to incorporating any of the material into the work.

Included in the job-mix design data shall be the grade of cement and brand of fly ash (if used). A new mix design shall be submitted for approval at least two weeks prior to use any time the Contractor requests a change in materials, or proportioning of the materials, from that given in the approved mix designs. The C+P content for each mix during soil cement production shall not be changed from that of the approved job-mix designs unless approved by the Engineer.

The following mix designs were taken from "Geotechnical Investigation Report, 19th Avenue Landfill Environmental Cleanup, Phoenix, Arizona," SH&B, September 24, 1991. It is presented strictly for reference purposes. Neither SH&B nor SLA represents the mix designs as any more than typical of the site from which the sample was derived. The overall average cement content required for this construction may vary from that shown below.

Sample SCD-1

7-day Strength	750 PSI	1000 PSI
cement content	5.8%	6.7%
lbs per CY soil cement	232	268

801.3.2 PREPARATION OF SUBGRADE

The soil cement shall be placed on a prepared subgrade shaped to the lines and grades shown on the project plans or as directed by the Engineer. The subgrade shall be compacted to a minimum of 95% of the maximum dry density, as determined by Arizona Test Method 225 and rock corrected, as necessary, according to Arizona Test Method 227. Density determinations in the field shall be performed

according to Arizona Test Methods 230 or 231, or according to AASHTO T238 and T239. When the subgrade material is composed predominantly of rock such that these compaction control procedures will not indicate the density achieved, the Engineer will determine the amount of compaction required and the adequacy of equipment used in obtaining the required compaction. Immediately prior to placement of the soil cement mixture, the subgrade shall be uniformly moistened and maintained in an acceptable condition throughout the placement operation. Soft or yielding subgrade shall be corrected and made stable before construction proceeds or as directed by the Engineer. Saturated or submerged subgrades shall be dewatered until the soil cement has achieved the 7-day design strength and in no case less than 72 hours.

801.3.3 MIXING

Aggregate, cement, and fly ash (if used) for the soil cement shall be proportioned and mixed in a central mixing plant, unless otherwise permitted by the Engineer. The plant shall be either of the batch-mixing type (using revolving blade or rotary drum mixers), or of the continuous mixing type, at the option of the Contractor. The aggregate, fly ash (if used) and cement shall be proportioned by weight.

The fly ash (if used) and cement shall be added in such a manner that it is uniformly distributed throughout the aggregate during the mixing operation. There shall be safe, convenient facilities for sampling the cement and fly ash in the supply line to the weight hopper or pugmill. The charge in the batch mixer or the rate of feed to the continuous mixer shall not exceed that which will permit complete mixing of all the mix material.

Control of Mix Water: The water shall be proportioned by weight or volume and there shall be means by which the Engineer may readily verify the amount of water required per batch or the rate of water flow required for continuous mixing. The time of the addition of water or the points at which it is introduced into the mixer shall be as approved by the Engineer.

Control of water content in the field shall be accomplished in two ways. First, the moisture-density relationship for the soil cement mixture shall be determined in accordance with AASHTO T-134, Method B, on a routine basis or when any significant gradation shift or rock content change occurs. Second, the actual moisture content of the mixture at the time of compaction, or shortly thereafter, shall be determined in accordance with ASTM D2216 (oven dry) or AASHTO T-239 (Nuclear densimeter), to determine if the optimum moisture content as determined by AASHTO T-134, Method B, is being maintained. Water content in the aggregates is to be continuously monitored and the mixing water shall be adjusted as necessary to maintain proper moisture.

Batch Mixing: The mixer shall be equipped with a sufficient number of paddles of a type and arrangement to produce an uniformly mixed batch. The mixer shall be equipped with a timing device which will indicate, by a definite audible or visual signal, the expiration of the mixing period. The device shall be accurate to within two seconds. The time of mixing shall begin after all ingredients are in the mixer and shall end when the mixer is half emptied. The allowable tolerance for weight batching of aggregates and cementitious material shall be 2.0% and 0.5%, respectively, for each batch.

The batch-mixing plant shall be equipped with devices by which the weights and/or volume of various components of each batch mixing can be monitored and recorded. The batch-mixing plant shall provide sampling facilities which are satisfactory to the Engineer and which will allow representative samples of the soil cement mixture to be obtained easily and safely.

Continuous Mixing: Aggregate shall be drawn from the storage facility by a feeder or feeders which will continuously supply the correct amount of aggregate in proportion to the cement and fly ash (if used).

A control system shall be provided that will automatically close down the plant when the material in any storage facility approaches the strike-off capacity of the feed gate. The plant will not be permitted to operate unless this automatic control system is in good working condition.

The feeder for the aggregate shall be mechanically or electrically driven.

Continuous mix plants shall provide sampling facilities which are satisfactory to the Engineer, and which will allow representative samples of the soil cement mixture to be obtained easily and safely.

The cement feeder and the aggregate feeders shall be equipped with devices by which the rate of feed can be accurately determined while the plant is in full operation.

801.3.4 PLACEMENT

Mixed materials shall be transported from the plant to the construction site in hauling vehicles and spread on the prepared subgrade or previously completed soil cement. Spreading shall be accomplished by the use of approved motor graders or crawler type equipment. The compacted lifts of soil cement shall not exceed nine (9) inches or be less than four (4) inches in thickness. Each successive layer shall be placed as soon as practicable after the preceding layer is completed, and approved by the Engineer.

All soil cement surfaces that will be in contact with succeeding layers of soil cement shall be kept continuously moist by fog spraying until placement of the subsequent layer, provided that the Contractor will not be required to keep such surfaces continuously moist for a period longer than seven (7) days. The method and equipments used to maintain soil cement continuously moist shall be approved by the Engineer prior to the construction.

Soil cement shall not be mixed or placed when the air temperature is below forty five (45) degrees F. in the shade, unless the air temperature is at least forty (40) degrees F. and rising, or when the temperature is expected to drop below forty five (45) degrees F. in the next 24 hours. Soil cement shall not be mixed or placed when the air temperature is greater than one hundred ten (110) degrees F. in the shade. Mixing and placing shall not proceed when the soil-aggregate or the area on which the soil cement to be placed is frozen.

801.3.5 DEWATERING

All soil cement shall be placed on surfaces free of standing or free water. The site of soil cement placement shall be protected from surface water of any origin and from groundwater and infiltration of any origin. It is expected that dewatering will be required in order to place the grade control structure and portions of the soil cement bank protection. The construction site shall be dewatered to the extent that the soil cement is kept above any free water until design strength is obtained, but in no case less than 72 hours.

Water derived from dewatering activities shall meet State water quality standards prior to discharge into the Salt River. Temporary retention basins for sediment deposition may be required. If sediment control basins are required, the Contractor shall utilize dust palliative, screens, etc. to minimize airborne dust from settling into the pools of water.

The Contractor shall demonstrate that any water derived from dewatering or other activities meets relevant water quality standards prior to discharge into the Salt River as indicated in the Special Provisions contained herein.

801.3.6 COMPACTION

Soil cement shall be uniformly compacted to a minimum of 95% with an average of 100% of maximum density as monitored by nuclear density tests in accordance with AASHTO T238 and T239. Maximum density shall be determined in the lab in accordance with the requirements of AASHTO T99, Method D for minus 3/4 inch material only, with rock correction at each density test location according to AASHTO T224, Section 2.2.2. At least one density test will be taken for each 500 cubic yards of soil cement.

At the start of compaction of each lift, the mixture shall be in an uniform, loose condition throughout its full depth. Its moisture content shall be as previously specified herein. No section shall be left undisturbed for longer than thirty (30) minutes during compaction operations. Compaction of each lift shall be accomplished in such a manner as to produce a dense surface free of compaction planes and shall be completed within one (1) hour from the time water is added to the mixture. Whenever the Contractor's operation is interrupted for more than two (2) hours, the top surface of the completed layer, if smooth, shall be scarified to a depth of at least one (1) inch with a spike-tooth instrument prior to placement of the next lift. The surface, after scarifying, shall be swept using a power broom or other method approved by the Engineer, to completely free the surface of all loose material prior to placement of the next lift. After compaction, the soil cement shall be shaped to the required grades, and cross-sections and rolled to a reasonably smooth surface.

At the time of compaction, the moisture content shall not be more than one (1) percent below optimum and shall not be more than one (1) percentage point above optimum when the mean air temperature during construction hours does not exceed 90 degrees F. When the mean air temperature does exceed 90 degrees F., or there is a breeze or wind which promoted the rapid drying out of the soil cement mixture, the moisture content of said mix shall be increased as needed at the direction of the Engineer, but shall be less than that quantity that will cause the soil cement to become unstable during compaction and finishing operations.

Backfill shall not be placed against the soil cement until it has achieved its 7-day design strength. Construction joints shall be provided at the end of each day's work or when work is halted for two (2) hours or more. The joints shall be trimmed to a straight line and vertical to the full depth of the lift. Before resuming placement of new material, the joints shall be roughened and loose material shall be removed by power broom or compressed air. The joints shall be staggered at a minimum horizontal distance of 100 feet.

801.3.7 CONTROL STRIPS

A control strip shall be constructed at the beginning of work on the soil cement to be compacted. The control strip construction shall be required to establish equipment and procedures required to attain densities for the specified course plus use of portable nuclear moisture/density testing equipment to determine in-place densities obtained during the construction process.

Compaction equipment shall be capable of obtaining specified compaction requirements without detrimentally affecting the compacted material. The equipment shall be modern, efficient compacting units approved by the Engineer. The compacting units shall be of a type that are capable of compacting

each lift of material as specified, and meet the minimum requirements as contained herein. Minimum requirements for rollers are as follows:

(1) Self-propelled drum drive vibratory roller shall be of a type which will transmit dynamic impact to the surface to be compacted through a steel drum by means of revolving weights, eccentric shaft or other equivalent methods. The compactor shall have a gross weight of not less than 23,000 pounds and shall produce a dynamic force of at least 341 pounds per lineal inch of drum width when operated at 2,400 cycles per minute (cpm). The dynamic force is defined as the force developed by revolving the eccentric weight at 2,400 cpm. The roller shall have a smooth drum or drums and the drum diameter shall be between 4 and 5.5 feet and the width shall be between 5.5 and 8 feet. The frequency of vibration during operation shall be 2,400 cycles per minute. The roller shall be operated at speeds not to exceed 1.5 miles per hour and in the forward direction. The engine driving the eccentric mass shall have a rating of not less than 125 horsepower. Variation in speed, and frequency, and method of operation will be directed when found necessary to secure maximum compaction of the materials.

(2) Heavier compacting units may be required to achieve the specified density of the soil cement.

Each control strip, constructed to acceptable density and surface tolerances shall remain in place and become a section of the completed soil cement. Unacceptable control strips shall be corrected or removed and replaced at the Contractor's expense. A control strip shall have an area of approximately 400 square yards and shall be of the same dimensions specified for the construction of the course which it represents.

The materials used in the construction of the control strip shall conform to the specification requirements. They shall be furnished from the same source and shall be of the same type used in the remainder of the course represented by the control strip. The underlying surface upon which a control strip is to be constructed shall have the prior approval of the Engineer.

The equipment used in the construction of the control strip shall be approved by the Engineer and shall be of the same type and weight to be used on the remainder of the course represented by the control strip.

Compaction of control strips shall commence immediately after the course has been placed to the specified thickness, and shall be continuous and uniform over the entire surface. Compaction of the control strip shall be continued until no discernible increase in density can be obtained by additional compactive effort.

Upon completion of the compaction, the mean density of the control strip will be determined by averaging the results of ten density tests taken at randomly selected sites within the control strip.

If the mean density of the control strip is less than 95 percent of the density of laboratory compacted specimens as determined by testing procedures appropriate for the material being placed, the Engineer may order the construction of another control strip.

A new control strip may also be ordered by the Engineer or requested by the Contractor when:

(1) A change in the material or mix design is made.
(2) There is reason to believe that a control strip density is not representative of the material being placed.
(3) Ten days of production have been accepted without a new control strip.

801.3.8 Power Tampers and Small Vibratory Rollers

Small vibratory rollers which are capable of operating within a few inches of a vertical face shall be used for compaction adjacent to the guide banks, next to the utilities and drainage conduit; at transitions to constructed levee protection, and at other areas where the larger vibratory rollers specified above cannot maneuver. The dynamic force produced by the small rollers shall be at least 150 pounds per linear inch of drum width. Tampers shall be of a type capable of developing a force per blow of at least 1,400 pounds. The amount of rolling and tamping required shall be whatever is necessary for the particular equipment to provide the same degree of compaction as would be attained with four passes of the large self-propelled vibratory roller specified above. Standby replacement equipment shall be available within 1 hour's time if needed.

801.3.9 CURING

Whenever the atmospheric temperatures are expected to drop below 30 degrees F., the soil cement shall be protected from freezing for seven (7) days after its construction by a covering of straw, earth or other suitable material approved by the Engineer.

Temporarily exposed surfaces shall be kept moist as previously set forth. Care must be exercised to ensure that no curing material other than water is applied to the surface that will be in contact with succeeding layers.

Permanently exposed surfaces shall be kept in a moist condition for seven (7) days, or they may be covered with bituminous curing material, subject to the Engineer's approval. Any damage to the protective covering within seven (7) days shall be repaired to the satisfaction of the Engineer.

Regardless of the curing material used, the permanently exposed surfaces shall be kept moist until the protective cover is applied. Such protective cover is to be applied as soon as practicable, with a maximum time limit of twenty four (24) hours between the finishing of the surface and the application of the protective cover or membrane.

801.3.10 MAINTENANCE

The Contractor shall be required, within the limits of his contract, to maintain the soil cement and curing seal in good condition until all work is completed and accepted. Maintenance shall include immediate repairs of any defects that may occur. This work shall be done by the Contractor at his own expense and repeated as often as necessary. Faulty work shall be replaced for the full depth of the layer.

801.4 MEASUREMENT

The work will be measured by the cubic yard of completed soil cement bank protection and grade control structure constructed to the lines and grades and typical sections shown on the Plans. The horizontal thickness of soil cement banks and grade control structure used in the determination of soil cement quantity will be nine (9) feet, which will allow for the construction of a well compacted 8-foot thick soil cement structure. Cement and fly ash will be measured by the ton.

Trimmed ?

801.5 PAYMENT

The accepted quantities of soil cement will be paid for at the contract unit price per cubic yard in accordance with the adjustments shown below. Such payment shall constitute full payment for all work

necessary to construct the soil cement, including mixing aggregate, cement, fly ash and water; spreading and compacting the mixture to the grade and cross-section specified; control strips; and furnishing and applying curing seal. Cement and fly ash will be paid for at the contract unit prices per ton. No payment will be made for any soil cement, cement, and/or fly ash wasted by the Contractor during handling, mixing and placing operations.

Any quantity of soil cement placed beyond the limits shown on the Plans will not be included in the price paid to the Contractor and will be at the Contractor's expense.

Adjustment in Contract Unit Price for Strength Deficiency	
Percent of Specified Minimum 7-Day Compressive Strength Attained (nearest 1%)	Percent of Soil Cement Unit Price Allowed
100% or greater	100
97-99	92
94-96	85
90-94	77
85-89	68
80-84	60
75-79	50
less than 75	Remove and replace or leave in place at no payment

Material represented by lots attaining seven-day compressive strengths with a mean value less than 75 percent compressive strength will be evaluated as to acceptance. The Engineer will determine if the material can be left in place. Soil cement not allowed to remain in place shall be replaced at the Contractor's expense.

END OF SECTION

SECTION B01802
ARMORFLEX LINING

802.1 Description

This work shall consist of furnishing all labor, materials, equipment, and incidentals required and perform all operations in connection with the installation of cellular concrete erosion control mats in accordance with the lines, grades, design and dimensions shown on the Plans and as specified herein.

All cellular concrete mats shall be premanufactured as an assembly of concrete blocks, with specific hydraulic capacities, bound into mats by the use of revetment cables.

Individual blocks in the cellular mats shall be staggered and interlocked for enhanced stability. The mats shall be constructed of open and/or closed cell blocks as shown on the Contract Drawings. The open cell version of the blocks shall have two (2) vertical openings of rectangular cross section.

Strands of cable shall extend through two (2) ducts in each block in a manner which provides for longitudinal binding of the blocks within the mats. Each row of blocks shall be laterally offset by one-half block width from the adjacent row so that any given blocks is cabled to four other blocks (two in the row above and two in the row below). The cables shall be looped at one end of the mat and the ends of each cable spliced together at the other end of the mat to form another set of loops. The splicing of the cable ends shall be by sleeves approved by the Engineer.

Since such cables pass through staggered blocks, parallel cables running in a single direction effectively interconnect blocks into an integral mat of staggered rows of blocks to produce an articulating concrete mat revetment which must be used with filter fabric, as specified.

Certification: All cellular concrete mats will only be accepted when accompanied by documented hydraulic performance characteristics, derived from tests under controlled flow conditions. Test conditions should conform to U.S. Federal Highway Administration and U.S. Bureau of Reclamation Testing Protocol as documented in "Hydraulic Stability of Articulated Concrete Block Revetment Systems During Overtopping Flow," Report No. FHWA-RD-89-199.

802.2 Cellular Concrete Mats

This specification covers concrete blocks for erosion control mats used in revetments, storm channels, etc. and for soil stabilization. Concrete units covered by this specification are made from lightweight or normal weight aggregates, or both.

802.2.1 Materials

Cementitious Materials shall conform to the following applicable ASTM specifications:

Portland Cements -	ASTM C 150, for Portland Cement.
Blended Cements -	ASTM C 595, for Blended Hydraulic Cements.
Hydrated Lime Types -	ASTM C 207, for Hydrated Lime Types.
Pozzolans -	ASTM C 618, for Fly Ash and Raw or Calcined Natural Pozzolans for use in Portland Cement Concrete.

Aggregates shall conform to the following ASTM specifications, except that grading requirements shall not necessarily apply:

Normal Weight - ASTM C 33, for Concrete Aggregates.

Polyester Revetment Cable and Fittings. Revetment cable shall be constructed of high tenacity low elongating, continuous filament polyester fibers. Cables shall consist of a core construction comprised of the parallel fibers contained within an outer jacket or cover. The weight of the parallel core shall be between 65% to 70% of the total weight of the cable. The revetment cable shall have the following physical characteristics:

Nominal Cable Diameter	Approx. Avg. Strength Lbs.	Weight/100 Feet Min. Lbs.	Max Lbs.
1/4"	3,700	2.47	2.74
5/16"	7,000	3.99	4.42
3/8"	10,000	4.75	5.26
1/2"	15,000	8.93	9.90

Elongation requirements specified below are based upon stabilized new, dry cable. Stabilization refers to a process in which the cable is cycled fifty (50) times between a load corresponding to $200D^2$ and a load equal to 10%, 20% or 30% of the cable's approximate average breaking strength. Relevant elongation values are as shown in the table below. The tolerance on these values is $\pm 5\%$.

	% Breaking Strength 10%	20%	30%
Permanent Elongation (while working)	0.7	1.8	2.6
Elastic Elongation	0.6	1.4	2.2
Total Stretch	1.3	3.2	4.8

The revetment cable shall exhibit good to excellent resistance to most concentrated acids, alkalis and solvents. Cable shall be impervious to rot, mildew and degradation associated with marine organisms. The materials used in the construction of the cable shall not be affected by continuous immersion in fresh or salt water.

Selection of cable and fittings shall be made in a manner that insures a safe design factor for mats being lifted from both ends, thereby forming a catenary. Consideration shall be taken for the bending of the cables around hooks or pins during lifting. Revetment cable splicing fittings shall be selected so that the resultant splice shall provide a minimum of 60% of the minimum rated cable strength. Fittings such as sleeves and stops shall be aluminum and washers shall be galvanized steel unless otherwise shown on the Plans.

The Contractor shall furnish manufacturer's certificates of compliance for cellular concrete mats, revetment rope, and any revetment rope fittings and connectors to the Engineer prior to the start of mat fabrication.

The Contractor shall furnish to the Engineer all manufacturer's specifications, written recommendations, and shop drawings for fabrication, transporting, handling, and installation of

cellular concrete mats, revetment ropes, rope connectors, special fittings, anchorage hardware, and anchorage details, 14 days prior to assembly of the cellular mats.

Concrete for constructing concrete connectors shown on the Plans, or as recommended by the cellular concrete mat manufacture shall be Class AA concrete, unless otherwise shown on the Plans.

802.2.2. Physical Requirements

At the time of delivery to the work site, the units shall conform to the physical requirements prescribed below.

Compressive Strength - (min, net area)	Average of 3 units: 4,000 psi Individual Unit: 3,500 psi
Water Absorption (max) -	Average of 3 units: 10 lbs/ft^3 Individual Unit: 12 lbs/ft^3

Durability. The manufacturer shall satisfy the purchaser by proven field performance that the concrete units have adequate durability even if they are to be subjected to a freeze-thaw environment.

Size of Cellular Concrete Mats. The cellular concrete blocks, cables and fittings shall be fabricated at the manufacturer or another approved location into mats with a width of up to eight (8) feet and a length which is approved by the Engineer.

802.2.3 Visual Inspection

All units shall be sound and free of defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction. Minor cracks incidental to the usual methods of manufacture, or minor chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for rejection.

802.2.4 Sampling and Testing

The purchaser or his authorized representative shall be accorded proper access to facilities to inspect and sample the units at the place of manufacture from lots ready for delivery.

Sample and test units in accordance with ASTM Methods C 140, Sampling and Testing Concrete Masonry Units. Additional testing, other than that provided by the manufacturer, shall be borne by the purchaser.

802.2.5 Manufacturer

Cellular concrete blocks shall be **ARMORFLEX** as manufactured and sold by NICOLON CORPORATION of Norcross, Georgia, or approved equal. The nearest sales representative is:

GEOPRODUCTS COMPANY
7367 Noche Tapatia
Rancho Santa Fe, CA 92067

Phone: (619) 756-3500
Fax: (619) 756-0284

The cellular concrete blocks shall be **ARMORFLEX**, as shown on the Plans or approved equal. They shall have the following nominal characteristics:

Class:	50S
Type:	Open
Open area:	20%
Block Weight:	45-52 lbs.
	45-53 lbs./sq.ft.
Block Size:	13.0" L x 11.6" W x 6.0" H

802.3 Filter Fabric

This specification covers geotextile for use under concrete cellular mats used for erosion control in revetments, storm channels, etc. and for soil stabilization.

The geotextile shall be a pervious sheet of woven monofilament/multifilament plastic yarns. The geotextile shall be Filterweave 70/20 as manufactured by Nicolon, or approved equal, and shall meet the following physical requirements:

Physical Property	Test Procedure	Minimum Value
Grab Tensile Strength (Unaged Geotextile)	ASTM D4632	Warp: 275 lbs. Fill: 390 lbs.
Breaking Elongation (Unaged Geotextile)	ASTM D4632	10% in any principal direction
Burst Strength	ASTM D3786	525 psi
Puncture Strength	ASTM D4833	145 lbs
A.O.S., U.S. Std. Sieve	ASTM D4751	60
% Open Area	CWO-22125-86	10
Permittivity	ASTM D4491	0.51 sec^{-1}
Water Flow Rate	ASTM D4491	35 gpm/sq.ft.

The geotextile fiber shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of propylene, ethylene, ester, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic, if necessary, to make the filaments resistant to deterioration due to ultraviolet and heat exposure. The edges of the geotextile shall be finished to prevent the outer fiber from pulling away from the geotextiles.

The Contractor shall furnish the Engineer, in duplicate, manufacturer's certified test results showing actual test values obtained when the physical properties are tested for compliance with the specifications.

During all periods of shipment and storage, the filter fabric shall be protected from direct sunlight, ultraviolet rays and temperatures greater than 140 degrees fahrenheit. To the extent possible, the fabric shall be maintained wrapped in its protective covering.

At the time of installation, filter fabric shall be rejected if it has been removed from its protective cover for over 72 hours or has defects, tears, punctures, flow deterioration, or damage incurred during manufacture, transportation or storage. With the acceptance of the Engineer, a torn or punctured section of fabric shall be repaired by placing a filter fabric patch over the damaged area prior to placing the mats. The patch shall be large enough to overlap a minimum of three (3) feet in all directions.

802.4 Construction

802.4.1 FOUNDATION PREPARATION

Areas on which filter fabric and cellular concrete mats are to be placed shall be constructed to the lines and grades shown on the Plans. The slope shall be graded smoothly to ensure that intimate contact is achieved between the slope face and the geotextile (filter fabric), and between the geotextile and the entire bottom surface of the Armorflex blocks. All obstructions, such as roots and projecting stones must be removed and all of the soft or low density pockets of material removed must be filled with selected material and compacted. No holes, "pockmarks", slope board teeth marks, footprints, or other voids, shall be permitted in the slope. Where such areas are below the allowable grades they shall be brought to grade by placing thin layers of selected material and compacted. When the grading is extremely difficult due to the composition of the soil, a thin underlayment of fine granular material shall be placed. The adequacy of the selected geotextile shall be reevaluated by the Engineer. The slope face and invert area shall be uniformly compacted per details shown on the Plans, and the depth of layers and amount of compaction shall be as required by the Engineer.

Excavation and preparation for anchor trenches, side trenches, and toe trenches or aprons shall be done in accordance to the lines, grades and dimensions shown on the Plans. The anchor trench hinge-point at the top of the slope shall be uniformly graded so that no significant dips or bumps occur in elevation. The width of the anchor trench hinge-point shall also be graded uniformly to assure intimate contact between all Armorflex blocks and the underlaying grade at the hinge-point.

Immediately prior to placing the filter fabric and cellular concrete mats, the prepared area shall be inspected by the Engineer and no fabric or mats shall be placed thereon, until that area has been approved.

802.4.2 Placement of Filter Fabric

Filter Fabric, as specified elsewhere, shall be placed within the limits shown on the Plans. Filter Fabric shall be placed directly on the prepared area in intimate contact with the subgrade, and free of wrinkles. The geotextile shall not be walked on or disturbed when the result is a loss of intimate contact between the Armorflex block and the geotextile or between the geotextile and the subgrade. The geotextile filter fabric shall be placed so that the upstream strip of fabric will overlap on top of the downstream strip. The longitudinal and transverse joints shall be overlapped at least three (3) feet. The geotextile shall extend at least one foot beyond the cellular concrete mat termination points.

802.4.3 Placement of Cellular Concrete Mats

Cellular concrete mats, as specified in Section 2-6.2 of these Specifications, shall be placed within the specified lines, grades and limits shown on the Plans. The cellular concrete mats shall be placed on the filter fabric in such a manner as to produce a level surface. No individual block within the plane of placed Armorflex mats shall protrude more than one-half inch or as otherwise specified by the Engineer. To ensure that the blocks within the Armorflex mats are flush and develop intimate contact with the subgrade, the blocks shall be "seated" with a roller or other means as approved by the Engineer.

The cellular concrete mats shall be attached to a spreader bar or other approved device to aid in the lifting and placing of the mats in their proper position by the use of a crane or other approved equipment. Dragging of the mats on the fabric shall not be permitted when the result is wrinkling or tearing of the geotextile with subsequent loss of intimate contact. The mats shall be placed side by side and/or end to end, so that the mats abut each other and then interconnected per details shown on the Plans. Mat seams greater than two (2) inches shall be filled with Class AA concrete.

The cellular concrete mats shall be anchored, when required, by fastening cable loops to anchors placed into the anchor trenches as shown on the Plans.

Anchor trenches and side trenches shall be backfilled and compacted per details shown on the Plans. Backfilling and compaction of trenches shall be completed before proceeding with the placement of additional mats, or as directed by the Engineer. The integrity of a soil trench backfill must be maintained so as to ensure a surface that is flush with the top surface of the Armorflex mats for its entire service life. Toe trenches shall be backfilled as shown on the Plans.

802.4.4 Finishing

The cells or opening in the cellular concrete mats shall be filled and compacted with native topsoil. An one-inch cover layer of topsoil shall be maintained after compaction. Backfilling and compaction shall be completed before proceeding with the placement of additional mats, or as directed by the Engineer.

802.4.5 Consultation

The manufacturer of the cellular concrete mats shall provide construction advice during the installation phases of the project, when required.

802.5 Measurement and Payment

Armorflex lining shall be paid for per square foot of cellular concrete mat shipped to the construction site as shown on the shipping tickets issued by the manufacturer, and approved by the Engineer.

The contract unit price paid per square foot of concrete cellular mat lining shall include furnishing all labor, materials, tools, equipment, and incidentals for doing all of the work and all excavation below the channel theoretical slope and grades as shown on the Plans for assemble, transportation, and installation of concrete cellular mats, for providing and installing filter fabric, constructing any special anchorage arrangements and concrete connectors as recommended by the cellular mat manufacturer or as shown on the Plans, for backfilling cellular grids as shown on the Plans, and as provided for by these Special Provisions, or as directed by the Engineer.

END OF SECTION

SECTION B01803
SPECIAL MATERIALS HANDLING

803.1 DESCRIPTION

This work consists of the excavation, identification, transportation and disposal of all items defined as SPECIAL MATERIALS in Section A.21 of the Special Provisions primarily consisting of Municipal Solid Waste.

Material covered under this section will be obtained through excavation of the existing refuse to the line and grade shown on the plans, or as directed by the Engineer. All existing refuse material underlying the proposed soil cement bank and grade control structure shall be completely removed, unless otherwise directed by the Engineer. All existing refuse material underlying other proposed minor structures shall be removed to a minimum of 3' below the structures, or as directed by the Engineer.

803.2 CONSTRUCTION METHODS

The contractor shall perform the described work as indicated elsewhere in the Supplementary Conditions and Special Provisions. The material shall be disposed of in the refuse disposal area(s) of Cells A and A-1 as shown on the plans or identified by the Engineer. The material shall be spread and compacted to form a firm, unyielding surface and covered with a compacted clay cap. The Contractor shall perform odor and vector control, and dust control in accordance with Subsection A.12 and A.13 of the Special Provisions.

The construction of the compacted clay cap shall be in accordance with Section B01212 of these Special Provisions and details shown on the plans, or as directed by the Engineer. The location of the disposal sites will be in the identified portion of landfill Cells A and A-1, with the exact site to be determined by the Engineer.

803.3 MEASUREMENT

The quantity of Special Materials Handling will be the amount determined during construction on an in-situ basis. The Engineer shall compute the quantity of Special Materials Handling by a method which in his opinion is best suited to obtain an accurate determination. The quantity determined shall not include refuse, debris, soil/rock fill or any other material previously defined as Routine, nor shall it include any construction debris/rubbish generated by the Contractor, nor any material excavated from outside the limits of refuse excavation as shown on the plans, indicated in the Special Provisions, or as directed by the Engineer.

803.4 PAYMENT

Quantities of Special Materials Handling will be paid for at the contract unit price per cubic yard as stipulated in the proposal. Such price shall include excavation, transporting, placing, compacting, covering and all other related work, including dewatering, and the treatment of such water, if required.

END OF SECTION

SECTION B01804
HAZARDOUS MATERIALS HANDLING

804.1 DESCRIPTION

During excavation operations any suspicious materials encountered that are classified as Hazardous Materials by the Industrial Safety Consultant shall be brought to the attention of the Engineer. Any such materials, or others as identified by the Engineer and/or the Industrial Safety Consultant as being hazardous shall be dealt with as Hazardous Materials. The Contractor shall communicate this to the Engineer immediately, and stop work in the vicinity of the discovery. Every effort shall be made to contain the Hazardous materials and to prevent exposure to humans. Removal and disposal of this material shall only be performed by the specially trained, licensed, and supervised personnel. This work will either be performed by others or by the Contractor, if he is so qualified.

Material covered under this section will be obtained through excavation to the line and grade shown on the plans, or as directed by the Engineer. The separation of material resulting from Structural Excavation or from material specifically removed below any proposed overlying structure or as directed by the Engineer. Material underlying proposed structures which is sufficiently competent to support the proposed structure, as determined by the Engineer, shall be left in place unless otherwise directed by the Engineer.

804.2 CONSTRUCTION METHOD

The Hazardous Material shall be excavated, contained, transported and disposed at an approved offsite hazardous material landfill according to all local, state, and federal regulations by a licensed Contractor.

804.3 MEASUREMENT AND PAYMENT

The quantity of Hazardous Material Handling shall either be on a weight or volume basis as agreed to by the Contractor and the Engineer. Payment will be on a cost and materials basis at a rate agreed upon by the Contractor and the Engineer.

END OF SECTION

SECTION B01805
ROUTINE MATERIALS HANDLING

805.1 DESCRIPTION

This work consists of the excavation, identification, transportation and disposal of all items defined as ROUTINE MATERIALS in Section A.21 of the Special Provisions primarily consisting of construction debris and rubbish, burned glass ash, and tires.

Material covered under this section will be obtained through excavation of the existing refuse to the line and grade shown on the plans, or as directed by the Engineer. All existing refuse material underlying the proposed soil cement bank and grade control structure shall be completely removed, unless otherwise directed by the Engineer. All existing refuse material underlying other proposed minor structures shall be removed to a minimum of 3' below the structures, or as directed by the Engineer.

805.2 CONSTRUCTION METHODS

The contractor shall perform the described work as indicated elsewhere in the Supplementary Conditions and Special Provisions. The material shall be disposed of in the refuse disposal area(s) of Cells A and A-1 as shown on the plans or identified by the Engineer. The material shall be spread and compacted to form a firm, unyielding surface and covered with a compacted clay cap. The Contractor shall perform odor and vector control, and dust control in accordance with Subsection A.12 and A.13 of the Special Provisions.

The construction of the compacted clay cap shall be in accordance with Section B01212 of these Special Provisions and details shown on the plans, or as directed by the Engineer. The location of the disposal sites will be in the identified portion of landfill Cells A and A-1, with the exact site to be determined by the Engineer.

The Contractor's attention is directed to the existing concrete debris located on the south bank near 19th Avenue bridge and on the north bank near upstream project limit. The existing concrete debris located on the south bank will have to be cleared and disposed of outside the construction limits. The existing concrete debris found on the north bank can be disposed of at designated areas within Cell A, in accordance with all applicable requirements and regulations specified in the Special Provisions.

805.3 MEASUREMENT

The quantity of Routine Materials Handling will be the amount determined during construction on an in-situ basis. The Engineer shall compute the quantity of Routine Materials Handling by a method which in his opinion is best suited to obtain an accurate determination. The quantity determined shall not include Municipal Solid Waste, hazardous materials, or any other material previously defined as Special, nor shall it include any construction debris/rubbish newly generated by the Contractor, nor any material excavated from outside the limits of refuse excavation as shown on the plans, indicated in the Special Provisions, or as directed by the Engineer.

805.4 PAYMENT

Quantities of Routine Materials Handling will be paid for at the contract unit price per cubic yard as stipulated in the proposal. Such price shall include excavation, transporting, placing, compacting, covering and all other related work, including dewatering, and the treatment of such water, if required.

END OF SECTION

SECTION B01806
GROUNDWATER MONITORING WELLS MODIFICATION

806.1 DESCRIPTION

This work consists of the adjusting existing groundwater monitoring wells to the proposed finished grade of Cells A and A-1, including raising or lowering the existing steel or PVC well casing and surface casing, construct concrete pad, re-install an existing pump at Well I-5, furnish and install new pumps at remaining wells, and steel cover at the designated locations shown on the Plans, or as directed by the Engineer.

806.2 MATERIALS

Steel casing for the adjustment of existing well shall be of same type, thickness and diameter of the existing steel or PVC casing.

Well cover shall be 10 gage galvanized steel in accordance with ASTM A-36. It shall be given one shop coat of No. 1 paint and two field coats of No. 10 paint as per Section 790.

Submersible pump shall be Redi-Flo2 manufactured by GROUNDFOS PUMPS CORP (2555 Clovis Ave, Clovis, CA 93612), or approved equal. Well seal shall be 4" Redi-Flo2 Well Seal manufactured by GROUNDFOS PUMPS CORP, or approved equal. Well casing may require a reducer in order to achieve the proper diameter for well seal.

806.3 CONSTRUCTION METHOD

The Contractor shall keep all wells clean at all times. All equipment and materials must be for environmental use and steam cleaned prior to installation. All modification work must meet ADWR Well Construction Regulations. The Contractor shall conduct all necessary surveying services to determine the elevation of the top of casing at measuring port on well seal before and after well modification. A copy of survey log shall be submitted to the Engineer within 7 days of the completion of the modification. All existing pumps must be salvaged and returned to the City of Phoenix.

Pumps are to be installed at the same depth of the existing pumps. All well modifications are included on the construction plans.

806.3 MEASUREMENT

Groundwater monitoring wells modification will be measured for payment by the lump sum as a single complete unit of work.

806.4 PAYMENT

Payment will be made at the Contract unit price per EACH, complete-in-place, which price shall be full compensation for furnishing all labor, materials and tools, and doing all work required to complete this item, in conformance with the details shown on the Plans, the requirements of the Standard Specifications and these Special Provisions, and the direction of the Engineer.

END OF SECTION

SECTION B01807
NPDES PERMIT

807.1 DESCRIPTION

This work shall consist of preparing a Storm Water Pollution Prevention Plan (SWPPP), subject to approval by the Engineer, and submit it during the Preconstruction meeting. The SWPPP shall comply with all applicable regulations and rules of a National Pollutant Discharge Elimination System (NPDES) permit, as specified under the Environmental Protection Agency (EPA) General Permit for Arizona issued September 9, 1992. The Contractor shall retain at the construction site, and furnishing all materials, labor, and equipment necessary to implement a Storm Water Pollution Prevention Plan (SWPPP) per NPDES requirements. The Contractor shall revise the SWPPP, as necessary, throughout the entire construction period.

This plan shall describe the measures to be taken by the Contractor to avoid polluting the Salt River and to prevent the unauthorized release of solid or liquid materials into the 100-year floodplain of the Salt River. This plan shall specifically detail the proposed method of handling and disposal of discarded materials, sediment, turbid or contaminated water, and harmful or hazardous materials. This plan shall also include a schedule detailing the proposed coordination for accomplishing all control devices or measures in a timely and appropriate manner, and site-specific diagrams indicating proposed locations where control devices or measures may be required during successive construction stages. To the extent possible, the Contractor may reference relevant portions of Section A.21 - "Materials Handling and Disposal Plan" of the Special Provisions, and the "Best Management Practices and Erosion Control Manual" published by the Maricopa County Flood Control District, September 1992.

The Pollution Control Plan shall indicate how the Contractor intends to promptly clear falsework, debris, etc. from the 100-year floodplain of the Salt River. Provisions for maintaining a clean and sanitary work site, including provisions for daily refuse disposal and hazardous and toxic waste disposal consistent with Federal and State Guidelines, as well as an erosion control plan indicating efforts to be taken by the Contractor to prevent material from washing into the 100-year floodplain shall be included.

While preparing the SWPPP, the Contractor shall include the following requirements:

1) Materials contaminated by oil, grease, organic matter, landfill refuses, or other objectionable/deleterious substances shall not be used as fill within the 100-year floodplain of the Salt River, nor in the levee embankment fill.

2) All construction debris shall be removed from the existing and proposed 100-year floodplain of the Salt River, and shall be removed from the construction site and properly disposed prior to the completion of work. If this material is stockpiled on site, it shall be done so as to prevent the material from falling, blowing, washing, or otherwise entering the 100-year floodplain of the Salt River.

3) Any construction haul roads, staging areas, construction backfill areas, etc. created by the Contractor within the channel of the Salt River shall be returned to a pre-construction state.

807.2 NPDES PERMIT REQUIREMENTS

The Contractor shall be designated as permittee, and shall eliminate a minimum of 80% of the construction related sediment resulting from storm water runoff from the construction site. All subcontractor shall comply with the requirements of the NPDES under the supervision of the Contractor.

The Contractor shall complete the following documents:

1. Storm Water Pollution Prevention Plan (SWPPP) for the Project, including certification of completion form.
2. Notice of Intent (NOI2) to be covered by NPDES General Permit for Arizona, including certification of signature.
3. Inspection and Maintenance Reports.
4. Notice of Termination (NOT) of coverage under NPDES General Permit.

Necessary forms for the NOI and NOT are attached herewith for the Contractor's use.

The Contractor shall submit the SWPPP to the Engineer for approval at the pre-construction meeting. The Contractor shall also transmit preliminary copies of the NOI, as indicated on the NOI form, at the pre-construction meeting. Approval of the SWPPP does not relieve the Contractor of the responsibility to comply with the NPDES permit or other permit requirements.

The Contractor (and all other co-permittees) shall submit completed, signed NOI forms at least 48 hours prior to the notice to proceed date on the project to the EPA at the following address:

EPA Storm Water Notice of Intent
P.O. Box 1215
Newington, VA 22122

If the Contractor fails to provide the required submissions within the specified time frame, the Engineer will order the pre-construction meeting suspended, or suspend the work until such time as they are furnished. The Contractor shall not be entitled to additional compensation or an additional extension of contract time resulting from any delays due to any suspension.

The NOI shall be posted on the construction site along with the SWPPP. A copy of the NOI shall be sent to:

1. Storm Water Coordinator, ADEQ
   P.O. Box 600
   Phoenix, Arizona 85001-0600

2. Development Services Department, City of Phoenix
   200 West Washington Street, 2nd Floor
   Phoenix, Arizona 85003-1611

3. Environmental Engineering Manager
   Engineering & Architectural Services Department
   200 West Washington Street, 7th Floor
   Phoenix, Arizona 85003-1611

807.3 CONSTRUCTION REQUIREMENTS

The Contractor shall be prepared to implement the SWPPP at the onset of any rainfall, such that 80% of the construction related sediment which is generated from storm water runoff within the project is eliminated.

The Contractor shall maintain all related construction elements in proper working order, including cleaning and repair. No separate payment will be made for such inspections, cleaning, or repair.

The Contractor shall review the SWPPP and revise it as necessary throughout the duration of the contract, in order to assure compliance with the EPA permit requirements. The Contractor shall submit all revisions to the SWPPP to the Engineer for approval prior to implementation. The Contractor shall perform monthly and major rainfall event inspections in accordance with the requirements of the EPA and document the findings.

The Engineer will inspect the condition of all measures listed in SWPPP. The Contractor shall provide the Engineer with all documents in accordance with the record keeping requirements of the EPA.

All SWPPP reports required under this contract shall be available tot he public in accordance with the requirements of Section 308(b) of the Clean Water Act. The Contractor as a permittee of construction activities with storm water discharges covered by the Arizona General Permit shall make plans available to the public upon request through the EPA.

No condition of the Arizona General Permit as well as the SWPPP shall release the Contractor from any responsibilities or requirements under other environmental statutes or regulations.

The final SWPPP shall be kept on the project site at all times, and shall be retained by the permittee for three year following the final acceptance.

Upon final stabilization of the construction site, and de-mobilization, the Contractor shall submit its completed, signed NOT form to the EPA, with copies to the Engineer, and Agencies who received a copy of NOI, thereby terminating all NPDES permit coverage for the project.

807.4 BASIS OF PAYMENT

The lump sum bid price shall include all work such as design, placement, construction, maintenance, inspection, removal and disposal of all elements required by the NPDES permit coverage. Payment shall be made monthly with equal payment during the entire construction period with 10% retention to be paid after filing of NOT. Cost of revision and implementation of SWPPP during construction period being considered as included in the price of lump sum item.

Appendix C — NOI Form Instructions

See Reverse for Instructions

Form Approved. OMB No. 2040-0086
Approval expires: 8-31-95

NPDES FORM

United States Environmental Protection Agency
Washington, DC 20460

Notice of Intent (NOI) for Storm Water Discharges Associated with Industrial Activity Under the NPDES General Permit

Submission of this Notice of Intent constitutes notice that the party identified in Section I of this form intends to be authorized by a NPDES permit issued for storm water discharges associated with industrial activity in the State identified in Section II of this form. Becoming a permittee obligates such discharger to comply with the terms and conditions of the permit. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. Facility Operator Information

Name: Phone:

Address: Status of Owner/Operator:

City: State: ZIP Code:

II. Facility/Site Location Information

Is the Facility Located on Indian Lands? (Y or N)

Name:

Address:

City: State: ZIP Code:

Latitude: Longitude: Quarter: Section: Township: Range:

III. Site Activity Information

MS4 Operator Name:

Receiving Water Body:

If You are Filing as a Co-permittee, Enter Storm Water General Permit Number:

Are There Existing Quantitative Data? (Y or N)

Is the Facility Required to Submit Monitoring Data? (1, 2, or 3)

SIC or Designated Activity Code: Primary: 2nd: 3rd: 4th:

If This Facility is a Member of a Group Application, Enter Group Application Number:

If You Have Other Existing NPDES Permits, Enter Permit Numbers:

IV. Additional Information Required for Construction Activities Only

Project Start Date:

Completion Date:

Estimated Area to be Disturbed (in Acres):

Is the Storm Water Pollution Prevention Plan in Compliance with State and/or Local Sediment and Erosion Plans? (Y or N)

V. Certification: I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name: Date:

Signature: _____

EPA Form 3510-6 (8-92)

Instructions - EPA Form 3510-6
Notice Of Intent (NOI) For Storm Water Discharges Associated With Industrial Activity
To Be Covered Under The NPDES General Permit

Who Must File A Notice Of Intent (NOI) Form

Federal law at 40 CFR Part 122 prohibits point source discharges of storm water associated with industrial activity to a water body(ies) of the U.S. without a National Pollutant Discharge Elimination System (NPDES) permit. The operator of an industrial activity that has such a storm water discharge must submit a NOI to obtain coverage under the NPDES Storm Water General Permit. If you have questions about whether you need a permit under the NPDES Storm Water program, or if you need information as to whether a particular program is administered by EPA or a state agency, contact the Storm Water Hotline at (703) 821-4823.

Where To File NOI Form

NOIs must be sent to the following address:

Storm Water Notice of Intent
PO Box 1215
Newington, VA 22122

Completing The Form

You must type or print, using upper-case letters, in the appropriate areas only. Please place each character between the marks. Abbreviate if necessary to stay within the number of characters allowed for each item. Use one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions on this form, call the Storm Water Hotline at (703) 821-4823.

Section I Facility Operator Information

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same as the name of the facility. The responsible party is the legal entity that controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Enter the appropriate letter to indicate the legal status of the operator of the facility.

F = Federal
M = Public (other than federal or state)
S = State
P = Private

Section II Facility/Site Location Information

Enter the facility's or site's official or legal name and complete street address, including city, state, and ZIP code. If the facility or site lacks a street address, indicate the state, the latitude and longitude of the facility to the nearest 15 seconds, or the quarter, section, township, and range (to the nearest quarter section) of the approximate center of the site.

Indicate whether the facility is located on Indian lands.

Section III Site Activity Information

If the storm water discharges to a municipal separate storm sewer system (MS4), enter the name of the operator of the MS4 (e.g., municipality name, county name) and the receiving water of the discharge from the MS4. (A MS4 is defined as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is owned or operated by a state, city, town, borough, county, parish, district, association, or other public body which is designed or used for collecting or conveying storm water.)

If the facility discharges storm water directly to receiving water(s), enter the name of the receiving water.

If you are filing as a co-permittee and a storm water general permit number has been issued, enter that number in the space provided.

Indicate whether or not the owner or operator of the facility has existing quantitative data that represent the characteristics and concentration of pollutants in storm water discharges.

Indicate whether the facility is required to submit monitoring data by entering one of the following:

1 = Not required to submit monitoring data;
2 = Required to submit monitoring data;
3 = Not required to submit monitoring data; submitting certification for monitoring exclusion

Those facilities that must submit monitoring data (e.g., choice 2) are: Section 313 EPCRA facilities; primary metal industries; land disposal units/incinerators/BIFs; wood treatment facilities; facilities with coal pile runoff; and, battery reclaimers.

List, in descending order of significance, up to four 4-digit standard industrial classification (SIC) codes that best describe the principal products or services provided at the facility or site identified in Section II of this application.

For industrial activities defined in 40 CFR 122.26(b)(14)(i)-(xi) that do not have SIC codes that accurately describe the principal products produced or services provided, the following 2-character codes are to be used:

HZ = Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under subtitle C of RCRA [40 CFR 122.26 (b)(14)(iv)];
LF = Landfills, land application sites, and open dumps that receive or have received any industrial wastes, including those that are subject to regulation under subtitle D of RCRA [40 CFR 122.26 (b)(14)(v)];
SE = Steam electric power generating facilities, including coal handling sites [40 CFR 122.26 (b)(14)(vii)];
TW = Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage [40 CFR 122.26 (b)(14)(ix)]; or,
CO = Construction activities [40 CFR 122.26 (b)(14)(x)].

If the facility listed in Section II has participated in Part 1 of an approved storm water group application and a group number has been assigned, enter the group application number in the space provided.

If there are other NPDES permits presently issued for the facility or site listed in Section II, list the permit numbers. If an application for the facility has been submitted but no permit number has been assigned, enter the application number.

Section IV Additional Information Required for Construction Activities Only

Construction activities must complete Section IV in addition to Sections I through III. Only construction activities need to complete Section IV.

Enter the project start date and the estimated completion date for the entire development plan.

Provide an estimate of the total number of acres of the site on which soil will be disturbed (round to the nearest acre).

Indicate whether the storm water pollution prevention plan for the site is in compliance with approved state and/or local sediment and erosion plans, permits, or storm water management plans.

Section V Certification

Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, state, Federal, or other public facility: by either a principal executive officer or ranking elected official.

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 0.5 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may increase or reduce this burden to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

Appendix D — NOT Form Instructions

Please See Instructions Before Completing This Form

Form Approved. OMB No. 2040-0086
Approval expires: 8-31-95

NPDES FORM

EPA

United States Environmental Protection Agency
Washington, DC 20460

Notice of Termination (NOT) of Coverage Under the NPDES General Permit for Storm Water Discharges Associated with Industrial Activity

Submission of this Notice of Termination constitutes notice that the party identified in Section II of this form is no longer authorized to discharge storm water associated with industrial activity under the NPDES program. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. Permit Information

NPDES Storm Water General Permit Number: [ ]

Check Here if You are No Longer the Operator of the Facility: ☐

Check Here if the Storm Water Discharge is Being Terminated: ☐

II. Facility Operator Information

Name: [ ] Phone: [ ]

Address: [ ]

City: [ ] State: [ ] ZIP Code: [ ]

III. Facility/Site Location Information

Name: [ ]

Address: [ ]

City: [ ] State: [ ] ZIP Code: [ ]

Latitude: [ ] Longitude: [ ] Quarter: [ ] Section: [ ] Township: [ ] Range: [ ]

IV. Certification: I certify under penalty of law that all storm water discharges associated with industrial activity from the identified facility that are authorized by a NPDES general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this Notice of Termination, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that discharging pollutants in storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act.

Print Name: [ ] Date: [ ]

Signature: _____

Instructions for Completing Notice of Termination (NOT) Form

Who May File a Notice of Termination (NOT) Form

Permittees who are presently covered under the EPA issued National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Industrial Activity may submit a Notice of Termination (NOT) form when their facilities no longer have any storm water discharges associated with industrial activity as defined in the storm water regulations at 40 CFR 122.26 (b)(14), or when they are no longer the operator of the facilities.

For construction activities, elimination of all storm water discharges associated with industrial activity occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with industrial activity from the construction site that are authorized by a NPDES general permit have otherwise been eliminated. Final stabilization means that all soil-disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

Where to File NOT Form

Send this form to the the following address:

Storm Water Notice of Termination
P.O. Box 1185
Newington, VA 22122

Completing the Form

Type or print, using upper-case letters, in the appropriate areas only. Please place each character between the marks. Abbreviate if necessary to stay within the number of characters allowed for each item. Use only one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions about this form, call the Storm Water Hotline at (703) 821-4823.

PLEASE SEE REVERSE OF THIS FORM FOR FURTHER INSTRUCTIONS

EPA Form 3510-7 (8-92)

Instructions - EPA Form 3510-7
Notice of Termination (NOT) of Coverage Under The NPDES General Permit for Storm Water Discharges Associated With Industrial Activity

Section I Permit Information

Enter the existing NPDES Storm Water General Permit number assigned to the facility or site identified in Section III. If you do not know the permit number, contact the Storm Water Hotline at (703) 821-4823.

Indicate your reason for submitting this Notice of Termination by checking the appropriate box:

If there has been a change of operator and you are no longer the operator of the facility or site identified in Section III, check the corresponding box.

If all storm water discharges at the facility or site identified in Section III have been terminated, check the corresponding box.

Section II Facility Operator Information

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same name as the facility. The operator of the facility is the legal entity which controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Section III Facility/Site Location Information

Enter the facility's or site's official or legal name and complete address, including city, state and ZIP code. If the facility lacks a street address, indicate the state, the latitude and longitude of the facility to the nearest 15 seconds, or the quarter, section, township, and range (to the nearest quarter section) of the approximate center of the site.

Section IV Certification

Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing , production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, State, Federal, or other public facility: by either a principal executive officer or ranking elected official.

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 0.5 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may increase or reduce this burden to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

[FR Doc. 92-21385 Filed 9-8-92; 8:45 am]
BILLING CODE 6560-50-C

SPECIAL PROVISIONS

DIVISION C

GAS MONITORING AND MIGRATION CONTROL SYSTEM

SECTION C1 - GENERAL REQUIREMENTS

SECTION C2 - SITE WORK

SECTION C11 - CELL A EQUIPMENT

SECTION C12 - CELL A-1 EQUIPMENT

SECTION C15 - MECHANICAL AND PLUMBING

SECTION C16 - ELECTRICAL

APPENDIX

APPENDIX (Continued)

SECTION 1 - GENERAL REQUIREMENTS

SUBSECTION C01010
SUMMARY OF WORK

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. The project consists of decommissioning and removal of existing equipment and structures at the two flare stations; modification of existing gas well heads; removal of existing FRP header pipe; drilling and installation of approximately 79 vertical landfill gas extraction wells; drilling and installing approximately 63 gas monitoring probes; installation of condensate sumps; construction of approximately 12,500 feet of gas collection pipe; connection of new and existing gas wells to the collection header; preparation of the flare station areas, including excavating and backfilling; disposal of excavated refuse from construction of the flare station foundation; chain link fence construction; installation of the new flare and flare station; and all other appurtenant equipment as shown in the Drawings and as specified herein.

1.02 LOCATION OF PROJECT

A. The 19th Avenue Landfill is located in the city of Phoenix, Arizona, at the northwest corner of the intersection of 19th Avenue and the Salt River.

1.03 ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH

A. The Contract.

B. Approved Shop Drawings.

C. The Specifications and bulletins.

D. The General Conditions and Supplementary Conditions.

E. The change orders and directives issued from time to time by the Owner and/or Engineer.

F. The governing building code, all governing laws, ordinances, rules, permits, regulations, and directives from governing authorities having jurisdiction over this work.

G. Guarantees in accordance with requirements of the Contract Documents, with period of Guarantees as stated therein; except that if Contractor neglects to correct or complete work in punch lists, during period of Guarantee, Contractor is still responsible and required to do so after expiration dates of Guarantee, until the corrective work is complete and accepted by the Owner.

H. Cooperation with other Contractors employed on the project by the Owner under separate contracts. Such cooperation shall include but shall not be limited to written notices to others when required, so as to implement proper coordination of the work of all separate Contractors in the project and to safeguard the maintenance of the construction schedule.

1.04 DISPOSAL OF REFUSE

A. Refuse excavated during well drilling shall be classified, according to the criteria stated in Section A21 of the Special Provisions for the purposes of handling and disposal. Refuse excavated shall be disposed of, in accordance with these specifications. Refuse shall not be allowed to be exposed overnight.

1.05 DEFINITIONS

Whenever in these Specifications, or in other Contract Documents, the following terms are used, the intent and meaning must be interpreted as follows:

A. Calendar Day: Every day shown on the calendar.

B. Contract Time: The number of calendar days for completion of the work, including authorized time extensions. In case a calendar date of completion is specified in the Agreement in lieu of the number of working days, the work shall be completed by that date. The Contract time shall be computed by excluding the first and including the last day.

C. Owner or City: City of Phoenix, City of Phoenix Public Works Department.

D. Engineer: City Appointed.

E. Equipment:

1. Construction Equipment - All machinery and equipment, together with the necessary supplies for upkeep and maintenance, tools and apparatus necessary for the proper construction, and acceptable completion of work.

2. Installed equipment - All material or articles used in equipping a facility as furnishings or apparatus to fulfill a functional design.

F. Extra Work: An item of work not provided for in the Contract as awarded but found essential to the satisfactory completion of the Contract within its intended scope.

G. Laboratory: The established materials testing laboratory of the Contracting Agency's Engineering Department, or other laboratories acceptable to or authorized by the Engineer to test materials and work involved in the Contract.

H. Referenced Documents: Bulletins, Standards, Rules, Methods of Analysis or Testing, Codes and Specifications of public or private agencies, Engineering Societies, or Industrial Associates. Reference shall be to the latest edition thereof, including Amendments, which are in effect and published at the time the Notice Inviting Bids is issued, unless a specific edition is identified, in which case reference must be to such specific edition.

I. Shop Drawings: Drawings or reproduction of Drawings, detailing, fabrication and erection of structural elements, false work and forming for structures, fabrication of reinforcing steel, installed equipment and installation of systems, or any other supplementary Drawings or similar data.

J. Working day: A calendar day, exclusive of Saturdays, Sundays, and the City's recognized legal holidays, on which weather and other conditions not under the control of the Contractor will permit construction operations to proceed for the major part of the day with the normal working force engaged in performing the controlling item or items of work which would be in progress at that time.

1.06 ABBREVIATIONS AND REFERENCES

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ADEQ	Arizona Department of Environmental Quality
AFBMA	Anti-Friction Bearings Manufacturers' Association
AGA	American Gas Association
AISC	American Institute of Steel Constructors
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American Wire Gauge
AWS	American Welding Society
AWWA	American Water Works Association
BTU	British Thermal Unit
CGA	Compressed Gas Association
CI	Cast Iron
CSA	Canadian Standards Association
CSP	Corrugated Steel Pipe
FM	Factory Mutual Research Corporation
FRP	Fiberglass Reinforced Plastic
HDPE	High Density Polyethylene
IEEE	Institute of Electrical and Electronics Engineers
IPS	Iron Pipe Size
LFG	Landfill Gas
MAG	Maricopa Association of Governments' Uniform Standard Specifications and Uniform Standard Details
NBS	National Bureau of Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NFPA	National Fire Protection Association
NLGI	National Lubricating Grease Institute
O&M	Operating and Maintenance
OSHA	Occupational Safety and Health Administration
P&ID	Process and Instrumentation Diagram
PVC	Polyvinyl Chloride
SAE	Society of Automotive Engineers
SS, SST	Stainless Steel
UL	Underwriters' Laboratories, Inc.
USASI	USA Standards Institute

1.07 WORK BY OTHERS

A. The Contractor is advised that work by others will be in progress adjacent to, or at the site, during the Contract time. Cooperation in mobilization, storage, access, and other construction activities between the parties, and access by the City at all times, are required.

B. The Contractor shall coordinate and interface his work with all other work on or adjacent to the site.

1.08 COORDINATION

A. It is a declared and acknowledged intention and meaning, through coordination of the Contract Documents and Schedules, to provide and secure the contemplated structure complete and ready for use, as called for in the Contract Documents. The Contractor shall coordinate the work of the various trades to avoid interference, duplication of work, or unfinished gaps between operations.

1.09 REMOVING OBSTRUCTIONS

A. When the proper completion of the work requires their temporary or permanent removal, the Contractor shall, at his expense, remove and temporarily or permanently replace or relocate to the satisfaction of the Owner, all water pipe, pipelines, conduits, culverts, roads, driveways, fences, wires, poles, retaining walls, curbs, gutters, concrete walks, and all other improvements of whatever character, not required by law, to be removed by the Owner thereof. All such improvements temporarily removed shall be maintained until permanently replaced at the Contractor's expense.

END OF SECTION

SECTION 1 - GENERAL REQUIREMENTS

SUBSECTION C01011
SPECIAL REQUIREMENTS

PART 1: GENERAL

1.01 SAFETY

A. Contractor shall comply with provisions of the Occupational Safety and Health Administration (OSHA) regulations for construction, and with the additional safety provisions in the Contractor's safety plan.

B. The Contractor shall assume full responsibility to ensure that, during construction, his crew will follow a safety plan. The safety plan shall be prepared by the Contractor and approved by the Engineer prior to the start of the field construction. The safety plan shall have provisions for all aspects of protection against bodily injury from heavy construction equipment. The plan shall also have provisions for the excavation of refuse which shall be handled in a proper manner. Approval of the safety plan by the Engineer does not release the Contractor of liability in the event of an accident, or an injury, nor does it place any liability on the City. The Contractor shall be prepared to respond to potential injuries, illnesses, or situations of imminent hazard to employees or public health and safety. Personnel from local medical facilities shall be contacted in case of a medical need, and the quickest route to these facilities shall be determined in advance.

C. First aid facilities conforming at least to the minimum requirements of the Occupational Safety and Health Administration shall be provided in a readily accessible location or locations.

D. The Contractor shall make all reports as required by any authority having jurisdiction and shall permit all safety inspections of the work being performed under this contract. Before proceeding with any construction work, the Contractor shall take the necessary action to comply with all provisions for safety and accident prevention.

E. The Contractor shall comply with all federal, state, and local safety codes, ordinances, and regulations, including the requirements of the Occupational Safety and Health Administration, the Division of Industrial Safety and State of Arizona, whenever any work is being done in or within 50 feet of a refuse-filled area.

F. The Contractor is advised that decomposing refuse produces landfill gas which is approximately 50 percent methane (natural gas) by volume. Landfill gas is colorless, can be odorless, may contain hydrogen sulfide, is combustible, and contains no oxygen. Landfill gas can also migrate through soil near the landfill. The Contractor is therefore advised of the need for precautions against fire, explosion and asphyxiation when working in or near excavations which are in or near refuse fill areas.

1.02 LANDFILL SAFETY HAZARDS

A. Fires may start or be started from exposed and/or confined decomposing solid waste.

B. Fires or explosions may occur in confined or enclosed spaces.

C. Landfill gases displace oxygen and may cause an oxygen deficiency in underground trenches, vaults, conduits, and structures.

D. Heavy acid gases, including hydrogen sulfide (H_2S) may be present. H_2S is a colorless, toxic, flammable gas which, in low concentrations, has an offensive odor described as that of rotten eggs. It is unlikely that hazardous concentrations of H_2S will build up except in vaults or other confined spaces. H_2S, however, quickly numbs the olfactory senses so that reliance upon odor can lead to a very dangerous condition and cause instant death.

E. Wildlife which could represent hazards to humans include rattlesnakes and black widow spiders. Rodents, birds, and stray dogs should be treated as potential hazards.

F. Air quality studies consistently show that concentrations of most potentially hazardous substances (Priority Pollutants) in the ambient air on and in the vicinity of sanitary landfills are well below threshold limits. However, in confined or enclosed areas or venting sources of gas on or adjacent to landfills, dangerous concentrations of combustible and possibly toxic gases may accumulate. Oxygen depletion may also occur in these areas of confinement; therefore, planning shall be performed followed by safety procedures which shall be continuously observed.

1.03 GENERAL REQUIREMENTS

A. The Contractor shall assign a site Safety Officer during the course of the work. The site Safety Officer shall conduct safety orientation and instruction at all meetings with all workers prior to the start of operations. This person shall be trained in the use of all of the recommended safety equipment. The workers shall be advised concerning the kind and degree of hazard associated with the operations and the safety precautions required. Any persons employed after the initiation of operations shall also be oriented and instructed on said safety hazards and precautions.

B. Smoking or open flames shall be prohibited within 50 feet of the construction area or as directed by the Engineer.

C. No worker shall be allowed to work alone at any time in or immediately near an excavation and/or construction area. Another worker shall be present at the site, but shall maintain a safe distance to preclude possible adverse impacts from landfill gas.

D. Periodically during excavation and construction, the work area shall be monitored for levels of methane and hydrogen sulfide.

E. No worker shall handle excavated refuse without wearing work gloves.

F. Construction equipment shall be equipped with a vertical exhaust at least five feet above grade and/or with spark arresters.

G. Motors utilized in the excavation area shall be explosion-proof.

H. No welding shall be permitted within 50 feet of an excavation area.

I. No excavation or drilled hole greater than 12 inches deep shall be left open overnight unless securely covered in an acceptable manner.

J. All refuse excavated during construction activities shall be disposed of at a legal point of disposal. Refuse may be temporarily stockpiled if covered with a six-inch layer of earth, or a 30 mil flexible membrane liner, provided local health authorities approve.

K. Soil shall be stockpiled adjacent to operations in areas of exposed refuse for fire fighting purposes. Soil is probably the most effective means of extinguishing landfill fires (smothers by eliminating oxygen).

L. All personnel must wear hard hats.

M. At least two self-contained breathing apparatus shall be provided at the site for emergency purposes. Workmen should not be permitted to enter excavations where there is an oxygen deficiency or a combustible mixture of methane without taking precautionary measures.

N. A minimum of two fire extinguishers of the 50-pound dry chemical type shall be maintained or kept within easy access of the working area.

O. Startup and shutdown of equipment shall not be done in areas of exposed refuse.

P. When constructing and/or working in a manhole, vault, or other subgrade enclosure in and/or adjacent to the landfill site, the interior atmosphere shall be tested for the presence of oxygen, hydrogen sulfide, and methane gas before entry and continuously when occupied. The person entering should wear a parachute-type safety harness with attached tether secured to the surface. A self-contained breathing apparatus shall be available for use if needed. Forced-air ventilation fans shall be used to provide a fresh air stream.

Q. In addition to compliance to the safety rules and regulations of those governmental authorities having jurisdiction, the Contractor is advised of the presence of methane gas emanating from the natural decomposition of refuse buried at the job site and shall take precautions to ensure the safety of workers and the public. The Contractor shall demonstrate to the Engineer on a daily basis that all safety equipment is functioning properly, that all monitoring instruments are calibrated, and that the instrument operators are sufficiently knowledgeable in the use of the safety equipment.

R. A copy of the safety plan shall be posted at the job site. Scheduled meetings shall be held to review the safety program.

S. The Contractor shall adequately identify and guard all hazardous areas and conditions by visual warning devices and, where necessary, physical barriers. Such devices shall, at a minimum, conform to the requirements of OSHA. Excavations on project sites from which the public is excluded shall be marked or guarded in a manner appropriate for the hazard.

1.04 SAFETY EQUIPMENT

Prior to commencement of the construction of landfill gas migration control facilities, the following equipment shall be provided by the Contractor:

A. Hard hats and work gloves for all personnel.

B. First aid kit, eye wash station, stretcher, and blankets.

C. Two fire extinguishers, 50-pound dry chemical-type.

D. No smoking signs.

E. Acid gas/organic vapor respirators for each worker and observer with replacement cartridges which fit the respirator.

F. Two parachute-type harnesses and safety lines.

G. Two self-contained breathing apparatus.

H. Organic vapor analyzer capable of monitoring gaseous total organic compounds (TOCs) from 0 to 10,000 parts per million (PPM) by volume as methane.

I. Hydrogen sulfide indicator.

J. Barricades.

K. Ladders.

L. Suitable cover plate for excavations that will remain open at end of working day.

M. Air-moving equipment that can provide ventilation if working in a substandard air environment (trenches, manholes, etc.)

N. Clean water, soap, and paper towels.

1.05 SAFETY PROCEDURES FOR DRILLING AND INSTALLATION OF CONDENSATE TRAPS AND EXTRACTION WELLS IN LANDFILLS

A. If drilling and/or construction is not completed by the end of the working day, the hole shall be covered with a plate of sufficient thickness and with sufficient bearing over the undisturbed ground to prevent access to the hole and to support expected loads. The edges of the plate should be covered with sufficient depth of wet dirt to prevent escape of gas.

B. The Contractor is cautioned on the strong possibility of caving during drilling and well installation operations. Anyone working near the edge of the drilling borehole shall be secured with a safety belt and life line to preclude the possibility of falling into the opening. No more than four feet of slack shall be allowed in the tether line. In lieu of safety belt and life line, a construction platform over the borehole of the well will be acceptable. The platform shall be designed for the anticipated load.

1.06 OTHER CONSIDERATIONS

A. All utility lines installed in the landfill shall be constructed to accommodate site settlement.

B. All electrical, telephone, and other conduit to structures located on the landfill site shall be sealed to prevent landfill gas from entering the structures.

C. Payment for complying with the safety requirements in this Section shall be included in the Contractor price. No separate payment will be made.

END OF SECTION

SECTION 1 - GENERAL REQUIREMENTS

SUBSECTION C01029
BASIS OF PAYMENT

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

This section includes the items of work and the basis of payment for these tasks. The Contractor shall bid items A through V separately and provide a total sum for all work items.

A. Decommissioning and removal of existing equipment and structures at the flare stations and transporting to a site selected by the City or to an approved disposal facility. Payment for this work will be made on a lump sum basis.

B. Modification of 32 existing gas well heads by removal of existing fittings and valves, flexible connections, extension of the well head as required for reconnection to the new header. Payment for this work will be made on a unit price basis.

C. Removal of existing FRP header pipe from Cell A and Cell A-1, transporting pipe to a storage location designated by the City or to an approved disposal facility. Payment for this work will be made on a lump sum basis.

D. Drilling and installation of approximately 79 vertical landfill gas extraction wells to the depths shown in the Drawings on the gas well drilling schedule. This item includes installation of gas extraction well piping, refuse removal and disposal as hazardous waste, backfill and compaction. Payment for this work will be made on a unit price basis.

E. Drilling and installation of approximately 63 gas monitoring probes, including equipment, labor and materials. Payment for this work will be made on a unit price basis.

F. Abandonment of approximately 7 existing vertical landfill gas extraction wells by the procedure shown in the Drawings. This item includes removal of exposed gas extraction well piping, backfill and compaction. Payment for this work will be made on a unit price basis.

G. Abandonment of approximately 18 gas monitoring probes by the procedure shown in the Drawings, including equipment, labor and materials. Payment for this work will be made on a unit price basis.

H. Installation of condensate sumps. This item includes procurement, installation and assembly of condensate sump components, piping and fittings, refuse removal and disposal as hazardous waste, backfill and compaction. Payment for this work will be made on a unit price basis.

I. Construction of approximately 12,500 feet of HDPE gas collection header pipe of the sizes shown on the Drawings. Includes all labor and materials, trench excavation safety measures, bedding as required, HDPE pipe, joining of pipe and fittings, trench backfill and compaction, and refuse removal and disposal as hazardous waste. Payment will be made on the basis of lineal feet of pipe installed.

J. Connection of 79 new and 32 existing gas wells to the collection header. Includes all labor and materials as shown on the Drawings. Payment for this work will be made on a unit price basis.

K. Constructing the flare station foundations for Cell A and Cell A-1, including preparation of the flare station area, excavating and backfilling, forming, reinforcing and placing concrete as shown on the Drawings. Payment for this work will be made on a lump sum basis for each site.

L. Installation of all mechanical equipment for Cell A, as shown in the Drawings and included in these Specifications. Payment for this work will be made on a lump sum basis.

M. Installation of the Cell A landfill gas flare assembly, including all equipment supplied by the flare manufacturer. Payment for this work will be made on a lump sum basis.

N. Installation of Cell A flare station electrical switch gear and control panel, including all equipment, electrical and telephone services to the facility, instrumentation and controls, conduits, wiring and ancillary equipment as shown in the Drawings. Payment for this work will be made on a lump sum basis.

O. Installation of the Cell A-1 gas handling and flare assembly skid, including resources necessary for the installation of new electrical power service. Payment for this work will be made on a lump sum basis.

P. Mobilization and demobilization. This task includes any and all temporary facilities and utilities, safety plans, and construction equipment required for this project. Payment for this work will be made on a lump sum basis.

Q. Construction of approximately 11,900 feet of HDPE compressed air line piping of the sizes shown on the Drawings. Includes all labor and materials, HDPE pipe, and joining of pipe and fittings. Trench, backfill, compaction and refuse removal/disposal costs are covered in item I. Payment will be made on the basis of lineal feet of pipe installed.

R. Construction of approximately 11,900 feet of HDPE condensate piping of the sizes shown on the Drawings. Includes all labor and materials, HDPE pipe, and joining of pipe and fittings. Trench, backfill, compaction and refuse removal/disposal costs are covered in item I. Payment will be made on the basis of lineal feet of pipe installed.

S. Installation of the two Cell A air compressor skids. Payment for this work will be made on a lump sum basis.

T Installation of the two Cell A-1 air compressor skids. Payment for this work will be made on a lump sum basis.

U. Installation of the 9,200 gallon Cell A condensate storage tank, including a 10,360 gallon secondary containment tank; granulated activated carbon vessel; and associated pipe, fittings, and appurtenances. Payment for this work will be made on a lump sum basis.

V Installation of the 1,400 gallon Cell A-1 condensate storage tank, including a 2,900 gallon secondary containment tank; granulated activated carbon vessel; and associated pipe, fittings, and appurtenances. Payment for this work will be made on a lump sum basis.

END OF SECTION

SECTION 1 - GENERAL REQUIREMENTS

SUBSECTION C01170
SPECIAL PROVISIONS

PART 1: GENERAL

1.01 PROJECT REQUIREMENTS

A. The installation shall be in strict conformance with all applicable federal, state, and local regulations.

B. All work shall be performed in accordance with the Maricopa Association of Governments' Uniform-Standard Specifications and Uniform Standard Details, and City of Phoenix Special Provisions.

C. In the event of a conflict between these Specifications and the standard specifications, these Specifications shall govern. Additionally, in the event of a conflict between these Specifications and the contract Drawings, the Drawings shall govern, with the exception of specific parts described in the Equipment Data Sheets (a part of these Specifications), wherein the Equipment Data Sheets shall govern. All such conflicts shall be reported in writing immediately to the City of Phoenix. No extra work shall be performed on this contract without the express and written authorization by the City.

D. All work, materials and methods of construction shall be subject to the inspection of the City (or their authorized representative), who shall be the judge of quality and suitability for the purposes for which they are used. If any of them fail to meet his approval, the same must be replaced, corrected or otherwise made good, as the case may require, by the Contractor at his own expense.

E. Any deviations, exceptions, additions, deletions or recommendations to this Specification must be submitted to the City.

F. The work shall conform to such other addenda, revisions, and supplementary drawings relating thereto as may be furnished by the City, and to such drawings in explanation of details or minor modifications as may be furnished from time to time during construction, including such minor modifications as the City may consider necessary during the prosecution of the work. All such addenda, revisions, or supplementary drawings will be submitted to the City.

G. The written dimensions on the Drawings are presumed correct, but the Contractor shall be required to check all dimensions carefully before beginning the work. If any errors or omissions are discovered, the Engineer shall be so advised in writing and shall make the proper corrections. After the completion of this project, the Contractor shall supply "As-Built" drawings as described in S.P. C01730.

1.02 PERMITS AND LICENSES

A. The Contractor shall procure all construction permits and licenses, including the Maricopa County Bureau of Air Pollution Control Flare Station Operating Permits, and give all notices necessary and incident to the due and lawful prosecution of the work. The City shall waive all charges and fees for permits and licenses.

1.03 WASTE DISPOSAL

A. The Contractor shall dispose of surplus materials, waste products, and debris and shall make necessary arrangements for such disposal. This does not include refuse disposal which is specified in Section C01010.

B. Ditches, washes, or drainage ways shall not be filled if filling may create water control problems.

C. Disposal operations shall not create unsightly or unsanitary nuisances.

D. The Contractor shall maintain the disposal site in a condition of good appearance and safety during the construction period.

E. Prior to final acceptance of the work, the Contractor shall have completed the leveling and cleanup of the disposal site.

END OF SECTION

SECTION 1 - GENERAL REQUIREMENTS

SUBSECTION C01340
SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

Submission to the Engineer and Owner for design review, shop drawings, product data, and samples required by the Contract Documents. In ample time for each to serve its purpose and function, the Contractor shall submit to the Engineer such schedules, reports, drawings, lists, literature samples, instructions, directions, and guarantees as are specified or reasonably required for construction, operation, and maintenance of the work.

1.02 SCHEDULE

The Contractor shall submit a submission schedule to the Engineer and Owner for review.

1.03 COSTS OF PREPARING SUBMITTALS AND REVISING SUBMITTALS

Costs of preparing submittals as specified herein shall be part of the Contract price for all work originally contemplated under the Contract. For changes to the Contract, both additive and deductive, the Contractor may request compensation for revision of shop drawings. Compensation will not be allowed for submittal of brochure or samples, or for detailing costs caused by disapproval of shop drawings. If the Contractor wishes to request compensation for detailing costs caused by changes, he shall submit his request in advance of making the changes. The request shall include the hourly rate, and a guaranteed maximum cost. Markups for overhead, profit, or fringe benefits will not be authorized. Requests for compensation which are made after the work is done will not be considered. Prior to the Engineer's review of such Drawings, any work which the Contractor may do on the fabrications covered by the same, shall be at his own risk. The Owner will not be responsible for any expense or delays incurred by the Contractor for changes to make the same conform to the Contract Documents.

1.04 SCHEDULE OF SUBMITTALS

A. A schedule of shop drawings submittals shall be made within fifteen (15) days of award of Contract. If the Contractor requires additional time for certain items, he shall request, in writing, permission for extension of time, stating the affected items, the reason for the request, and the approximate date when the submittal can be made.

B. All submittals shall be made in time to avoid delaying the work.

1.05 SUBMISSION REQUIREMENTS

A. Prior to submitting, the material shall be checked for compliance with these Specifications. Include transmittal with each submittal.

B. Shop Drawings shall include:

1. Project title.

2. Name of Contractor, subcontractor.

3. Field dimensions.

4. Identification of product and materials.

5. Fabrication and erection details.

6. Identification of deviations from Contract requirements.

7. Contractor's stamp (approximately 3" x 1/2)" and signature signifying that each drawing submitted complies with the Contract Documents as follows:

   Reviewed By:_____

   Contractor's Name:
   Job Name:
   Job Location:
   Job Number: Date:_____

8. Reference numbers as to sheet and detail, schedule, or room numbers shown on Contract Drawings, and specification section number where applicable.

9. Indication of complete method of connection, jointing, support, anchorage, reinforcement, and other features of construction, including abutting finish surface.

10. Reference to the specification paragraph number.

C. Product date shall include:

1. The date of submission and the dates of any previous submissions.

2. The project title and number.

3. Trade identification.

4. The names of the Contractor and supplier.

5. Identification of the product, including the specification section number.

6. Field dimensions, clearly identified.

7. Relations to adjacent or critical features of the work or materials.

8. Applicable standards, such as ASTM, federal specification numbers, or as indicated.

9. Identification of deviation from Contract Documents.

10. Identification of revisions on resubmittals.

11. Contractor's stamp, signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of the Contract Documents.

12. Performance characteristics and capacities.

13. Dimensions and clearances required.

14. Wiring or piping diagrams and controls.

15. Specification paragraph number.

D. Samples shall consist of:

1. Samples of material, size, and finish specified.

2. Tags or labels (at least 3" x 4") which are attached to samples or inscribed with the following information: job, Owner, material, texture, finish, model or catalog number, and Contractor's stamp with signature indicating he has reviewed the submittal and that it is in conformance with the Contract Documents.

3. Full range of color, texture, and pattern, if not specified.

4. At the option of the Owner or Engineer, samples may be subject to testing, and in such event, additional samples as required shall be supplied by the Contractor at no additional cost.

5. Specification paragraph number.

E. Each submittal shall be accompanied by a letter of transmittal containing a complete itemized and numbered list of the submittal material together with the subcontractor's name. Separate letters of transmittal shall accompany each submittal from different subcontractors and different categories (trades and building units).

F. Bound sets of brochures, catalog sheets, specifications and materials lists shall include an index sheet completely identifying the entire contents of the submittal in sequential order. The Contractor shall identify, stamp, and sign only this index sheet. Include a listing with specific model numbers, manufacturer, types, etc.

G. In lieu of signing each brochure or specification sheet, the Contractor may indicate on the letter of transmittal that he has reviewed and approved all the material included. This does not eliminate the requirement for identification stamp information.

H. Submittals:

1. Forward all submittals to the office of the City Engineer.

1.06 COPIES REQUIRED

Submit the following number of copies of each item unless required otherwise in the Specification.

A. Shop Drawings: One (1) sepia transparency and five (5) prints.

B. Brochures, catalog cuts, diagrams, charts, schedule, and other standard descriptive data: Six (6) sets, bound in sequence.

1.07 RESUBMISSION REQUIREMENTS

A. The Engineer will return to the Contractor one (1) copy of the ozalid transparency, and two (2) sets of brochures and prints, stamped and signed, with the corrections noted, if any.

B. Make all corrections or changes in the submittals required by the Engineer and resubmit only when so indicated.

E. Shop Drawings and product data:

1. Revise initial drawings or data, and resubmit only when so indicated on the submittal.

2. Indicate all changes which have been made other than those requested by the Engineer.

1.08 ENGINEER'S RESPONSIBILITIES

A. The Engineer will review submittals for design concept and general compliance with the Contract Documents. He will not be responsible for quantity, size, or dimensional errors on the Shop Drawings.

B. The Engineer will affix to the submittal a stamp indicating the action to be taken, and will return the submittal within five (10) working days after receipt.

C. Approval of a separate or specified item does not constitute acceptance of an assembly in which the item functions.

1.09 DISTRIBUTION

A. Contractor: Responsible for his own use and that of subcontractors, suppliers, the manufacturer, and field workers.

B. Engineer: Responsible for his own use and that of the Owner.

1.10 SPARE PARTS

The Contractor shall furnish the Owner five (5) identical sets of information on spare parts for all equipment being furnished. The spare parts list shall include the current price for each part, and shall be limited to those parts which manufacturers recommend be maintained by the Owner in inventory at the plant site.

END OF SECTION

SECTION 1 - GENERAL REQUIREMENTS

SUBSECTION C01400
CONTROL OF WORK

PART 1: GENERAL

1.01 QUALITY CONTROL

A. All materials and equipment shall be new and of the specified quality and equal to the samples found to be acceptable by the City, if samples have been submitted. The work shall be done and completed in a thorough, workmanlike manner, notwithstanding any omission in the Contract Documents.

B. At the option of the Contractor, materials and equipment to be supplied under this Contract will be tested and inspected either at their place of origin or at the work site. The Contractor shall give the City notification a minimum of two (2) weeks in advance of actual readiness of materials and equipment to be tested and inspected at point of origin. Satisfactory tests and inspections at the point of origin shall not be construed as a final acceptance of the materials and equipment, nor shall such tests and inspections preclude retesting or reinspection at the work site.

C. Materials and equipment requiring testing and inspection at the place of origin shall not be shipped prior to such testing and inspection.

D. Inspectors employed by the City shall be authorized to inspect all work done and materials and equipment furnished. Such inspection may extend to all or any part of the work, and to the preparation, fabrication, or manufacture of the materials and equipment to be used. The Inspector will not alter or waive the provisions of the Contract Documents.

E. The Contractor shall at all times maintain proper facilities and provide safe access to all parts of the work, to the shops wherein the work is in preparation, and to all warehouses and storage yards wherein materials and equipment are stored, for purposes of inspection by the City.

F. The Contractor shall furnish the City with every reasonable facility for ascertaining whether or not the work as performed is in accordance with the requirements and intent of the Specifications and Contract. Should any work be covered before acceptance or consent of the City, it must, if required by the City, be uncovered for examination at the Contractor's expense.

1.02 WARRANTY OF WORK

A. All equipment, materials, and articles incorporated in the work covered by this Contract shall be new and subject to review and acceptance by the City unless otherwise specifically provided for in the Specifications.

B. Where equipment, materials, or articles are referred to in the Specifications as "or equivalent," or "equal to" any particular standard, the Engineer shall decide the question of equality.

C. The Contractor shall guarantee the work against defective materials or workmanship for a period of one (1) year from the date of its final acceptance under this Contract except where longer or shorter warranty periods are specifically stated by the manufacturer of individual components.

D. It is the Contractor's ultimate responsibility to deliver, at the time of final acceptance, a complete project that complies in all details with these Specifications. All items should be ready to operate.

E. During the warranty period, should the Contractor fail to remedy defective material or workmanship, or to make replacements within five (5) days after written notice by the City, it is agreed that the City may make such repairs and replacements and the actual cost of the required labor and materials shall be chargeable to and payable by the Contractor.

F. In the event it is necessary for the City to file suit to enforce any liability of the Contractor pursuant to this article, Warranty of Work, the Owner shall be entitled to recover from the Contractor, in addition to all other amounts found due and owing, costs of suit and reasonable expenses and fees, including reasonable attorneys' fees, incurred by the Owner in successfully enforcing the Contractor's obligations, all to be taxed as costs and included in any judgment rendered.

G. The warranty provided herein shall not be in lieu of, but shall be in addition to any warranties or other obligations otherwise imposed by law. The remedies provided herein shall not be exclusive and the City shall be entitled to any and all remedies provided by law.

END OF SECTION

SECTION 1 - GENERAL REQUIREMENTS

SUBSECTION C01630
PRODUCT SUBSTITUTIONS

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

Furnish and install the products specified under options and conditions for substitutions stated in this section.

1.02 SUBSTITUTIONS

A. If the Contractor desires to have consideration given to items other than those specified, he may submit such request to the Engineer and Owner. Requests will be considered only in the case of product unavailability or when the substitution will result in a net savings of cost or time to the Owner. The Contractor shall submit five (5) copies of requests for substitution.

B. The Contractor shall submit a separate request for each substitution. The Contractor shall support each request with the following:

1. Complete data substantiating compliance of the proposed substitution with requirements stated in the Contract Documents:

   a. Product identification, including manufacturer's name and address.

   b. Manufacturer's literature, identifying the following:

      (1) Product description.
      (2) Reference standards.
      (3) Performance and test data.
      (4) Samples as applicable.

2. Itemized comparison of the proposed substitution with the product specified, including a list of significant variations.

3. Data relating to changes in construction schedule.

4. List of changes required in other work or products.

5. Accurate cost data comparing the proposed substitution with the product specified. Amount of any net change to the Contract Sum.

6. Designation of availability of maintenance services, sources, or replacement materials.

C. Substitutions will not be considered for acceptance when:

1. They are indicated or implied on Shop Drawings or product data submittals without a formal request from the Contractor.

2. They are requested directly by a subcontractor or suppliers.

3. Acceptance will require substantial revision of Contract Documents as determined by the Engineer. The cost or revision, if any, shall be borne by the Contractor.

D. Substitute products shall not be ordered or installed without written acceptance from the Engineer or Owner.

E. The Engineer will determine the acceptability of proposed substitutions.

F. A "No-Credit" substitution may be requested only in the event it is found that the specified item is not available or is obsolete at the time of construction.

1.03 CONTRACTOR'S REPRESENTATION

In making formal requests for substitution, the Contractor represents that:

A. He has investigated the proposed product and has determined that it is equal to or superior in all respects to that specified.

B. He will provide the same warranties or bonds for the substitution as for the product specified.

C. He will coordinate installation of the accepted substitution into the work, and will make such changes as may be required for the work to be complete in all respects.

D. Cost data is complete and includes related costs under his Contract, except:

1. Engineer's costs for redesign or revision of Contract Documents.

2. Costs incurred by other trades at the time of installation which are the result of a substitution of material or equipment and paid by other trades.

E. The Contractor waives all claims for additional costs or delays related to substitution which consequently becomes apparent.

F. The substitution is acceptable to all governmental agencies having jurisdiction over the work.

1.04 ENGINEER'S DUTIES

A. Review Contractor's requests for substitutions.

B. Issue Addendum on approved substitutions in a timely manner.

1.05 CONTRACTOR'S OPTIONS

A. For products specified only by reference standard, select product by any manufacturer meeting that standard. The Contractor shall submit five (5) copies of requests to the Engineer for each product. Requests shall include the following information:

1. Name and address of manufacturer.

2. Trade name.

3. Model or catalog designation:

a. Reference standards.
b. Performance test data.

B. The Contractor shall tabulate products by specification section numbers and titles.

C. For products specified by naming several products or manufacturers, select any one of the products and manufacturers named which complies with the Specifications.

D. For products specified by naming one of more products or manufacturers and stating "or equal," submit a request, as for substitutions, for any product or manufacturer which is not specifically named.

E. For products specified by naming only one product and manufacturer, there is no option. No substitution will be allowed.

END OF SECTION

SECTION 1 - GENERAL REQUIREMENTS

SUBSECTION C01640
PRODUCT HANDLING AND PROTECTION

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall transport, deliver, handle, and store materials and equipment at the job site in such manner as to prevent damage, including damage which might result from the intrusion of foreign matter or moisture. The Contractor shall comply with the following:

1. Manufacturer instructions for material and equipment regarding temperature limitations.

2. Other environmental conditions which are required to maintain the original quality of the materials and equipment.

e. Material handling designed to prevent damage to products and finishes.

B. Packaging:

1. The Contractor shall maintain packaged materials in manufacturers' original containers with seals unbroken and labels intact until they are incorporated into the work.

2. Packaged material shall bear the name of the manufacturer and the product, including brand name, color, stock number, and all other complete identifying information.

C. The Contractor shall remove all damaged or otherwise unsuitable materials and equipment promptly from the job site.

D. Storing, the Contractor shall:

1. Locate storage piles, stacks, or bins so as to avoid being disturbed. Provide barricades as required to protect storage from damage.

2. Store all materials and equipment in accordance with manufacturer instructions, above grade, and properly protected from weather and construction activities. Provide space heaters to prevent condensation as necessary.

E. Protection, the Contractor shall:

1. Protect all finished surfaces.

2. Ensure that all finished surfaces are clean, unmarred, and suitably protected until accepted by Owner.

3. Consult individual Specification sections for additional specific product handling and protection requirements.

END OF SECTION

SECTION 1 - GENERAL REQUIREMENTS

SUBSECTION C01650
QUALITY CONTROL

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. All materials and equipment shall be new and of the specified quality and equal to the samples found to be acceptable by the Owner, if samples have been submitted. The work shall be done and completed in a thorough, workmanlike manner, notwithstanding any omission in the Contract Documents. The Contractor shall call the Owner's attention to apparent errors or omissions and request instructions in writing before proceeding with the work. The Owner may, by appropriate written instructions, correct errors and supply omissions, which instructions shall be as binding upon the Contractor as though contained in the original Contract Documents.

B. At the option of the Owner, materials and equipment to be supplied under this Contract will be tested and inspected either at their place of origin or at the site of the work. The Contractor shall give the Owner written notification well in advance of actual readiness of materials and equipment to be tested and inspected at point of origin. Satisfactory tests and inspections at the point of origin shall not be construed as a final acceptance of the material and equipment, nor shall such tests and inspections preclude retesting or reinspection at the work site.

C. Materials and equipment which will require testing and inspection at the place of origin shall not be shipped prior to such testing and inspection.

1.02 INSPECTION

A. Materials, equipment, and workmanship shall be subject to the inspection of, and rejection by, the Owner, if not in conformance with the Contract Documents. Defective materials, equipment, or work shall be replaced with new and acceptable materials, equipment, or work.

B. On all questions concerning the acceptability of materials or equipment, classification of materials or equipment, execution of the work, and the determination of costs, the decision of the Owner shall be final and binding upon all parties.

C. The Contractor shall at all times maintain proper facilities and provide safe access to all parts of the work, to the shops wherein the work is in preparation, and to all warehouses and storage yards wherein materials and equipment are stored, for purposes of inspection by the Owner/Engineer.

1.03 SAMPLES AND TESTS

A. At the option of the Owner, the source of supply of materials for the work shall be subject to inspection before the delivery is started and before such materials are used in the work. Representative preliminary samples of the character and quality prescribed shall be submitted by the Contractor or producer of materials to be used in the work in sufficient quantities or amounts for testing or examination.

B. Any tests of materials furnished by the Contractor shall be made in accordance with the commonly recognized standards of national technical organizations, and such special methods and tests are prescribed in the Contract Documents.

1.04 SAMPLING

The Contractor shall furnish such samples of materials as are requested by the Owner without charge. No material shall be used until the Engineer has had the opportunity to test or examine such materials. Samples will be secured and tested whenever necessary to determine the quality of the materials. Samples and test specimens prepared at the job site, such as concrete test cylinders, will be taken or prepared by the Owner in the presence and with the assistance of the Contractor.

1.05 TESTING

A. Except for tests otherwise specified, all routine tests of materials shall be at the expense of the Contractor and shall be performed in a laboratory designated by the Owner.

B. In the event the Contractor protests a failing test of material in place or to be used, he shall take additional samples as herein specified and have additional tests run at his own expense. In the event the original test proves to have been in error, the Contractor shall be reimbursed for his direct costs of sampling and testing.

1.06 TEST STANDARDS

A. All sampling, specimen preparation, and testing of materials shall be in accordance with the standards of nationally recognized technical organizations.

B. The physical characteristics of all materials not particularly specified shall conform to the latest standards published by the American Society for Testing Materials, where applicable.

1.07 EQUIPMENT TESTS

All items of mechanical equipment shall be tested for proper operation, efficiency, and capacity.

END OF SECTION

SECTION 1 - GENERAL REQUIREMENTS

SUBSECTION C01700
ACCEPTANCE OF WORK

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

Procedures for substantial completion and for final acceptance.

1.02 SUBSTANTIAL COMPLETION

A. Prior to final acceptance of the construction by the City, the following items must be completed at a minimum:

1. A written notice that the work, or designated portion thereof, is substantially complete.

2. A list of items to be completed or corrected.

3. A final walk-through conducted by the City, Engineer, and Contractor to verify that all work is substantially complete, and that it has been performed in accordance with all Plans and Specifications.

4. Demonstration by the Contractor that all equipment is operational.

1.03 FINAL ACCEPTANCE

A. When the work is considered complete, the Contractor shall demonstrate that the following items have been accomplished at a minimum:

1. Work has been completed in accordance with the Contract Documents.

2. Equipment and systems have been tested in the presence of the Owner's representative and are operational.

3. A complete and up-to-date listing of all subcontractors and suppliers for the project. The list shall include names, addresses, telephone numbers, the name of the contact person, and a description of the work performed or the material provided by each.

4. A notarized statement from the Contractor guaranteeing all work for the period of one (1) year from the date of Substantial Completion.

5. One complete set of reproducible drawings with each sheet stamped "As-Built" and signed and dated by the General Contractor and each respective subcontractor.

6. Submittal of ten (10) sets of all necessary complete O&M literature, bound in loose-leaf 3-ring binders, for all equipment installed by the Contractor.

END OF SECTION

SECTION 1 - GENERAL REQUIREMENTS

SUBSECTION C01710
FINAL CLEANING

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall clean up construction debris from the building, yard, and public property and remove it from the site.

B. The Contractor shall implement final cleaning of building components as specified herein.

1.02 SAFETY REQUIREMENTS

A. Standards. The Contractor shall maintain the project in accordance with state and local safety and insurance standards.

B. Hazards control. The Contractor shall:

1. Store volatile wastes in covered metal containers, and remove them from the premises daily.

2. Prevent accumulation of wastes which create hazardous conditions.

C. Conduct cleaning and disposal operations to comply with local ordinances and antipollution laws. The Contractor shall:

1. Not bury any rubbish or waste materials on the project site unless specifically authorized to do so by the City, and then only in designated areas.

2. Not dispose of volatile waste such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

3. Not dispose of wastes into streams or waterways.

4. Haul debris to a legal disposal facility.

1.03 APPLICABLE STANDARDS

A. Environmental Protection Agency (EPA) regulations.

B. Occupational Health and Safety (OHSA) regulations.

C. State and local laws.

PART 2: PRODUCTS

2.01 MATERIALS

The Contractor shall:

A. Use only those cleaning materials recommended by the manufacturer on the surface to be cleaned.

B. Use cleaning materials only on surfaces recommended by the cleaning material manufacturer.

PART 3: EXECUTION

3.01 DURING CONSTRUCTION

A. Clean-up:

1. The Contractor shall furnish on-site rubbish collection containers and provide weekly rubbish removal service.

2. Prior to completion of the work, remove from the vicinity of the work all temporary structures, unused materials, concrete forms, and other like materials. All work areas shall be graded and left in a neat condition conforming to the natural appearance of the landscape or as directed elsewhere in the Contract Documents.

B. Disposal of waste materials onsite: Disposal of waste materials on the site or on the property within the project limits must have the prior written approval of the Owner.

C. Disposal of material by removal:

1. Prior to completion of the work, remove from the construction area all materials designated by the Owner to be removed.

2. All material to be removed shall become the property of the Contractor. The Contractor shall remove and dispose of all materials in a legal manner. The Contractor is responsible for the selection of the disposal facility and the length of the haul.

3. The Contractor shall make all necessary arrangements with private parties and with local officials pertinent to the locations and regulations for disposal.

4. The Contractor shall pay all fees or charges required for the disposal of materials.

D. In the event the Contractor fails to perform the cleanup work, the Owner may have this work performed at the expense of the Contractor. In that case, the surety or sureties of the Contractor are liable.

3.02 FINAL CLEANING

The Contractor shall:

A. Employ experienced workmen or professional cleaners for final cleaning.

B. Expedite the cleaning, washing, waxing, and polishing required within the technical sections of the Specifications. In addition, perform final cleaning to remove all foreign matter, spots, soil, and construction dust, so as to get the project in a complete and finished condition ready for acceptance and the use intended. Remove all marks, stains, fingerprints, and other soil or dirt from all painted, enameled, or varnished work and all other exposed finished surfaces.

C. Remove all glazing compound, sealant, stains, and paint from all glass. Wash and polish glass, using care not to scratch glass. At completion, replace all broken and scratched glass.

D. Broom clean floors that are not scheduled to receive finishing material or coating.

E. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior finished surfaces; polish bright surfaces to a shine finish.

F. Repair, patch, and touch-up marred surfaces to the specified finish to match adjacent surfaces.

G. Broom clean paved surfaces; rake clean other surfaces of grounds.

H. Keep project clean at all times.

I. Ascertain that all roof drains, scuppers, floor drains, and area drains are free of debris.

3.03 LIABILITY

The Contractor shall be held liable for replacement costs of any plant material damaged or destroyed by contact with waste products such as, but not limited to, cleaning compounds, sealers, and chemicals, or by the disposal of waste products into planting areas during construction.

END OF SECTION

SECTION 1 - GENERAL REQUIREMENTS

SUBSECTION C01730
OPERATING AND MAINTENANCE DATA

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

The Contractor is responsible for the following requirements:

A. Compilation of product data and related information required for maintenance of products, including specifications, drawings, and descriptions of equipment; installation instructions; operating and maintenance instructions; parts list; and, where applicable, test data and curves for each type of equipment. The Contractor shall also supply "As-Built" drawings of the installed systems, system components, and equipment in a format designated by the Owner.

B. Preparation of Operations and Maintenance Manual comprised of the compiled operation and maintenance data and instructions for systems, system components, and equipment. The Manual shall be bound in a substantial cover having indicated thereon the types of equipment, manufacturer's name, and year of purchase.

C. Instruction of Owner's personnel in maintenance of products and operation of equipment and system.

D. Schedule of required submittals.

1.02 QUALITY ASSURANCE

In preparation of data required by this Section, the Contractor shall use only personnel who are thoroughly trained and experienced in operation and maintenance of the described items, completely familiar with the requirements of this Section, and skilled in technical writing to the degree needed for communicating the essential data.

1.03 SUBMITTALS

A. Preliminary: Not later than three (3) weeks prior to completion of the project, the Contractor shall submit two (2) copies of a preliminary draft of the proposed Operations and Maintenance Manual or Manuals to the Engineer for review and comment.

B. Final: Unless otherwise directed in other pertinent sections, or in writing by the Engineer, the Contractor shall submit ten (10) copies of the final Operations and Maintenance Manual to the Engineer prior to indoctrination of operation and maintenance personnel.

C. Revisions: Following the indoctrination and instruction of operation and maintenance personnel, the Contractor shall review all proposed revisions of Operations and Maintenance Manuals with the Engineer.

1.04 MANUALS

A. Format:

1. Size: 8-1/2: x 11". Heavy-duty plastic or cardboard three-ring binder.

END OF SECTION

SECTION 1 - GENERAL REQUIREMENTS

SUBSECTION C01750
STARTUP AND TESTING

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

The Contractor shall provide startup and testing after the equipment has been installed and immediately after receiving written notice from the Owner that these services are desired.

1.02 EQUIPMENT STARTUP

A. The Contractor shall maintain the existing gas extraction and flaring systems in operating condition during the construction of the new equipment.

B. The Contractor shall provide the services of an experienced factory-trained service engineer for one (1) eight-hour day to provide startup services. After the equipment has been installed, factory-trained service personnel shall perform final adjustments and inspection, lubricate, check oil levels, and ensure that the equipment is in proper condition for operation.

C. The test operation of each piece of mechanical equipment shall continue for not less than eight hours without interruption. All parts shall operate satisfactorily in all respects, under continuous full load and in accordance with the specified requirements for the full duration of the eight-hour test period. If any part of a unit shows evidence of unsatisfactory or improper operation during the eight-hour test period, correction or repairs shall be made by the Contractor and the full eight-hour test operation, as specified above, shall be completed again until all parts operate satisfactorily.

1.03 FINAL TEST OPERATION

A. After the equipment is installed and ready to be placed into full-time operation, the Owner will test all equipment for a period not to exceed seven (7) days by operating either under actual or simulated operating conditions before final acceptance is given. All defects of material or workmanship which appear during this test period shall be corrected by the Contractor. After such corrections are made, the seven-day test may be run again before final acceptance, if it is deemed advisable by the Owner.

B. The Contractor shall supply all power, water, oil, grease, auxiliaries, and operating personnel required for this final test operation.

C. The Contractor shall include in his bid an allowance for factory-trained service personnel, as described above, to adjust all of the said equipment supplied by him until this equipment has been tested by the Owner and the results of these tests are satisfactory to the Owner.

1.04 TRAINING

A. The Contractor shall provide the services of experienced factory-trained manufacturer's representatives, fluent in the English language, for a total of one (1) eight-hour day of classroom and

hands-on training on the equipment provided under this Contract. The training shall include instructions in the operation and maintenance of the equipment provided. Training shall be at a time convenient to the Owner.

B. One clean, reproducible copy shall be provided of all instructional materials, including videotapes, flip charts, slides, and pamphlets. The Owner shall have the right to make a videotape of all training sessions for their future training use.

END OF SECTION

END OF DIVISION ONE

SECTION 2 - SITE WORK

SUBSECTION C02500
LANDFILL GAS COLLECTION WELLS

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. Work related to the landfill gas collection wells shall consist of furnishing and installing solid and perforated pipe and fittings, bentonite soil seal, gravel, and backfill - all in accordance with details as indicated on the Drawings and as specified herein.

B. The excavation, backfill, and disposal of excavated material related to the construction of landfill gas collection wells shall conform to all applicable requirements of these Specifications.

C. The Contractor shall lay out the locations of landfill gas collection wells in the field for the approval of the Engineer.

D. The hole drilled for each well shall be a minimum of 24 inches in diameter. The depth of the wells shall be to the maximum depth of trash for that well, and shall not penetrate the bottom of the landfill. If the bottom of the landfill is penetrated, the Engineer is to be notified, and the bore of the well shall be backfilled with Bentonite to a minimum of 5 feet to seal the bottom of the bore before installation of the well.

E. The bore for the well shall be straight, and the well pipes shall be centered in the bore. The Contractor shall take all necessary precautions to maintain the well pipes vertically plumbed during backfilling of the bore. If the pipes are installed out of plumb, the Contractor shall correct the alignment at his own expense.

F. If, during the drilling of a well, an obstruction is reached such that the collection well cannot be completed to the full depth as called for on the Contract Drawings, the Engineer shall be consulted as to whether the borehole has advanced to a sufficient depth. If, in the opinion of the Engineer, the borehole has reached a sufficient depth, the Contractor shall be required to complete the collection well, and he will be compensated based on the depth actually reached or as specified in the bid proposal.

G. If, in the opinion of the Engineer, the borehole has not reached a sufficient depth to function as an effective collection well, the Contractor shall abandon this borehole by backfilling it with soil. The backfill material shall be placed in the borehole in three-foot lifts and hand-tamped. The Contractor will be compensated for this additional work as specified in the bid proposal.

H. The PVC pipe and fittings used in the wells shall be Schedule 40, and shall conform to all applicable requirements of these Specifications.

I. The perforations in the pipe in the landfill gas collection wells shall be as given on the Drawings. The pipe and fittings shall be Schedule 40 PVC. The bottom of the perforated pipe shall be blocked with a cap.

J. The gravel backfill around the perforated pipe shall be made with clean Class 2 aggregate. The maximum size of aggregate shall be 2 inches, and the minimum shall be 3/4 inch.

K. The backfill in the well bore shall be free of construction debris and rocks in excess of 1-1/2 inches. The material shall be from excavation and shall be compacted to a density equal to 90 percent relative compaction.

L. The bentonite material shall be Volclay bentonite as produced by the American Colloid Company or equal. The bentonite-soil seal shall be placed at the designated locations along the well pipe and shall be prepared with five pounds of bentonite per cubic foot of soil. The soil material shall not contain rocks greater than 2 inches in any dimension. The soil shall be approved by the Engineer. Immediately prior to placement, the mixture shall be wetted to a thick mud consistency.

M. The completed well shall be extended above grade and temporarily capped until the lateral piping is installed.

N. The Contractor shall connect the gas collection well to the gas header pipe according to the design drawings and shall include all pipe, valves, fittings, and meter boxes.

O. The Contractor shall relocate the flare stack at Cell A, as shown in the drawings, such that the flare station can continue service to the gas collection system until the new flare station is installed and operational. The flare stack relocation shall include installation of temporary concrete pad and re-routing and connection of the propane line, electrical conduits, and landfill gas header to the temporary flare stack location. After the new flare station is deemed operational by the Engineer, the old flare station shall be dismantled and delivered to the Skunk Creek Landfill per the Engineer's instructions.

P. The Contractor shall connect the new gas collection system at Cell A-1 to the existing flare station such that it can continue service to the gas collection system until the new flare station is installed and operational. The new gas collection system is to be temporarily connected to the existing flare station for continued operation during construction. After the new flare station is deemed operational by the Engineer, the old flare station shall be dismantled and delivered to the Skunk Creek Landfill per the Engineer's instructions.

END OF SECTION

SECTION 2 - SITE WORK

SUBSECTION C02600
LANDFILL GAS MONITORING PROBES

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. Work related to the gas monitoring probes shall consist of furnishing and installing meter boxes, fittings, bentonite-soil mix, pea gravel, and perforated pipe, all in accordance with details as indicated on the Drawings and as specified herein.

B. The excavation, backfill, and disposal of excavated material, related to the construction of the monitoring wells, shall conform to all applicable requirements of these Specifications.

C. The Contractor shall lay out the locations of the gas monitoring probes for the approval of the Engineer. The Contractor shall maintain a log showing the depth of each hole drilled.

D. The hole drilled for the monitoring well shall be a minimum of six inches in diameter. The depth of the monitoring well shall be as shown on the Drawings.

E. The PVC pipe and fittings used in the intake point shall be Schedule 80, and shall conform to all applicable requirements of these Specifications.

F. Bentonite material shall be Volclay bentonite as produced by the American Colloid Company or equal. The bentonite and soil mixture seal shall be placed at the designated locations along the pipe. Immediately prior to placement, the bentonite shall be wetted to a thick mud consistency.

G. The perforations in the probe piping shall be as shown on the Drawings.

H. The gravel backfill around the perforated pipe shall be made with clean pea gravel.

I. The bore for the intake point shall be straight, and the pipe for the intake point shall be installed vertically in the bore.

J. The backfill around the probes shall be free of construction debris and rocks in excess of one inch. The material may be from excavation, and shall be compacted to 90 percent relative compaction.

K. The meter box shall be as specified on the Drawings.

END OF SECTION

SECTION 2 - SITE WORK

SUBSECTION C02700
LANDFILL GAS CONDENSATE MANAGEMENT SYSTEM

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. Work related to the condensate management system shall consist of furnishing, fabricating, and installing all condensate sumps, sump to gas collection headers, air supply piping, condensate discharge piping, and all associated excavation, backfilling, and compacting for both Cell A and Cell A-1. The Contractor shall be responsible for furnishing and installing all miscellaneous piping and appurtenances, including plastic vaults, bentonite seals, pneumatic diaphragm pumps, level controller, filter/regulator, lubricator, appurtenant sump pipes and fittings, and the air supply line and condensate discharge line, all in accordance with details as indicated on the Drawings and as specified herein.

B. The excavation and disposal of excavated material, related to the construction of the condensate sumps, shall conform to all applicable requirements of these Specifications and be the responsibility of the Contractor.

C. The Contractor shall lay out the locations of the condensate sumps for the approval of the Engineer.

D. The hole drilled for the condensate sump shall be a minimum of two feet in diameter and 20 feet deep, as shown on the Drawings.

E. The PVC pipe and fittings used in condensate sump shall be Schedule 40 and 80, as shown in the drawings, and shall conform to all applicable requirements of these Specifications.

F. Bentonite material shall be Volclay bentonite as produced by the American Colloid Company or equal. The bentonite seal shall be placed at the designated locations along the pipe. Immediately prior to placement, the bentonite shall be wetted to a thick mud consistency.

G. The pipes, fittings, valves, pump, level controller, and all connections shall be as shown on the Drawings.

H. All connections to the gas collection header shall be installed as shown in the drawings.

I. The actuator on and off settings shall be set as shown on the drawings.

J. The plastic vault shall be Brooks Products Model No. 1730 series, 18" deep or equivalent.

K. Piping:

Cell A: Field air supply piping shall be high density polypropylene (HDPE) 1-inch diameter SDR 11. Condensate piping shall be HDPE 1-1/2-inch diameter SDR. Refer to Sections S.P. 15100 and S.P. 15200.

Cell A-1: Field air supply piping shall be HDPE 1/2-inch diameter SDR 11. Condensate piping shall be HDPE 1-inch diameter SDR. Refer to Sections S.P. 15100 and S.P. 15200.

PART 2: EQUIPMENT

2.01 CONDENSATE PUMP

A. The pumps shall be air-operated, double-diaphragm pumps with ball check valves and capacities as indicated on the drawings. Clamp band construction will provide ease of inspection and maintenance. Pumping volume shall be controlled by an integral air valve of only one moving part and which shifts without mechanical assistance. Pump is to be self-priming and have the ability to run dry and "dead head", with no need for variable speed motors or variable drives, and no pressure relief or bypass piping required.

B. Construction:

1. Wetted parts to be stainless steel, Teflon, Teflon-coated, VITON, or aluminum.

2. Non-wetted parts shall be standard material.

3. Pump body shall be polypropylene.

4. Elastomers:

a. Diaphragm shall be Teflon.

b. Valve seats shall be Teflon.

5. Hardware: 304 stainless steel.

C. Manufactured by Wilden Pumps, Colton, CA; or acceptable equivalent.

D. Contractor shall supply one spare pump.

2.02 CONDENSATE SUMP ASSEMBLY

A. General:

1. This section covers the minimum requirements for the supply, installation, and startup of an air-operated condensate liquid sump and automatic pump system.

B. Materials:

1. This section describes the acceptable material that shall be used for the construction of the air-operated liquid sump and automatic pump system.

a. Condensate Liquid Sump:

1. The 10-inch diameter condensate liquid sump shall be constructed of gas/liquid-tight Schedule 40 PVC. A 2-inch diameter HDPE SDR 11 elbow shall be used to drain liquid from the gas header into the sump. The sump shall be designed to withstand a vacuum of 10 psig and a pressure of 5 psig.

b. Equipment Enclosure Housing (Vault):

1. All operating components of the condensate pump and control assembly shall be located in a plastic vault, as detailed on the drawings.

2. All service connections shall be bulkhead mounted on a common wall of the vault, as shown on the drawings.

c. Liquid Pump:

1. A pneumatic diaphragm liquid pump, as specified in Part 2, 2.01, shall be provided with each sump to transfer liquids from the sump.

d. Level Control:

1. A top-mounted displacer type snap-acting pneumatic level switch mounted in the equipment enclosure shall be used to control liquid level in the sump. The switch mechanism shall be magnetically activated.

e. Compressed Air System:

1. The 1/4-inch NPT compressed air system shall include an inlet ball valve, filter/regulator with automatic drain valve and lubricator, as specified on the drawings..

f. Bolts:

1. All bolts, nuts, and washers in contact with LFG, condensate or soil shall be Type 304 SS.

g. Backfill Material (Vegetative Layer):

1. Soil backfill shall meet the engineering requirements for the site and shall be approved by the Engineer. The material place adjacent to the condensate pump shall be fine-graded and no objects shall be present that could cause damage to the sump. Backfill shall be compacted to 90% relative density.

2. Bentonite to prevent emission of landfill gas from the bore seal and to prevent air intrusion into the landfill.

C. Construction:

1. Prior to installation, protect stored valves and appurtenances from damage due to exposure to sunlight, heat, dirt, debris, freezing and thawing, vandalism, etc.

2. Clean all debris, dirt, gravel, etc., from inside of piping before placing valves in place.

3. Erect and support valves in respective positions free from distortion and strain on appurtenances during handling and installation. Inspect material for defects in workmanship and material. Clean out debris and foreign material from valve openings and seats, test operating mechanisms to check proper functioning, and check nuts and bolts for tightness. Repair valves and other equipment which do not operate easily or are otherwise defective.

4. Set plumb and support valves adequately in conformance with instructions of manufacturer. Shim valves mounted on face of concrete vertically and grout in place. Install valves in control piping for easy access.

5. Provide sleeve type coupling or flexible type grooved coupling on downstream side of buried valves to assist in valve removal.

D. Contractor shall supply one spare filter/regulator, lubricator, and level switch.

PART 3: EXECUTION

3.01 CONDENSATE MANAGEMENT SYSTEM

A. All work shall be performed in accordance with the drawings.

B. The area around the condensate liquid pump system shall be free draining away from the equipment, as shown on the drawings.

C. The installation of the air supply and condensate discharge piping shall be performed in accordance with the drawings.

D. Prior to making connections, all lines shall be purged of debris and thoroughly cleaned. All pipe shall be connected using good engineering practice.

E. The balance line shall be free draining to either the landfill gas collection pipe or the sump and shall be free of kinks or other obstructions to liquid or gas flow.

F. The hole shall be backfilled as detailed in the drawings.

G. Testing and Acceptance.

1. Prior to acceptance, the following verifications shall be made:

- o Verify all connections have been pressure-tested.
- o Verify the pipes and connections are clean and free of debris.
- o Verify the level switch displacers are installed at elevations appropriate for the installation. As-built elevations shall be recorded and submitted to the Engineer by the Contractor prior to project acceptance.
- o Set and verify the regulator and lubricator settings.
- o The unit shall be dry-operated for at least 5 minutes without incident.

END OF SECTION

SECTION 11 - CELL A EQUIPMENT

SUBSECTION C11010
GENERAL EQUIPMENT STIPULATIONS

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. These General Equipment Stipulations apply, in general, to the equipment furnished under all Divisions of these Special Provisions. They shall supplement the detailed equipment specifications, but in case of conflict, the detailed equipment specifications shall govern.

B. All presently installed equipment removed by the Contractor shall be returned to the City.

1.02 ADAPTATION OF EQUIPMENT

A. Equipment shall be readily adaptable for installation and operation in the structures as shown on the plans. No responsibility for alteration of a planned structure to accommodate other types of equipment will be assumed by the City. Equipment which requires alteration of the structures will be considered only if the Contractor assumes responsibility for making and coordinating necessary alterations. Such alterations shall be made at the Contractor's expense.

B. Equipment approved as being of equal quality, performance, etc., may be substituted for that specified. Any revisions to structures, piping, electrical or other work made necessary by such substitution shall be approved by the Engineer, and the cost of said revisions shall be made at the Contractor's expense.

1.03 EQUIPMENT GUARANTEE

A. The Contractor shall guarantee equipment against (a) faulty or inadequate design, and (b) leakage, breakage, or other failures. The guarantee period shall be as defined in the General Conditions.

1.04 WORKMANSHIP AND MATERIALS

A. Equipment shall be designed, fabricated, and assembled in accordance with the best modern engineering and shop practice. Individual parts shall be interchangeable. Equipment shall not have been in service at any time prior to delivery, except as required for tests.

B. Materials shall be suitable for service conditions. Iron castings shall be tough, close-grained gray iron free from blow-holes, flaws, or excessive shrinkage and shall conform to ASTM A48.

C. Except where otherwise specified, structural and miscellaneous fabricated steel used in items of equipment shall conform to the Standards of the American Institute of Steel Construction.

1.05 SAFETY GUARDS

A. Belt or chain drives, fan blades, couplings, exposed shafts and other moving or rotating parts shall be covered on all sides by safety guards. Safety guards shall be fabricated from 16 USS gauge or heavier galvanized or aluminum-clad sheet steel or 3/8-inch galvanized expanded metal. Each guard shall be designed for easy installation and removal. Necessary supports and accessories shall be provided for each guard. Supports and accessories, including bolts, shall be hot-dip galvanized. Safety guards in outdoor locations shall be designed to prevent the entrance of rain and dripping water. Drawings of safety guards shall be submitted to the Engineer for approval prior to fabrication or delivery.

1.06 EQUIPMENT BASES AND BEDPLATES

A. A heavy cast iron or welded steel base shall be provided for each item of equipment which is to be installed on a concrete base. Equipment assemblies, unless otherwise specified or shown on the drawings, shall be mounted on a single, heavy, cast iron or welded steel bedplate. Bases and bedplates shall be provided with machined support pads, tapered dowels for alignment of mating or adjacent items, adequate openings to facilitate grouting, and openings for electrical conduits. Seams and contact edges between steel plates and shapes shall be continuously welded and ground smooth. Bedplate drain fittings shall be piped to the nearest sump or designated drainage area.

1.07 JACKING SCREWS AND ANCHOR BOLTS

A. Jacking screws shall be provided in the equipment bases to aid in leveling prior to grouting.

B. Equipment suppliers shall furnish anchor bolts, nuts, washers, and sleeves for adequate design, as required, for proper anchorage of the equipment bases to the concrete slab. Sleeves shall be a minimum of 1.5 times the diameter of the anchor bolts. Unless otherwise shown or specified, anchor bolts for items of equipment mounted on baseplates shall be long enough to permit 1.5 inches of grout beneath the baseplate and to provide adequate anchorage into structural concrete.

1.08 EARTHQUAKE REQUIREMENTS

A. Equipment and supporting structures supplied under this Contract shall be provided with sufficient strength to prevent excessive motion or damage during an earthquake. Equipment that does not vibrate during normal operation shall be rigidly attached to the foundation or other adequate support to prevent lateral and vertical displacement. Equipment that vibrates during normal operation shall be provided with isolators with mechanical stops which are securely anchored to foundations or other adequate supports.

1.09 EQUIPMENT INSTALLATION

A. The Contractor shall obtain installation instruction booklets or other recommendations from the equipment manufacturers as to procedures for, sequence of, and tolerances allowed in equipment installation. In particular, the manufacturer's recommendations as to grout spaces required, type of grout to be used, and tolerances for level and alignment, both vertical and horizontal, shall be obtained and followed. Whenever applicable, the Contractor shall obtain the service of a manufacturer's representative specifically trained in erection of his equipment to supervise the installation.

B. Skilled craftsmen experienced in installation of the equipment or similar equipment shall be used. Applicable specialized tools and equipment, such as precision machinist levels, dial indicators, and gauges shall be utilized in the installations. The work shall be accomplished in a workmanlike manner to produce satisfactory equipment installation free of vibration or other defects.

C. Prior to installation of equipment, sacking and concrete preparation shall be completed, and the work area shall be maintained in a vacuum-clean condition during the equipment installation.

1.10 MANUFACTURER'S NAMES

A. Manufacturer' and catalog numbers are for the convenience of the Contractor. The detailed specifications shall apply in the event of a conflict. If detailed specifications have not been given, the manufacturer's name and catalog number shall determine the design criteria and quality for comparison should an equal be submitted.

1.11 SPECIAL TOOLS AND ACCESSORIES

A. Equipment requiring periodic repair and adjustment shall be furnished complete with special tools, instruments, and accessories required for proper maintenance. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices, and drawings and data on such devices shall be submitted to the Engineer for approval prior to delivery.

1.12 EQUIPMENT BASE GROUTING

A. After assembly and installation on the concrete slab, each unit shall be leveled, using a precision level, and aligned in place but not grouted until after the initial fitting and alignment of connecting piping. Each unit shall then be grouted to the concrete slab. Each equipment base shall be completely filled with grout. The grout shall extend to the edge of each base and shall be beveled at 45 degrees all around the unit. Grout which is exposed at horizontal surfaces shall be rounded to provide drainage to appropriate points. After grout has set, jacking screws shall be removed and nuts on anchor bolts shall be tightened, followed by an overall check on leveling and alignment. Should equipment not meet tolerances of leveling and alignment, as recommended by the manufacturer, corrective measures shall be taken to obtain the tolerances required.

1.13 LUBRICATION

A. Equipment shall be adequately lubricated by systems which require attention no more than once a week during continuous operation. Lubrication systems shall not require attention during startup or shutdown and shall not waste lubricants. Lubricants of the type recommended by the equipment manufacturer shall be provided in sufficient quantity for consumption prior to completion of required testing and acceptance of equipment by the City. The Contractor shall provide the Engineer, prior to equipment startup, four (4) copies of a list showing the proper lubricants for each item of mechanical equipment, approximate quantities needed per year of continuous operation, and recommended lubrication intervals. Wherever possible, the types of lubricants shall be consolidated with the manufacturer's approval to minimize the number of different lubricants required for plant maintenance. The Contractor shall supply at least 6 months supply of all lubricants.

1.14 DRIVE UNITS

A. Drive units shall be designed for 24-hour continuous duty service and shall be constructed so that oil leakage around shafts is precluded.

B. Each V-belt drive shall include a sliding base or other suitable tension adjustment. V-belt drives shall have a service factor of at least 1.5 at maximum speeds using the nameplate rating of the driving motor.

1.15 ELECTRIC MOTORS

A. Motors shall be squirrel cage induction motors designed and applied in compliance with NEMA, USASI, IEEE, ASA C50, and AFBMA standards and with the NEC for the specific duty imposed by the driven equipment.

B. Each motor shall be rated for continuous duty and shall have a horsepower output adequate for the requirements of the driven equipment, including all losses.

C. Polyphase integral horsepower motor shall have a service factor of 1.15. The service factor shall provide an additional continuous rated overload capacity of not less than 15 percent over the full nameplate horsepower rating. Motors may be loaded to the full nameplate horsepower rating. The service factor shall not be used in determining a non-overloaded condition.

D. Insulation materials shall be non-hygroscopic and meet or exceed Class B definition. Motor temperature rating shall not exceed Class B temperature limits when the motor is operated at full load continuously in a maximum ambient temperature of 120°F.

E. Bearings shall be of the antifriction type made from vacuum degassed steel and shall be permanently sealed or grease lubricated with readily accessible inlet and outlet grease fittings to allow for "in service" regreasing. Inner bearing protection shall consist of an internal shaft flinger or inner bearing cap. Bearings shall be designed to give 25,000 hours minimum life by B-10 calculations for the conditions specified for continuous operation at full load. The proportions, mountings, and adjustments shall be consistent with best modern practices for applied radial and thrust loads at the speeds specified.

F. Nameplates shall be stainless steel with embossed lettering and shall be fastened to the motor frame with corrosion-resistant pins. Each nameplate shall contain the manufacturer's name, serial number, and all the information required by the National Electrical Code.

G. Data submitted shall include:

1. Name of Manufacturer
2. Type, Model and Frame Size
3. Motor Horsepower
4. Full Load Speed
5. Design Letter
6. Enclosure Construction

7. Temperature Rise & Class of Insulation System
8. Service Factor
9. Voltage, Frequency, Phase
10. Full Load Current
11. Locked Rotor Current
12. Minimum (B-10) Bearing Life
13. Motor Efficiency at 1/2, 3/4 and Full Load

1.16 SHOP PAINTING

A. Equipment shall be shop primed prior to delivery to the job site unless otherwise specified. Steel and iron surfaces shall be shop primed with Amercoat 25, Koppers Inertol 622, or Engard 124, or equal, in accordance with the recommendations of the paint manufacturer. After delivery to the job site, equipment surfaces shall be prepared and painted per these Special Provisions.

B. Surfaces of equipment which will be inaccessible after assembly shall be painted or otherwise protected before assembly by a method which provides protection for the life of the equipment.

C. Electric motors, drives and other equipment that would be damaged by sandblasting shall be shop primed with a rust inhibitive primer and finish coated with a high quality industrial alkyd enamel. After delivery to the job site, the surfaces shall be inspected, prepared and finish coated per these Special Provisions.

D. Machined, polished, and other ferrous and non-ferrous surfaces which are not to painted shall be coated with rust preventative compound, Dearborn Chemical "No-Ox-Id", Houghton "Rust Veto 344", Rust-Oleum "R-9", or equal.

1.17 INSTRUCTION MANUAL AND PARTS LIST

A. Refer to the requirements of S.P. C01730.

1.18 EQUIPMENT CHECK AND STARTUP

At the end of each stage of the project where mechanical equipment has been installed, the Contractor shall check out and operate all equipment to ascertain that it was properly installed, lubricated, calibrated, etc., and has operated under conditions satisfactory to the Engineer.

1.19 WARNING SIGNS FOR FLARE STATIONS

Contractor shall furnish and affix, to all four sides of fencing or other protective barrier surrounding the flare stations at both Cell A and Cell A-1, the following warning signs:

A. Explosive Gases Present

B. No Ignition Sources Within 50 Feet

C. No Smoking

END OF SECTION

SECTION 11 - CELL A EQUIPMENT

SUBSECTION C11100
CELL A GAS FLARE

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

This section covers the requirements for design, fabrication, installation, and startup of the Cell A gas flare.

A. All items of equipment shall be the product of a manufacturer experienced in the design, construction, and operation of equipment for the purpose required; and, who shall have established a record of successful operation of such equipment manufactured or produced by them.

B. The Contractor shall furnish and install the flare assembly, including all piping, valves, fittings, supports, controls and accessories, as shown on the Drawings to obtain a complete and operable gas flaring system.

C. All equipment shall be designed, fabricated and assembled in accordance with the best modern engineering and shop practice. Individual parts shall be manufactured to standard sizes and gauges so that repair parts, furnished at any time, can be installed in the field. Equipment shall not have been in service at any time prior to delivery, except as required by factory testing.

D. All mechanisms and parts of the flare assembly shall be engineered to withstand the stresses which may occur during operation or for any other stresses which may occur during fabrication, transportation, installation, and operation.

E. Equipment shall include all production line improvements made to the delivery or contract date. All equipment shall comply with applicable requirements of the standards of AISC, AGA, ASME, AWS, NFPA, and UL as of the bid submittal date. The equipment shall be furnished factory assembled to the extent possible and ready for installation.

F. The flare and all appurtenances shall comply with the requirements of the Uniform Building Code (UBC) for Seismic Zone 2. Mechanical and electrical equipment, and their supports and connections, shall be designed to prevent sliding and overturning. Brackets and anchors shall be of ductile material so that they can absorb energy and continue to carry the load. Structural calculations documenting compliance of the flare supports with the seismic requirements and concrete foundation design based on the soil bearing pressure at the flare location shall be prepared by a structural or civil engineer registered to practice in the State of Arizona and submitted to the City.

G. A permanent nameplate shall be attached to the flare in a conspicuous place. The following information shall be plainly marked on the nameplate: name and address of the manufacturer, model number, serial number, date of manufacture, and any other information necessary for complete identification.

H. The manufacturer shall pay all royalty and license fees for the flare, unless otherwise specified. He shall defend all suits or claims for the infringement of any patent rights, and shall hold the Owner harmless from loss on account thereof.

I. The Contractor shall relocate the flare at the Cell A flare station as shown in the drawings such that the flare station can continue service to the gas collection system until the new flare station is installed and operational. The flare stack relocation shall include installation of temporary concrete pad and re-routing of the propane line, electrical conduits, and landfill gas header to the temporary flare stack location. After the new flare station is deemed operational by the Engineer, the old flare station shall be dismantled and delivered to the Skunk Creek Landfill per the Engineer's instructions.

1.02 SUBMITTALS

A. The manufacturer shall provide submittal drawings (Mechanical, Electrical, and Structural) bearing a stamp of an engineer registered to practice in the State of Arizona for the Engineer's approval prior to commencement of manufacturing.

PART 2: EQUIPMENT

2.01 FLARE COMPONENTS

A. An insulated steel stack shall be fabricated of steel plate. The entire inside surface of the stack shall be lined with lightweight, 2200 °F castable refractory. The lining shall be applied over V-pins welded to the steel shell. The fabricator shall apply two V-pins per square foot in a staggered pattern to the inside surface of the stacks. The castable refractory shall be properly cured according to the manufacturer's instructions prior to shipment. Refractory shall be rated for the design operating temperature and precured a minimum of 48 hours. Refractory shall not require warm-up or cool-down procedures to avoid refractory damage. The flare may be subject to sudden startup after a prolonged idle period during which the refractory is exposed to weather conditions. In addition, sudden shutdown may occur after prolonged operational periods.

B. The stack shall be equipped with four each 4-inch diameter test ports and placed three feet below the top edge and at 90° spacing around the periphery of the round stack.

C. Thermocouple ports shall be installed six, eight, ten, and twelve feet below the top edge of the stack. Unused ports shall be plugged.

D. The space between the bottom edge of the stack, the concrete pad and the legs shall be enclosed with metal adjustable panels capable of moving up to 12-inches above the concrete pad. Between the legs where the main gas line enters the flare, a fixed panel shall be installed.

E. The flare shall be equipped with a combustion air damper assembly. The damper assembly shall be actuated automatically by an electric positioning motor which is controlled by the temperature controller that senses the stack gas temperature by the thermocouple in the flare stack.

F. The signal from the temperature controller shall actuate a temperature positioning motor, as identified in the Equipment Data Sheets, to adjust louvers to the required opening. The actuating motor shall be mounted on the damper assembly frame and shall be suitably protected from high temperature conditions.

G. The Contractor shall supply a type "K" thermocouple with sheath as indicated in the Equipment Data Sheets. The Contractor shall also supply one spare thermocouple.

H. The Contractor shall supply a complete propane pilot assembly including ignition transformer, electric igniter, pressure regulator, and solenoid operated valve.

I. The flare shall be equipped with an access manhole at the front of the unit for inspection and maintenance of burners.

J. The exposed carbon steel surfaces of the flare shall have two coats of rust-resistant, heat-resistant paint applied by the flare fabricator. Such paint shall have a high zinc content (minimum 12 percent by weight) suitable for the operating temperatures. One gallon of touch-up paint shall be supplied with the flare. The color is to be selected by the Owner.

K. The flare shall be equipped with an automatic landfill gas shut-down valve as specified in the Equipment Data Sheets.

L. The flare shall be equipped with a burner assembly for landfill gas.

M. The flare shall have provisions for natural gas auxiliary fuel burners. The auxiliary fuel assembly shall include pressure regulator, limiting orifice, and operating valves.

N. The flare shall be provided with lifting eyes near the top of the flare to permit the lifting upright suspension of the flare at these points. The flare shall arrive on the site with internal supports as required to permit the lifting of the flare by the lifting eyes without damage to the refractory or other flare components.

O. The flare shall be assembled at the factory to the extent possible. Any unavoidable on-site assembly shall be performed by the Contractor under the direction of the manufacturer.

P. An electrical enclosure shall be provided on the flare. The enclosure shall contain the ignition transformer and terminal strips, as shown on the Drawings, for connection to include the pilot gas solenoid, ignition transformer, damper actuator motor, and ultraviolet scanner. All flare electrical and instrumentation wiring shall terminate at this enclosure.

Q. The flare assembly shall have an ultraviolet scanner located so that the pilot flame and the main flame are within the field of view from the same position.

R. The flare shall be equipped with view ports to observe the combustion and thermocouple.

S. The flare shall be equipped with a permanent ladder to access the thermocouple and view ports.

2.02 LANDFILL GAS COMPOSITION

LANDFILL GAS COMPONENT	COMPOSITION RANGE %
Methane (CH_4)	53.0 TO 13.0
Carbon Dioxide (CO_2)	46.0 TO 12.0
Nitrogen (N_2)	0.75 TO 61.0
Oxygen (O_2)	0.25 TO 14.0

Water Vapor (H_2O)	3.5 TO 11.0

NOTE: The LFG composition does not vary linearly in between the listed range extremes.

2.03 FLARE DESIGN CAPACITY

A. The flare shall be designed to combust between 150 and 1500 SCFM of landfill gas.

B. The range of heat loading required for the flare is from four (4) to eighteen (18) million British Thermal Units per hour (mmBtu/hr) of landfill gas. The flare manufacturer shall certify that the maximum rate can be combusted at the required efficiency and provide a performance envelope describing the amount of auxiliary fuel (assumed natural gas at 1000 Btu/scf), if any, required to combust the minimum heat loading of landfill gas.

C. The landfill gas vertical ground flare unit shall be installed at an altitude of approximately 1,000 feet above mean sea level, and shall be designed to continuously burn and completely oxidize landfill gas under the following conditions, without the use of auxiliary fuel:

	MINIMUM	MAXIMUM
Btu loading (million Btu/hr)	4	18
Landfill gas flow rate (cfm)	150	1500
Landfill gas temperature	70	120
Ambient air temperature	35	120

2.04 FLARE COMBUSTION EFFICIENCY

A. The minimum destruction efficiency for non-methane organic compounds (NMOC) shall be ninety-eight (98) percent.

B. The flare shall provide a minimum retention time of 0.6 second at a minimum temperature of 1,400° F with Btu loadings between 4 and 18 million Btu per hour without consumption of auxiliary fuel. The flare shall provide the above minimum retention time and temperature for all other conditions using natural gas as auxiliary fuel.

2.05 ADDITIONAL DESIGN REQUIREMENTS

A. The maximum gas pressure at the inlet of the flare shall not exceed 10 inches of water column ("WC).

B. Burner noise shall not exceed 80 dB, as measured on the "A" weighted decibel scale at a distance of three feet from the outer surface of the flare for the flow of gases specified above.

C. Flame shall not extend above the top of the flare during operation.

D. The flare shell skin temperature shall not exceed 250° F under maximum Btu loading conditions.

PART 3: EXECUTION

3.01 SUBMITTALS

A. The Contractor shall provide a complete schedule showing the various stages of Drawing preparation, production, receipt of sub-vendor items, final assembly, testing, and shipment. The schedule shall also include the name, address, and telephone number of the individual directly responsible for the completion of each stage.

B. Submittals shall include the following:

1. Shop drawings including the description of materials used for various components, a list of replaceable wear and service items, and complete list of all accessories to be provided.

2. Structural calculations.

3. Approximate shipping weight of equipment, and if shipped unassembled, the number of components and approximate weight of each.

4. Detailed installation instructions.

3.02 PAINTING

A. The Contractor shall paint all equipment furnished by him with three coats of paint. Where it is practical to apply a shop coat, two field coats in addition to the shop coat shall be required. Where a shop coat is not practical, one rust-prohibitive coat and two finish coats shall be applied.

B. All factory-finished equipment shall be protected from damage during erection, thoroughly cleaned after erection, and touched up as required. If the factory finish has, in the opinion of the Engineer, been seriously damaged, the equipment shall be given two additional finish field coats.

C. The surfaces of all piping, valves, electrical conduits, structural steel, etc., shall be properly prepared and painted with one coat of rust prohibitive paint and two field coats of moisture and acid-resistant paint.

D. The color of the finished paint shall be as determined by the City.

3.03 INSPECTION

The City reserves the right to appoint an inspector or other authorized representative of the Engineer to inspect the gas flare prior to shipping, with full power to reject all materials and workmanship not conforming to the drawings and specifications. The Contractor shall give the City a minimum notice of five (5) working days before the completion of the fabricating operations to permit ample time for the inspection of the gas flare.

3.04 TESTING

The Contractor shall demonstrate the successful automatic operation of the flare prior to final acceptance of the equipment. The flare shall be field tested to demonstrate that it meets capacity, noise, flame height, combustion temperature, skin temperature, and automatic temperature control requirements.

3.05 DRAWINGS AND DATA

Complete as-built fabrication, assembly, support and installation drawings showing fabrication details, detailed specifications, materials used, parts devices and other accessories forming a part of the equipment furnished, shall be submitted for inclusion in the Operations and Maintenance Manual (O&M).

END OF SECTION

SECTION 11 - CELL A EQUIPMENT

SUBSECTION C11200
CELL A GAS BLOWERS

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. This specification sets forth the requirements for the Cell A landfill gas blowers.

B. The Contractor shall furnish, and deliver to the job site, two (2) blower units to be installed on a concrete pad as shown on the drawings.

C. The blowers shall be Hauck Turbo Blowers P/N TBGB-071-271-E, manufactured by Hauck Manufacturing Company, or approved equal.

PART 2: EQUIPMENT

2.01 BLOWER COMPONENTS

A. Each blower shall be equipped with a stainless steel nameplate which includes capacity and pressure, maximum RPM, direction of rotation, and manufacturer's name and model number.

B. Each blower shall be belt driven centrifugal units.

C. The blowers shall be fabricated with fiberglass housings and aluminum impellers.

D. Each blower shall be equipped with double shaft seals.

E. The impellers shall be precisely balanced to help eliminate vibrations.

F. The blowers shall be mounted on vibration isolation pads.

G. The blowers shall be equipped with flexible couplings and inlet and outlet adapters to the IPS connections as shown on the Drawings.

H. The two blowers shall be arranged with the discharge positions in Position 1, bottom horizontal.

2.02 BLOWER PERFORMANCE

A. Each blower shall be sheaved to run at a speed of 4400 RPM and designed to deliver 100 to 1500 standard cubic feet per minute of LFG at a suction pressure of approximately 36-inches water column vacuum and a discharge pressure of approximately 16-inches water column.

B. The differential pressure across the blower is dependent on the gas flow and will vary accordingly from the approximate figures mentioned above. The gas blower shall be capable of delivering the entire range of gas flow without surging and without replacing the sheaves.

C. Each blower shall be constructed with an impeller "E".

D. The electric motors supplied with the blowers shall be three phase 230/460 Volt, 60 Hertz motors and 30 horsepower. The motors shall be TEFC with 1.15 service factor. The supply of equipment shall be in compliance with the detailed specifications of the blowers.

2.03 PAINTING

A. The Contractor shall paint all equipment furnished by him with three coats of paint. Where it is practical to apply a shop coat, two field coats in addition to the shop coat shall be required. Where a shop coat is not practical, one rust-prohibitive coat and two finish coats shall be applied.

B. All factory-finished equipment shall be protected from damage during erection, thoroughly cleaned after erection, and touched up as required. If the factory finish has, in the opinion of the Engineer, been seriously damaged, the equipment shall be given two additional finish field coats.

C. The surfaces of all piping, valves, electrical conduits, structural steel, etc., shall be properly prepared and painted with one coat of rust prohibitive paint and two field coats of moisture and acid-resistant paint.

D. The color of the finished paint shall be as determined by the City.

END OF SECTION

SECTION 11 - CELL A EQUIPMENT

SUBSECTION C11300
CELL A AIR COMPRESSORS

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. This section sets forth the requirements for furnishing and installing the Cell A instrument air compressors.

B. The Contractor shall furnish and install complete, in-place and ready for service, two (2) air compressor units, and appurtenances as shown on the drawings and specified herein. One unit will serve for normal operation and the other will be a standby unit.

C. The factory unit shall be UL/FM listed.

PART 2: EQUIPMENT

2.01 SYSTEM COMPONENTS

A. The two (2) air compressor assemblies shall each be a skid-mounted, approximately 6' x 7', duplex compressor package. The skid shall provide, at a minimum, 30 SCFM of air at 150 psi and 38 °F dew point. Each skid shall include:

1. Two separate twin cylinder, two stage, compressor blocks with belt drive and factory installed OSHA belt guard, each block driven by a 10 HP, 480 VAC/3 phase, TEFC electric motor, mounted on a rigid steel frame with Nema 4 Control Panel straddling an ASME approved 120 gallon receiver tank, with intake filter silencer, pop-off safety valve, and condensate drain as manufactured by Atlas Copco Compressors Inc., Holyoke, Massachusetts, Model No. 10LT11120H or equivalent.

2. One refrigerated dryer rated at 35 SCFM at 38 °F dew point, and 150 psig maximum working pressure, driven by a 1/3 HP electric motor as manufactured by Zeks Air Drier Corporation, Malvern, Pennsylvania, Model No. 35HSD or equivalent.

3. One particulate prefilter rated at 3 micron absolute removal as manufactured by Zeks Air Drier Corporation, Malvern, Pennsylvania, Model No. Accraflow 150PT or equivalent.

4. One coalescing after filter rated at 0.7 micron with 95% DOP efficiency as manufactured by Zeks Air Drier Corporation, Malvern, Pennsylvania, Model No. Accraseive 130RT or equivalent.

5. One oil/water separator as manufactured by Zeks Air Drier Corporation, Malvern, Pennsylvania, Model No. 45WOS or equivalent.

2.02 ANCILLARY EQUIPMENT

In addition to the air compressor assembly, the Contractor shall supply a filter regulator with pressure indicator, a shut-off valve, and a pressure switch alarm.

2.03 PERFORMANCE REQUIREMENTS

A. System shall be rated for 30 SCFM at 150 psi with a minimum of 38°F dewpoint.

B. Automatic pressure switch shall turn on the compressor at 140 psi and shut off at 160 psi.

2.04 PAINTING

A. The Contractor shall paint all equipment furnished by him with three coats of paint. Where it is practical to apply a shop coat, two field coats in addition to the shop coat shall be required. Where a shop coat is not practical, one rust-prohibitive coat and two finish coats shall be applied.

B. All factory-finished equipment shall be protected from damage during erection, thoroughly cleaned after erection, and touched up as required. If the factory finish has, in the opinion of the Engineer, been seriously damaged, the equipment shall be given two additional finish field coats.

C. The surfaces of all piping, valves, electrical conduits, structural steel, etc., shall be properly prepared and painted with one coat of rust prohibitive paint and two field coats of moisture and acid-resistant paint.

D. The color of the finished paint shall be as determined by the City.

END OF SECTION

SECTION 11 - CELL A EQUIPMENT

SUBSECTION C11500
CELL A CONDENSATE KNOCK-OUT VESSEL

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. This specification sets forth the requirements for the Cell A Condensate Knock-out Vessel used to remove solid particulates and mist particles from the gas stream.

B. The Contractor shall furnish, deliver and install at the job site, one condensate knock-out vessel assembly, including the equipment and controls specified below, at the location shown on the Drawings.

C. The manufacturer of the assembly shall provide structural calculations for seismic Zone 2. These certified calculations shall be a part of the submittal drawings.

D. The filter assembly shall be a Pego Systems, Inc. separator as described in the Equipment Data Sheets section of these Specifications, and as shown on Pego Drawing No. P0261V1C, or an approved equal.

PART 2: EQUIPMENT

2.01 COMPONENTS

A. Each vessel shall be equipped with a stainless steel nameplate which includes the manufacturer's name and model number, the capacity and pressure loss at rated capacity.

B. The orientation of the assembly shall be in accordance with the Drawings.

C. The vessel shall be fabricated from 14-inch diameter Schedule 10 carbon steel pipe. Welding shall be done in accordance with AWS D1.1-86.

D. The vessel shall contain three capacitance type liquid level switches of the side mount design. One switch shall function as a high level alarm. The other two switches shall function as high and low liquid level indicators for the operation of the pump, P-1.

E. The vessel shall be equipped with a manual drain valve and a flow check valve.

F. All interior surfaces of the housing that come in contact with the landfill gas shall be coated with epoxy coating such as Scotchkote 134, a product of 3M Corporation, Plasite 7122, a product of Wisconsin Protective Coating Corporation or an approved equal. The coatings shall be 10 mils and 8 mils thick respectively and shall be applied according to the manufacturer's recommendations and after suitable surface preparation. All exterior surfaces shall be painted in accordance with the general equipment stipulations.

G. The vessel shall be equipped with a liquid level gauge.

H. Inlet and outlet connections shall be 10-inch, 125 pound flat face flanges.

I. Pressure monitoring taps shall be installed on the inlet and outlet to the vessel. Taps to be 1/2" NPT.

J. The vessel shall be equipped with a 14-inch diameter by six-inch thick demister pad such as York Model 326.

2.02 PERFORMANCE

A. The vessel shall be rated for a minimum of 60" WC vacuum at 130° F.

B. Particulate removal efficiency shall be 99.7 percent of particulates greater than five (5) microns at a flow rate of 1500 SCFM.

C. Differential pressure between the inlet and outlet of the vessel shall be no greater than 3" WC at 1500 SCFM with a clean filter.

END OF SECTION

SECTION 11 - CELL A EQUIPMENT

SUBSECTION C11600
CELL A FLAME ARRESTERS

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. This Specification sets forth the requirements for flame arresters to prevent backflash from the gas flare.

B. The Contractor shall furnish, and deliver to the job site, one flame arrester plus one (spare) flame arrester element to be installed in the line leading to the gas burners as shown on the Drawings.

C. The flame arresters shall be a model 7628-10-11-FOZ, manufactured by Groth Equipment Corp., or an approved equal.

PART 2: EQUIPMENT

2.01 FLAME ARRESTER COMPONENTS

A. Each flame arrester shall be equipped with a stainless steel nameplate which includes size and pressure rating along with the manufacturer's name and the model number.

B. The flame arrester shall be an "in line" configuration fabricated of Type 356 aluminum and equipped with flanges on both ends.

C. The flame arrester shall be of wafer design to permit easy removal of the flame arrester element.

D. The flame arrester body shall be equipped with two tapped 1/2-inch holes on the top of each base (end piece) to allow determination of inlet and outlet static pressures.

E. The flame arrester flanges shall be 125 pound class flat face.

2.02 PERFORMANCE

The flame arrester shall have pressure-flow characteristics as shown in the table below:

FLOW* CUBIC FEET PER HOUR	PRESSURE DIFFERENTIAL INCHES W.C.
0	0
20,000	0.41
40,000	1.15
60,000	2.20
80,000	3.90

* Specific gravity of landfill gas is 0.98

END OF SECTION

SECTION 11 - CELL A EQUIPMENT

SUBSECTION C11700
CELL A PROPANE SYSTEM

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

Under this section, the Contractor shall furnish all materials, labor and equipment to install a complete propane pilot ignition system including tanks, valves, instruments, and piping as shown on the Drawings and described in these Specifications.

1.02 REGULATIONS AND STANDARDS

Where applicable, regulations and standards of ASTM B16.5, ANSI A-53-B, NFPA, AGA, CGA, and MAG.

1.03 SUBMITTALS

Complete assembly, support and installation drawings, together with specifications and data covering the propane tanks, material used, and other accessories forming a part of the equipment furnished, shall be submitted for approval.

PART 2: EQUIPMENT

2.01 COMPONENTS

A. Two (2) each five-gallon propane tanks with level gauge and integral shut-off valve. Tanks shall be certified for propane use.

B. Flexible hose connections between the tanks and the distribution piping. Hose shall be compatible with propane service and shall have a male CGA fitting adapter mating to the propane tank on one end and standard pipe thread connector on the other end.

C. Shut-off valves shall be rated for use with propane.

D. Pressure reducing regulator.

E. Pressure indicator.

F. Propane piping shall be non-coated carbon steel, A-106.

G. Any other instrumentation as shown on the Drawings.

PART 3: INSTALLATION

3.01 SYSTEM ASSEMBLY

The Contractor shall supply two (2) five-gallon propane filled gas tanks and shall install them at the designated location on the slab as shown on the Drawings. The two tanks shall be plumbed so that either tank may be removed from the premises for refilling while the remaining tank continues to supply the gas to the system. The gas output shall be regulated to the pressure required for the gas burner pilots.

3.02 PAINTING

A. The Contractor shall paint all equipment furnished by him with three coats of paint. Where it is practical to apply a shop coat, two field coats in addition to the shop coat shall be required. Where a shop coat is not practical, one rust-prohibitive coat and two finish coats shall be applied.

B. All factory-finished equipment shall be protected from damage during erection, thoroughly cleaned after erection, and touched up as required. If the factory finish has, in the opinion of the Engineer, been seriously damaged, the equipment shall be given two additional finish field coats.

C. The surfaces of all piping, valves, electrical conduits, structural steel, etc., shall be properly prepared and painted with one coat of rust prohibitive paint and two field coats of moisture and acid-resistant paint.

D. The color of the finished paint shall be as determined by the City.

END OF SECTION

SUBSECTION C11800
CELL A CONDENSATE STORAGE TANK

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. This section sets forth the requirements for furnishing and installing the Cell A condensate storage tank and secondary containment tank.

B. The Contractor shall furnish and install complete, in-place and ready for service, one (1) 9,200 gallon capacity plastic upright condensate storage tank, secondary containment tank, and appurtenances as shown on the drawings and specified herein.

C. The tank shall be fabricated of HDPE or equivalent non-corrosive material.

PART 2: EQUIPMENT

2.01 CONDENSATE STORAGE TANK

A. The condensate storage tank shall be a 9,200 gallon capacity HDPE upright tank, 12' Dia. x 12' H., with 24" top mounted manway as manufactured by Poly Cal Plastics, French Camp, California, Model No. Zorb Tank SP-025-U or equivalent.

B. The tank shall be supplied with four (4) 2-inch FNPT fittings on the top of the tank.

2.02 SECONDARY CONTAINMENT TANK

A. The secondary containment tank shall be a 10,360 gallon capacity HDPE tank, 14' Dia. x 9' H., with 8" internal flange as manufactured by Poly Cal Plastics, French Camp, California, Model No. SP-772-XL or equivalent.

2.03 GRANULATED ACTIVATED CARBON VESSEL, V-3

A. A plastic vessel containing granulated activated carbon shall be installed and connected to the condensate storage tank vent line for the control of organic compound vapors. The vessel shall be of 5 gallon capacity as manufactured by Barneby & Sutcliffe Corp., Model V-20 or equivalent.

2.04 ANCILLARY EQUIPMENT

A. Condensate storage tank shall be equipped with a capacitance type level switch, LSHH-2 (Endress & Hauser Model LSC 1132 or equal), which will activate a flare station shut down in the event of high liquid level in the storage tank.

B. Condensate storage tank shall receive liquids from the fuel gas filter/knockout vessel, V-1, via the pneumatic pump, P-1 (Wilden Model M-2 or equal), when the vessel liquid level switch indicates high liquid level in the vessel. Condensate storage tank shall also receive liquids from condensate sumps in field.

C. PVC piping, valves, fittings, and appurtenances, as identified in drawings, shall connect the tank to the condensate line from the field, to the vent line to the GAC vessel, V-3, and to the pneumatic pump, P-1, including the condensate and air lines from the condensate knock-out vessel (V - 1) to the pneumatic pump (P-1).

END OF SECTION

SECTION 12 - CELL A-1 EQUIPMENT

SUBSECTION C12600
CELL A-1 GAS HANDLING AND FLARE ASSEMBLY

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

This section covers the requirements for installation and startup of the Cell A-1 Gas Handling and Flare Assembly (Cell A-1 Flare Station). The Cell A-1 Flare Station shall be a unitized, modular, enclosed landfill gas ground flare station including all components necessary for a complete and operational system, as shown in the Cell A-1 Flare Station Piping and Instrumentation Diagram (P&ID). The Cell A-1 Flare Station shall be sized to extract, demist, compress and combust 100 SCFM of landfill gas (LFG) at 20 percent methane concentration. The Cell A-1 Flare Station shall include, but not be limited to, the following components:

A. Enclosed Ground Flare System:

1. Automatic pneumatically actuated main gas valve.
2. Flame arrester.
3. Burner unit, 250,000 to 1,500,000 BTU per hour of LFG.
4. Flare stack.
5. Interconnecting piping and isolation valves.
6. Internal electrical wiring.
7. Instrumentation and control devices.
8. Main control panel.
9. Access ladder and safety cage.
10. Sampling ports for both inlet and outlet gases.
11. Supplemental fuel (natural gas) system.

B. Gas Handling System:

1. Inlet and outlet flanges.
2. Gear operated main gas inlet butterfly valves as shown on P&ID.
3. One fuel filter/condensate knock out vessel.
4. Two centrifugal blower systems with geared isolation valves as shown on P&ID.

5. All required meters, gauges, and safety devices necessary to monitor, operate and maintain the system.

6. Laminar flow stainless steel piping.

7. Flow monitoring and recording system operating simultaneously with flare exhaust temperature monitoring and recording system.

C. Control System:

1. Enclosures, cabinets, and junction boxes.

2. Control, recording and annunciation devices.

3. Interconnecting conduit and wiring.

D. All items of equipment shall be the product of a manufacturer experienced in the design, construction, and operation of equipment for the purpose required; and, who shall have established a record of successful operation of such equipment manufactured or produced by them.

E. The Contractor shall furnish and install the gas handling and flare assembly skid, all piping, valves, fittings, supports, controls and accessories, as shown on the Drawings, to obtain a complete and operable gas flaring system. All electrical design and installation of required electrical components (*i.e.*, conduits, control panels), shall be the responsibility of the Contractor.

F. All equipment shall be designed, fabricated and assembled in accordance with the best modern engineering and shop practice. Individual parts shall be manufactured to standard sizes and gauges so that repair parts, furnished at any time, can be installed in the field. Equipment shall not have been in service at any time prior to delivery, except as required by factory testing.

G. All mechanisms and parts of the flare assembly shall be engineered to withstand the stresses which may occur during operation or for any other stresses which may occur during fabrication, transportation, installation, and operation.

H. Equipment shall include all production line improvements made to the delivery or contract date. All equipment shall comply with applicable requirements of the standards of AISC, AGA, ASME, AWS, NFPA, and UL as of the bid submittal date. The equipment shall be furnished factory assembled to the extent possible and ready for installation.

I. The flare and all appurtenances shall comply with the requirements of the Uniform Building Code (UBC) for Seismic Zone 2. Mechanical and electrical equipment, and their supports and connections, shall be designed to prevent sliding and overturning. Brackets and anchors shall be of ductile material so that they can absorb energy and continue to carry the load. Structural calculations documenting compliance of the flare supports with the seismic requirements and concrete foundation design based on the soil bearing pressure at the flare location shall be prepared by a structural or civil engineer registered to practice in the State of Arizona and submitted to the City.

J. A permanent nameplate shall be attached to the flare assembly in a conspicuous place. The following information shall be plainly marked on the nameplate: name and address of the manufacturer, model number, serial number, date of manufacture, and any other information necessary for complete identification.

K. The manufacturer shall pay all royalty and license fees for the flare, unless otherwise specified. He shall defend all suits or claims for the infringement of any patent rights, and shall hold the Owner harmless from loss on account thereof.

L. The Contractor shall connect the new gas collection system at Cell A-1 to the existing flare station such that it can continue service to the gas collection system until the new flare station is installed and operational. The new gas collection system is to be temporarily connected to the existing flare station for continued operation during construction. After the new flare station is deemed operational by the Engineer, the old flare station shall be dismantled and delivered to the Skunk Creek Landfill per Engineer's instructions.

1.02 SUBMITTALS

A. Shop Drawings: The manufacturer shall provide submittal drawings (e.g., Mechanical, Electrical, and Structural) bearing stamp of engineer registered to practice in the State of Arizona for the Engineer's approval prior to commencement of manufacturing. Drawings shall include all pertinent data necessary for complete construction and assembly including equipment dimensions, component parts, list of materials, installation and mounting details, electrical wiring diagram and details, and control panel front view.

If proposed equipment requires an arrangement differing from that indicated on the drawings (especially the P&ID) and as specified, the manufacturer shall prepare and submit for review detailed structural, mechanical, electrical and P&ID drawings, equipment lists, materials of construction, operating instructions, and written explanation for the new arrangement, showing all the necessary changes and all special features of proposed equipment. Manufacturer shall make such changes, if approved by the Engineer, at no additional cost to Owner.

B. Materials List: Manufacturer shall submit three (3) copies of a complete list of all materials and equipment proposed to be furnished and installed under this portion of the work, giving the manufacturer's name, catalog number, and catalog cut for each item where applicable.

C. Manufacturer's recommendations: Accompanying the materials list. submit three (3) copies of the manufacturer's current recommended method of installation for materials provided.

D. Equipment supplier's written report certifying that equipment:

1. Has been properly installed and connected.

2. Is in accurate alignment.

3. Is free from undue stress imposed by piping or mounting bolts.

E. Submit warranties as specified in Subsection C01400 of this specification. Include separate flare burner system warranty data.

PART 2: EQUIPMENT

The Cell A-1 Flare Station shall be a unitized, modular system including all components for a complete and operational system. The Cell A-1 Flare Station shall be pre-piped and pre-wired to the extent possible, requiring minimal field assembly. The Cell A-1 Flare Station shall include, but not be limited to the following equipment:

2.01 BLOWERS

A. Each blower shall be equipped to operate outdoors and have a stainless steel nameplate which includes capacity and pressure, maximum RPM, direction of rotation, and manufacturer's name and model number.

B. Two blowers (one operating and one spare) shall be provided, each of which shall be a centrifugal unit, 4-stage, with 5 HP TEFC 460 VAC 3-phase electric motor, capable of providing a differential pressure of 58 inches water column (corrected for temperature and altitude), as manufactured by Lamson Corp. Model 310 Exhauster with 1003 impeller or equivalent. The spare blower, B-101, shall be a mirror image of blower B-100.

C. The blowers shall be fabricated with cast iron casings and case aluminum impellers. Interior of casing and impellers shall be coated with Bisonite or approved equal to prevent corrosion. Blower construction shall be spark proof.

D. Each blower shall be equipped with shaft seals such that no contact is made between shaft, motor, and the housing, other than through the bearings such as non-contact labyrinth seals with babbit inserts or equivalent material.

E. The impellers shall be precision balanced to help eliminate vibrations.

F. The blowers shall be mounted on vibration isolation pads.

G. Drive motors shall be totally enclosed, fan-cooled, and of the proper rating to drive the blowers.

H. The blower shall provide a minimum of twenty (20) inches of water column inlet vacuum at the maximum rated capacity.

I. The total blower pressure rise shall be twenty (20) inches of water column greater than all pressures required to operate the flare assembly at maximum rated capacity.

J. Blowers shall be interlocked. Only one blower shall be operational at a time. Both blower assemblies shall have a Manual-Off-Auto switch.

2.02 FLARE

A. An insulated steel stack shall be fabricated of steel plate. The entire inside surface of the stack shall be lined with 2300° F refractory. Refractory shall be rated for the design operating temperature. Refractory shall not require warm-up or cool-down procedures to avoid refractory damage. The flare may be subject to sudden startup after a prolonged idle period during which the refractory is

exposed to weather conditions. In addition, sudden shutdown may occur after prolonged operational periods.

B. The stack shall be equipped with four each 4-inch diameter test ports and placed three feet below the top edge and at 90° spacing around the periphery of the round stack. Seven view ports, 2-inch NPT with removable tempered glass covers, shall be included on the stack. Three of these view ports shall be located at the base of that stack to view the pilot flame and the base of the main flame. The others shall be located such that they offer a view of each thermocouple.

C. Thermocouple ports shall be installed six, eight, ten, and twelve feet below the top edge of the stack. Unused ports shall be plugged.

D. The flare shall be equipped with a combustion air damper assembly. The damper assembly shall be actuated automatically by an electric positioning motor which is controlled by the temperature controller that senses the stack gas temperature by the thermocouple in the flare stack.

E. The Contractor shall supply a complete propane pilot assembly, including ignition transformer, electric igniter, pressure regulator, solenoid operated valve, and two 5-gallon propane supply tanks.

F. The flare station shall be equipped with an automatic landfill gas shut-down valve which shall be activated by:

- normal shut down selection at control panel,
- flame failure (determined by ultraviolet scanner),
- high liquid level in knockout vessel,
- high liquid level in condensate storage tank (condensate storage tank not to be included in or with flare station skid),
- rupture disk failure,
- low or high flame temperature, and
- power failure.

The flare station shall also be equipped with an autodialer system to notify selected personnel of shutdowns and low instrument air pressure. The flare station control panel shall include panel lights for:

- the above shut-down events.
- power on,
- purge on,
- pilot on,
- landfill gas on,
- auxiliary gas on,
- Blower B-100 on,
- Blower B-101 on, and
- Flare on.

G. The flare shall be equipped with a burner assembly for landfill gas with the following composition:

LANDFILL GAS COMPOSITION

LANDFILL GAS COMPONENT	COMPOSITION RANGE %
Methane (CH_4)	50 TO 0
Carbon Dioxide (CO_2)	50 TO 0
Nitrogen (N_2)	2 TO 78
Oxygen (O_2)	0 TO 20
Water Vapor (H_2O)	0 TO 11

NOTE: The LFG composition does not vary linearly in between the listed range extremes.

H. The flare shall have provisions for a 450,000 British Thermal Units (Btu) per hour natural gas auxiliary fuel burner(s). The auxiliary fuel assembly shall include pressure regulator, limiting orifice, and operating valves. The auxiliary fuel control valve shall be activated by low flare temperature with a preset handset level control.

I. The maximum gas pressure at the inlet of the flare shall not exceed 10 inches of water column ("WC).

J. Burner noise shall not exceed 80 dB, as measured on the "A" weighted decibel scale at a distance of three feet from the outer surface of the flare for the flow of gases specified above.

K. Flame shall not extend above the top of the flare during operation.

L. The flare shell skin temperature shall not exceed 230° F under maximum Btu loading conditions without a personnel protection barrier. The maximum allowable skin temperature shall be 300° F.

M. Flare Design Capacity:

1. The flare shall be designed to combust between 10 SCFM (at 50% methane) and 100 SCFM (at 20% methane) landfill gas within the range of compositions shown in Section 2.03.

2. The heat rating of the landfill gas flare is one-quarter (0.25) to one and one-half (1.5) million British Thermal Units per hour (mmBtu/hr). The gas handling and flare assembly manufacturer shall certify that the required efficiency can be maintained throughout the heat rating range and provide a performance envelope describing the amount of auxiliary fuel, if any, required to meet the minimum heat rate.

3. The landfill gas handling and flare assembly skids shall be installed at an altitude of approximately 1,000 feet above mean sea level, and shall be designed to continuously burn and oxidize landfill gas under the following conditions:

	MINIMUM	MAXIMUM
Landfill gas flow rate (scfm)	40	100
Landfill gas temperature	70 °F	120 °F
Ambient air temperature	35 °F	120 °F

N. Flare Combustion Efficiency:

1. The minimum destruction efficiency for non-methane organic compounds (NMOC) shall be ninety-eight (98) percent.

2. The flare shall provide a minimum retention time of 0.6 second at a minimum temperature of 1,400° F at the design range of Btu heat rating. The flare shall provide the above minimum retention time and temperature for all other conditions using natural gas as auxiliary fuel, if required.

3. The maximum oxides of nitrogen (NOx) emissions for the flare shall be 0.05 pound of NOx as NO_2 per mmBtu.

4. The maximum carbon monoxide (CO) emissions for the flare shall be 0.1 pound of CO per mmBtu.

2.03 FLARE INLET SHUTDOWN VALVE

A. The flare inlet shutdown valve shall be a pneumatically operated butterfly valve equipped with a stainless steel disk and Viton seat. The operator shall be equipped as a spring fail close device and shall close when directed by the logic in less than 2 seconds.

2.04 FLAME ARRESTOR

A. The flare station flame arrestor shall be a 6 inch, horizontal type, model 7628-06-14-FOO, manufactured by Groth Equipment Corp., or an approved equal equipped with a stainless steel nameplate which includes size and pressure rating along with the manufacturer's name and the model number. The flame arrester shall be an "in line" configuration fabricated of Type 356 aluminum and equipped with flanges on both ends. The flame arrester shall be of wafer design to permit easy removal of the flame arrester element. The flame arrester flanges shall be 125 pound flat face. The flame arrester shall have pressure-flow characteristics as shown in the table below:

FLOW* CUBIC FEET PER HOUR	PRESSURE DIFFERENTIAL INCHES W.C.
0	0
20,000	0.41
40,000	1.15
60,000	2.20
80,000	3.90

* Specific gravity of landfill gas is 0.98

2.05 FUEL GAS FILTER/KNOCKOUT DRUM

A. The flare station fuel gas filter/knockout drum (vessel) shall have a removal efficiency of 98% for particles larger than 5 microns and shall remove all free liquids. Total pressure drop (clean stage) through the vessel shall not exceed 3 inches of water column at design flow rate conditions. Material of construction shall be carbon steel. The interior of the vessel shall be coated to prevent corrosion of the vessel by the landfill gas condensate (Note: Landfill gas condensate may have a pH as low as 2). The operational pressure shall be 10 to 60 inches of water column vacuum. Design temperature shall be 250 °F. The vessel shall include inlet by-pass with hand operated valves, vessel differential pressure indicator with taps, lines and valves, capacitance type level indicator, level switches, level gauge, condensate drain valve, and pneumatically driven pump (Wilden M-2 or equivalent), as indicated on the drawings. One spare demister pad shall be included.

2.06 CONTROL SYSTEM

A. The control panel for the Cell A-1 Flare Station shall be compliant with NEMA 3R specifications at a minimum. The main control panel shall be sized 96" H. x 36" W. x 24" D. at a minimum, shall be provided with a swing out panel, and shall further be provided with a NEMA 4 compliant window in the door through which status annunciators, recorders, controller, etc. may be viewed. The control panel shall be mounted, installed and pre-wired to the extent possible by the Cell A-1 Flare Station manufacturer. The panel shall include as a minimum, but not be limited to, the following components:

1. A load center for all the motors, outlets, fixtures, controls and devices, etc. included with the system. One spare two-pole breaker and two spare single-pole breakers shall be provided in the load center.

2. A relay based logic control center to receive all the signals from the various safeties, controls and monitoring equipment, and to automatically control all the various components of the system.

3. An operator control panel to allow either manual or automatic selection for the control of the various operation components of the system.

4. A weather/heat shield shall be provided to protect the control panel against radiated heat (solar and/or flare) and rain. The control system shall be designed and manufactured as an outdoor system.

2.07 ADDITIONAL DESIGN REQUIREMENTS

A. All electrical equipment and control instrumentation for the blower and flare operation shall be integral to the gas processing and flare skid assemblies.

B. The gas handling and flare assembly skids shall be assembled at the factory. Any unavoidable on-site assembly shall be performed by the Contractor under the direction of the manufacturer.

C. Piping from pressure discharge of blowers shall include an elbow to a vertical mounted rupture disk with rupture disk monitor and vertical vent stack as described in the drawing. The rupture disk diaphragm material shall be Buna-N.

D. The piping from the pressure discharge of the blower before the flame arrestor shall include a tee with a blind flange for future connection.

E. The piping immediately leading to and from the flame arrester shall be equipped with two tapped 1/2-inch holes and hand operated valves, and shall be connected to a differential pressure indicator as described in the drawing to allow determination of inlet and outlet static pressures.

F. Provisions shall be made for connections of the landfill gas handling and flare assembly skid components to the instrument air compressor, as described in Section S.P. C12700.

G. Provisions shall be made for connections of the pneumatically driven pump from the fuel gas filter/knockout drum to the condensate storage tank, as described in Section S.P. C12800.

H. The control panel shall include an annunciator for first out annunciation.

I. All electrical panel components shall be mounted on a single control panel backboard.

PART 3: EXECUTION

3.01 SUBMITTALS

A. The Contractor shall provide a complete schedule showing the various stages of Drawing preparation, production, receipt of sub-vendor items, final assembly, testing, and shipment. The schedule shall also include the name, address, and telephone number of the individual directly responsible for the completion of each stage.

B. Submittals shall include the following:

1. Shop drawings, including the description of materials used for various components, a list of replaceable wear and service items, and s complete list of all accessories to be provided.

2. Structural calculations.

3. Approximate shipping weight of equipment, and if shipped unassembled, the number of components and approximate weight of each.

4. Detailed installation instructions.

3.02 PAINTING

A. The Contractor shall paint all equipment furnished by him with three coats of paint. Where it is practical to apply a shop coat, two field coats in addition to the shop coat shall be required. Where a shop coat is not practical, one rust-prohibitive coat and two finish coats shall be applied.

B. All factory-finished equipment shall be protected from damage during erection, thoroughly cleaned after erection, and touched up as required. If the factory finish has, in the opinion of the Engineer, been seriously damaged, the equipment shall be given two additional finish field coats.

C. The surfaces of all piping, valves, electrical conduits, structural steel, etc., shall be properly prepared and painted with one coat of rust prohibitive paint and two field coats of moisture and acid-resistant paint.

D. The color of the finished paint shall be as determined by the City.

3.03 INSPECTION

The City reserves the right to appoint an inspector or other authorized representative of the Engineer to inspect the gas flare prior to shipping, with full power to reject all materials and workmanship not conforming to the drawings and specifications. The Contractor shall give the City a minimum notice of five (5) working days before the completion of the fabricating operations to permit ample time for the inspection of the gas handling and flare assembly skids.

3.04 TESTING

The Contractor shall demonstrate the successful automatic operation of the gas handling and flare assembly skids prior to final acceptance of the equipment. The gas handling and flare assembly skids shall be field tested to demonstrate that it meets capacity, noise, flame height, combustion temperature, skin temperature, and automatic temperature control requirements.

3.05 DRAWINGS AND DATA

Complete as-built fabrication, assembly, support and installation drawings, showing fabrication details, detailed specifications, materials used, parts devices and other accessories forming a part of the equipment furnished, shall be submitted for inclusion in the Operations and Maintenance Manual (O&M).

END OF SECTION

DIVISION 12 - CELL A-1 EQUIPMENT

SUBSECTION C12700
CELL A-1 AIR COMPRESSORS

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. This section sets forth the requirements for furnishing and installing the Cell A-1 instrument air compressors.

B. The Contractor shall furnish and install complete, in-place and ready for service, two (2) air compressor units and appurtenances, as shown on the drawings and specified herein. One unit will serve for normal operation and the other will be a standby unit.

C. The factory unit shall be UL/FM listed.

PART 2: EQUIPMENT

2.01 SYSTEM COMPONENTS

A. The two (2) air compressor assemblies shall each be a skid-mounted, approximately 6' x 7', duplex compressor package. The skid shall provide, at a minimum, 15 SCFM of air at 150 psi and 38 °F dew point. Each skid shall include:

1. Two separate twin-cylinder, two-stage, compressor blocks with direct drive; each block driven by a 5 HP, 277 VAC 3-phase, TEFC electric motor, mounted on a rigid steel frame with Nema 4 Control Panel straddling an ASME approved 80 gallon receiver tank, with intake filter silencer, pop-off safety valve, and condensate drain, as manufactured by Atlas Copco Compressors Inc., Holyoke, Massachusetts, Model No. DT580H/V or equivalent.

2. One refrigerated dryer rated at 18 SCFM at 38 °F dew point, and 150 psig maximum working pressure, driven by a 1/5 HP electric motor as manufactured by Zeks Air Drier Corporation, Malvern, Pennsylvania, Model No. 18HSB or equivalent.

3. One particulate prefilter rated at 3 micron absolute removal as manufactured by Zeks Air Drier Corporation, Malvern, Pennsylvania, Model No. Accraflow 75PT or equivalent.

4. One coalescing afterfilter rated at 0.7 micron with 95% DOP efficiency, as manufactured by Zeks Air Drier Corporation, Malvern, Pennsylvania, Model No. Accraseive 80RT or equivalent.

5. One oil/water separator, as manufactured by Zeks Air Drier Corporation, Malvern, Pennsylvania, Model No. 45WOS or equivalent.

2.02 ANCILLARY EQUIPMENT

In addition to the air compressor assembly, the Contractor shall supply a filter regulator with pressure indicator, a shut-off valve, and a pressure switch alarm.

2.03 PERFORMANCE REQUIREMENTS

A. System shall be rated for 15 SCFM at 150 psi with a minimum of 38°F dewpoint.

B. Automatic pressure switch shall turn on the compressor at 140 psi and shut off at 160 psi.

2.04 PAINTING

A. The Contractor shall paint all equipment furnished by him with three coats of paint. Where it is practical to apply a shop coat, two field coats in addition to the shop coat shall be required. Where a shop coat is not practical, one rust-prohibitive coat and two finish coats shall be applied.

B. All factory-finished equipment shall be protected from damage during erection, thoroughly cleaned after erection, and touched up as required. If the factory finish has, in the opinion of the Engineer, been seriously damaged, the equipment shall be given two additional finish field coats.

C. The surfaces of all piping, valves, electrical conduits, structural steel, etc., shall be properly prepared and painted with one coat of rust prohibitive paint and two field coats of moisture and acid-resistant paint.

D. The color of the finished paint shall be as determined by the City.

END OF SECTION

SECTION 12 - CELL A-1 EQUIPMENT

SUBSECTION C12800
CELL A-1 CONDENSATE STORAGE TANK

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. This section sets forth the requirements for furnishing and installing the Cell A-1 condensate storage tank and secondary containment tank.

B. The Contractor shall furnish and install complete, in-place and ready for service, one (1) 1400 gallon capacity plastic upright condensate storage tank, a secondary containment tank, and appurtenances as shown on the drawings and specified herein.

C. The tank shall be fabricated of HDPE or equivalent non-corrosive material.

PART 2: EQUIPMENT

2.01 CONDENSATE STORAGE TANK

A. The condensate storage tank shall be a 1,400-gallon capacity HDPE upright tank, 7' - 5" Dia. x 5' - 2" H., with 17" top-mounted manway, as manufactured by Poly Cal Plastics, French Camp, California, Model No. Zorb Tank 077-U or equivalent.

B. The tank shall be supplied with four (4) 2-inch FNPT fittings on the top of the tank.

2.02 SECONDARY CONTAINMENT TANK

A. The secondary containment tank shall be a 2,900-gallon capacity HDPE tank, 10' Dia. x 5' H., with 8" internal flange, as manufactured by Poly Cal Plastics, French Camp, California, Model No. SP-096-XL or equivalent.

2.03 GRANULATED ACTIVATED CARBON VESSEL, V-102

A. A plastic vessel containing granulated activated carbon shall be installed and connected to the condensate storage tank vent line for the control of organic compound vapors. The vessel shall be of 5-gallon capacity, as manufactured by Barneby & Sutcliffe Corp., Model V-20 or equivalent.

2.04 ANCILLARY EQUIPMENT

A. Condensate storage tank shall be equipped with a capacitance type level switch, LSHH-102, (Endress & Hauser Model LSC 1132 or equal) which will activate a flare station shut down in the event of high liquid level in the storage tank.

B. Condensate storage tank shall receive liquids from the fuel gas filter/knockout vessel, V - 100, via the pneumatic pump, P-100, (Wilden Model M-2 or equal) when vessel liquid level switch indicates high liquid level in vessel. Condensate storage tank shall also receive liquids from condensate sumps in field.

C. PVC piping, valves, fittings, and appurtenances, as identified in drawings, to connect the tank to the condensate line from field, to the vent line to the GAC vessel, V-103, and to the pneumatic pump, P-100, including the condensate and air lines from the condensate knock-out vessel (V - 100) to the pneumatic pump (P-1).

END OF SECTION

SECTION 15 - MECHANICAL AND PLUMBING

SUBSECTION C15010
GENERAL PIPING SPECIFICATIONS

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

These General Piping Specifications apply, in general, to all piping. They shall supplement the detailed piping sections, standard specifications, and the equipment sections.

1.02 REFERENCE STANDARDS

Where ANSI, ASTM, AASHTO, SCS or other standards are referenced, applicable requirements of the last revision shall apply except as otherwise noted in these Special Provisions.

1.03 PIPE ITEMS NOT REQUIRING SUBMITTALS

Unless otherwise required, for piping which is installed in accordance with the specification and the engineering drawings, pipe submittals will not be required prior to fabrication and installation.

1.04 PIPE ITEMS REQUIRING SUBMITTALS

A. Items not specifically called for in the detailed pipe sections.

B. Any major relocations of piping from that detailed on the drawings.

C. Any change of materials, jointing methods, or supports from that specified or detailed on the drawings.

D. Details of additional supports not shown on the drawings which are required to adequately support the piping.

1.05 AS-BUILT DRAWINGS

A. The Contractor shall prepare and submit two complete sets of As-Built Drawings as specified in the General Conditions. They shall be separate, clean blueprints reserved for the purpose of showing a complete picture of the piping and valve work as actually installed. These Drawings shall be kept current with the construction. The Engineer shall have the right to inspect the As-Built Drawings as the work progresses.

B. Upon completion of the work, these record Drawings shall be signed by the Contractor, dated, and returned to the Engineer for approval. Approved record drawings are a condition for final acceptance.

PART 2: MATERIALS

2.01 GENERAL REQUIREMENTS

A. Pipe shall be standard weight pipe unless noted or specified otherwise herein or on the Drawings.

B. Suitable caps or blind flanges shall be furnished as indicated on the drawings on pipes, valves, or branches that are to be left unconnected. A sufficient length of blank pipe shall be left where a cap is placed to enable cutting and installation of two or three fittings at a future date. Piping runs shown on the drawings shall be followed as closely as possible except for minor adjustments to avoid other piping or structural features. If major relocations are required, approval shall be obtained from the City Engineer.

C. Materials shall be new and in perfect condition. Materials shall be of the same type and manufacture for similar use, unless otherwise approved. No item or material shall be installed for any purpose not recommended by the manufacturer. Workmanship shall be of the best standard practice of the trade.

PART 3: INSTALLATION

3.01 HANDLING

A. Pipe, fittings, valves and accessories shall be handled in a manner that will ensure installation in sound, undamaged condition. Equipment, tools, and methods used in unloading, reloading, hauling and laying pipe and fittings shall be such that they are not damaged. Hooks inserted in ends of pipe shall have broad, well padded contact surface.

B. The Contractor shall provide slings with protective sleeves in order to protect the pipe coating.

3.02 MANUFACTURER INSTRUCTIONS

Manufacturer instructions and recommendations shall apply to installation of piping unless otherwise specified. When requested by the Engineer, the Contractor shall furnish the manufacturer's printed installation instructions before pipe installation.

3.03 CLEANING

A. The interior of pipe and fittings shall be thoroughly cleaned of all foreign matter before being installed and shall be kept clean until the work has been accepted. Joint contact surfaces shall be kept clean until the jointing is completed.

B. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being installed. No debris, tools, clothing, or materials shall be placed in the pipe.

C. Gas piping headers and laterals will be under vacuum after installation. The Contractor, therefore, shall make special effort to prevent dirt or other materials from being drawn into these pipes.

3.04 CUTTING

Cutting shall be done in a neat manner without damage to the pipe or lining. Pipe cuts shall be smooth, straight, and at right angles to the pipe axis.

3.05 TRENCH CONSTRUCTION

A. Where pipe grades or elevations are not definitely fixed by the contract drawings, trenches shall be excavated to a depth sufficient to provide a minimum depth of backfill cover, from final grade to the invert of the pipe, of 36 inches in all locations exclusive of pavement, treated, untreated or stabilized base covers. Greater pipe cover depths may be necessary on vertical curves or to provide necessary clearance beneath other pipes, conduits, drains, drainage structures, or other obstructions encountered at normal pipe grades. Measurement of pipe cover depth shall be made vertical from the invert of the pipe.

B. Trenches shall be excavated to a width which will provide adequate working space and pipe clearances for proper pipe installation, jointing and embedment. However, limiting trench widths below an elevation 12 inches above the top of installed pipe, shall be as specified on the Trench Width Table included on the Drawings. If the new pipe is to be installed in a fill or backfill area, the Contractor shall complete the fill or backfill to a minimum of two feet above the top of the pipe and then excavate the trench within the allowable trench width.

3.06 PLUGGING OPEN END PIPES

Whenever pipe laying is stopped, the open end of the line shall be sealed with an approved mechanical watertight plug. Water that may have entered the trench shall be removed prior to removing the plug. It is essential that no mud, trench water, or other foreign matter be permitted to enter the pipeline at any time.

3.07 INSPECTION

Pipe and fittings shall be carefully examined for cracks and other defects while suspended immediately before installation in final position. Spigot ends of pipe shall be examined with particular care. Defective, damaged, or unsound pipe and fittings shall be rejected and removed from the work site.

END OF SECTION

SECTION 15 - MECHANICAL AND PLUMBING

SUBSECTION C15050
FLEXIBLE CONNECTIONS

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

The flexible connectors shall consist of flexible hoses and plastic pipe collars, all as detailed on the Drawings.

PART 2: EQUIPMENT

2.01 ABOVEGROUND CONNECTORS

A. Aboveground flexible hoses shall be made from silicone rubber with polyester cover/liner, and it shall be reinforced with 302 stainless steel (SS). It shall withstand temperatures from -65° F to 325° F without any adverse effect. It shall be suitable for test pressure of 5 psig vacuum. The flexibility for contraction and expansion should be 50 and 20 percent, respectively, of its original size. The hose shall be capable of bend radius equal to 1.5 hose diameter. The flexible hose shall be Series IT-6000 as manufactured by Industrial Tube Corporation, Huntington Beach, California, or equivalent. The minimum hose length shall be 18 inches.

B. The plastic pipe shall be solvent-welded to PVC pipe. The reinforced soft cuff end of the hose shall slide over the pipe and collar. A stainless steel strap shall be installed around the hose, near the collar, to provide an air-tight joint.

2.02 BELOWGRADE CONNECTORS

A. Belowgrade flexible connections shall be made by using PVC Kanaflex Series 101-PS.

B. The PVC flexible hose will be solvent welded, clamped, or both, as indicated on the Drawings.

2.03 EXPANSION JOINTS ON ABOVEGRADE STAINLESS STEEL PIPE

The Expansion joints on the abovegrade stainless steel header shall be a flanged assembly consisting of nitrile bellows between ANSI 150-pound bolt circle flanges, McMaster-Carr Part Number 4528K35 or equal.

END OF SECTION

SECTION 15 - MECHANICAL AND PLUMBING

SUBSECTION C15100
HIGH DENSITY POLYETHYLENE PIPING

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

High density polyethylene piping shall be furnished and installed where shown on the drawings complete with fittings, jointing materials, hangers and other accessories which are shown on the drawings or are required for proper installation and functioning of the piping.

PART 2: MATERIALS

2.01 COMPONENTS

A. All HDPE landfill gas header pipe and fittings shall be made from a polyethylene resin Type 3408, manufactured with ultraviolet inhibitors.

B. The standard dimension ratio (SDR) for the high density polyethylene (HDPE) pipe shall be 17 for 6-inch and greater pipe. For pipe less than six inches, SDR 11 shall be used.

C. The HDPE pipe fittings shall have the same specifications and pressure ratings as PE pipe. Fittings having a wall thickness different than the pipe shall not be used.

D. All HDPE pipe elbows and tees shall be molded type. Fabricated type elbows and tees shall not be used.

PART 3: INSTALLATION

3.01 STORAGE AND HANDLING

All pipes and fittings shall be handled carefully in loading and unloading. They shall be lifted by hoists and lowered on skidways in such a manner as to avoid shock. Derricks, ropes or other suitable equipment shall be used for lowering the pipe into the trench. Pipe and fittings shall not be dropped or dumped.

3.02 PIPE JOINING

A. The HDPE pipe and pipe fittings shall be joined by the butt fusion method unless otherwise specified on the Drawings.

B. Mechanical joining to other piping materials, fittings, and valves shall be accomplished with a HDPE flange adapter and cast steel backup flanges.

C. The bolts and nuts used for mechanical joining shall be A-307 cadmium-plated steel. The cast steel backup flanges shall be compatible for joining with ANSI-B 16.5, 150-pound bolt circle flanges, and shall be epoxy coated.

D. Butt fusion and saddle fusion of HDPE pipe shall be performed by a qualified person. The HDPE pipe supplier shall verify the qualifications of the pipe installer, and the Contractor shall submit a copy of this verification to the Engineer. No HDPE pipe shall be installed prior to submittal of this verification.

END OF SECTION

SECTION 15 - MECHANICAL AND PLUMBING

SUBSECTION C15200
PVC PIPING

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

PVC piping shall be furnished and installed where shown on the drawings complete with fittings, jointing material and other accessories which are shown on the drawings or are required for proper installation and functioning of the piping.

PART 2: MATERIALS

2.01 GENERAL

PVC pipe shall be Schedule 40 unless noted or specified otherwise herein or on the Drawings and shall conform to ASTM D 1785, PVC 1120.

2.02 PLASTIC PIPE COMPOUNDS

The rigid unplasticized compound from which PVC pipe, fittings, and appurtenances shall be made to conform to ASTM D 1784, Class 12454B - for polyvinyl chloride.

2.03 FITTINGS

Schedule 80 fittings shall conform to the requirements of ASTM-D-2467 for socket type joints and shall have a minimum pressure rating of 100 psig at 73° F. Large diameter fittings may be fabricated conforming to the above pressure rating.

2.04 FLANGE GASKETS

Neoprene full-face gaskets 1/8-inch thick of 45 to 60 durometer ("A" scale) hardness are required for flanged joints.

2.05 FLANGE BOLTING

Bolts, washers, and nuts for making up flanged joints on PVC pipe shall be cadmium-plate steel, Type A307.

2.06 SOLVENT PRIMER

Socket type connections shall be primed with primer furnished by the supplier of the PVC pipe and fittings.

2.07 SOLVENT CEMENT

Socket type connections shall only be joined by heavy duty solvent cement furnished by the supplier of the PVC pipe and fittings, and shall conform to ASTM D 2564.

PART 3: INSTALLATION

3.01 STORAGE

Plastic pipe, fittings and appurtenances shall be stored in a flat, horizontal position until ready for installation.

3.02 JOINTS

A. PVC pipe fittings and appurtenance shall be provided with solvent joints, except where otherwise shown.

B. Solvent welded joints shall be made in accordance with ASTM D 2855. The ends of the plastic pipe shall be cut square and smooth, beveled and wiped clean.

C. Primer shall first be applied to the outside of the pipe and the inside of the fitting socket with a small paint brush or other approved applicator.

D. After priming, solvent cement shall be applied to the outside of the pipe and the inside of the fitting socket with a small paint brush or roller applicator. Solvent shall be applied in such a manner that no material is deposited on the interior surface of the pipe or extruded into the interior of the pipe during joining. The coated surfaces shall be immediately pushed snugly together and the pipe rotated approximately 1/4 turn to ensure uniform distribution of cement. Excess cement on the exterior of the joint shall be wiped clean immediately after assembly.

E. Care shall be exercised in assembling a pipeline with solvent welded joints so that stress on previously made joints is avoided. Handling of the pipe following jointing, such as lowering the assembled pipeline into the trench, shall not occur prior to set times specified in ASTM D 2855.

3.03 FLEX COUPLING SPECIFICATIONS

All flex connections as indicated on the drawings shall be "Kanaflex Model PS101" or "ITC 6000" as specified on the drawing or an approved equal.

END OF SECTION

SECTION 15 - MECHANICAL AND PLUMBING

SUBSECTION C15250
FIBERGLASS REINFORCED PLASTIC (FRP) PIPE

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

Reinforced plastic fiberglass piping shall be furnished and installed where shown on the drawings complete with fittings, jointing materials, hangers and other accessories which are shown on the drawings or are required for proper installation and functioning of the piping.

1.02 APPLICABLE STANDARDS

All pipe shall be manufactured in accordance with ASTM D-2996 or D-2997. Testing shall be in accordance with ASTM D-2992 Procedure "A".

PART 2: MATERIALS

2.01 GLASS FIBER REINFORCED PLASTIC PIPE

A. Fiberglass reinforced plastic pipe 10 inches and smaller shall be manufactured from either epoxy resin or high temperature vinyl ester resin and shall have an internal corrosion-resistant liner with a minimum thickness of 20 mils. All pipe shall be centrifugally cast or filament-wound.

B. Epoxy pipe shall have the designation of RTRP-11F or RTRP-21F as per ASTM D-3210. High temperature vinyl ester pipe shall have the designation of RTRP-12E per ASTM D-2310.

C. Pipe 10 inches and smaller shall have bell and spigot adhesive-bonded joints with matching tapered ends. Fittings and flanges shall be made of the same material as the pipe.

D. All FRP pipe shall have a rated operating temperature of 250°F.

2.02 FLANGES

Flanges shall be filament-wound and compression-molded and shall be rated for 150 psi internal pressure. Flanges shall be flat-faced, with outside diameter and bolt drilling pattern conforming to ANS B16.5, and shall be used only on equipment or when necessary for installation or dismantling.

2.03 FLANGE GASKETS

Flange gaskets shall be neoprene full-faced gaskets 1/8-inch thick of 60 to 70 durometer (A scale) hardness.

2.04 FLANGE BOLTING

All studs, bolts, washers, and nuts for making up flanges joints on fiberglass plastic pipe shall be of corrosion-resisting steel conforming to the requirements of ASTM Standard A 276-71, for tank interiors and submerged surfaces. Compression molded flanges may require annular spacer rings when bolting to raised face steel flanges. All flange bolting, including bolt torque requirements, shall be per the flange manufacturers' recommendations.

2.05 FITTINGS

Fittings may be filament wound or compression-molded, and shall be manufactured from the same materials and resin system as the pipe. Fittings 10 inches and smaller shall have bell ends for adhesive bonding. Fittings shall have the same internal corrosion-resistant liner as the pipe.

2.06 ADHESIVE CEMENT

Only adhesive cement specified and furnished by the supplier of the fiberglass pipe, fittings, and flanges shall be used for joints.

2.07 STEADY PRESSURE RATING

Fiberglass pipe shall have the following properties:

PIPE SIZE INCHES	INTERNAL PRESSURE (PSI) NOT LESS THAN 150° F	210° F	EXTERNAL PRESSURE (PSI) NOT LESS THAN 72° F	210° F
10	150	225	17	11

2.08 ULTIMATE TENSILE ELONGATION

The ultimate tensile elongation shall not be less than three percent when the pipe is tested according to ASTM Standard D 2105.

2.09 MODULUS OF ELASTICITY IN TENSION AT 75° F

The modulus of elasticity shall not be less than 2.37×10^6 psi when the pipe is tested according to ASTM Standard D 2105.

2.10 THERMAL CONDUCTIVITY COEFFICIENT

The thermal conductivity coefficient shall not be more than 2.8 Btu/hr/sq. ft./°F/in.

2.11 TOLERANCES

Straightness:	0.125 inches in 10 feet
Outside Diameter:	±0.015 inches
Roundness	±0.025 inches
Wall Thickness	±5 percent

2.12 FIBERGLASS QUALITY STANDARD AND IDENTIFICATION

A. All pipe, fittings and flanges shall be dimensionally true, homogenous throughout, and free from hairline and other visible cracks, holes, blisters, indentation, wrinkles and foreign inclusions. Visual inspection for compliance with the above requirements will be made on all pipe, fittings, and flanges by the Engineer after delivery to job site. Any pipe, fitting, or flange failing to pass this inspection will be rejected.

B. Pipe, fittings, and flanges shall have the following information printed indelibly or molded thereon: Manufacturer's lot or control number, manufacturer's name or trademark, material, type, grade, and size.

2.13 STORING AND HANDLING FIBERGLASS-PLASTIC PIPE, FITTINGS, AND FLANGES

Care shall be exercised in handling, loading, unloading and storing fiberglass plastic pipe and fittings to avoid distortion, scratches, gouges, dents, and in particular, scuffing of the ends. All pipe and fittings shall be stored in a flat, horizontal position until ready for installation. Pipe ends shall be protected from the elements, with caps or suitable wrapping. Plastic pipe shall be transported in a vehicle having a bed long enough to provide support for the full length of the pipe. Any length of pipe that has been damaged or distorted shall be replaced.

PART 3: INSTALLATION

3.01 PIPE JOINING

The joining of FRP pipe to fittings and flanges shall be done in accordance with the manufacturer's printed instructions and as hereinafter specified. All exposed edges, such as the ends of pipe and drilled holes, shall be coated with the approved adhesive cement.

3.02 PIPE SUPPORTS

A. Supports shall be provided at all points of directional change, including horizontal to vertical.

B. FRP pipe shall be supported in a manner which permits contraction and expansion for temperature changes.

C. Valves, check valves, and other devices in the line shall be supported so that the weight or torque applied to the device does not place undue stress on the pipe.

D. Steel fittings and valve assemblies in FRP pipe runs shall be supported independently of the FRP pipe so that their weight will not be supported by or transmitted to the FRP pipe. Where clamping of the pipe for the purpose of anchoring is required, the clamps shall be fitted with FRP type liners.

3.03 PROTECTIVE COATING

A. FRP piping, valves and appurtenances installed in locations exposed to sunlight shall have a protective coating against ultraviolet light. The coating shall be aluminum in color and consist of two finish coats applied to a minimum dry-film thickness of 5 mils (2-1/2 mils minimum each coat). Surface preparation shall consist of solvent cleaning.

B. Recommendations of the coating manufacturer shall be followed as to the type of equipment and methods of application. The coating shall be Amercoat 99, Engard 362, or equal.

END OF SECTION

SECTION 15 - MECHANICAL AND PLUMBING

SUBSECTION C15300
STEEL PIPE

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

Furnish all labor, equipment and materials required to install steel pipe and fittings as shown in the Drawings and in these Specifications.

1.02 SUBMITTALS

A. The Contractor shall submit certification that proposed pipe materials meet specifications.

B. The Contractor shall submit to the Engineer Shop Drawings showing each piping spool or fabricated assembly detailed on the Drawings.

1.03 REFERENCES

A. ASTM A-120
B. ASTM A-53
C. ASTM A-106
D. ANSI B-36.10

PART 2: MATERIALS

2.01 COMPONENTS

Steel pipe shall be of the size, type, and wall thickness or pressure class as shown on the Drawings.

END OF SECTION

SECTION 15 - MECHANICAL AND PLUMBING

SUBSECTION C15320
CORRUGATED STEEL PIPING

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

The corrugated steel piping shall be furnished and installed where shown on the drawings complete with fittings, jointing material and other accessories which are shown on the drawings or are required for proper installation and functioning of the piping or in accordance with Standard Specifications.

END OF SECTION

SECTION 15 - MECHANICAL AND PLUMBING

SUBSECTION C15400
STAINLESS STEEL PIPE

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

Furnish all labor, equipment, and materials required to install steel pipe and fittings as shown in the Drawings and in these Specifications.

1.02 SUBMITTALS

A. The Contractor shall submit to the Engineer certifications that pipe conforms to the required specifications.

B. Literature on type and size of welding rods shall be submitted.

1.03 REFERENCES

A. ASTM A-312.
B. ANSI B-36.9.
C. ANSI B-16.19
D. ASTM A-269
E. ASTM A-403
F. MSS SP-43

PART 2: MATERIALS

2.01 COMPONENTS

A. Stainless steel pipe shall be Type 304 seamless or welded pipe Schedule 10S.

B. All stainless steel fittings shall be Type 304 IPS butt weld fittings conforming to MSS SP-43 and ANSI B16.9.

C. Flanges shall be welding neck style unless detailed differently on the drawings. Flanges shall be standard weight 150 pound class flat face.

D. Flange bolts, nuts and washers shall be Type 304 or 18-8 stainless steel conforming to ANSI A-193.

E. Flange gaskets shall be 1/16" thick neoprene, full face.

PART 3: INSTALLATION

3.01 JOINING

A. All joining of stainless steel pipe two inches and larger shall be by full penetration butt welding.

B. All welding shall be performed by a certified welder.

3.02 PRESSURE TESTING

Pressure testing of the completed pipe assembly is required.

END OF SECTION

SECTION 15 - MECHANICAL AND PLUMBING

SUBSECTION C15800
VALVES

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

This section covers all valves, operators and appurtenances except where specific requirements are given in other sections. The Contractor shall furnish and install all valves complete with all operators, specialty items and appurtenances as shown on the Drawings and specified herein. Pipe and valve purchase orders shall be coordinated to ensure proper installation of the valves and piping in conformance with the specified requirements.

1.02 GENERAL EQUIPMENT STIPULATIONS

The General Equipment Stipulations shall apply to all equipment furnished under this section.

1.03 ELECTRICAL WORK

Electrical and instrument work shall be as specified and shown on the Drawings.

PART 2: EQUIPMENT

2.01 MANUAL OPERATORS

A. All valves shall be provided with a manual operator unless otherwise noted on the Drawings or specified. The direction of rotation of the wheel, wrench nut, or lever to open each valve shall be to the left (counterclockwise). Each valve body or operator shall have cast thereon the word OPEN and an arrow indicating the direction to open.

B. Operator mounting arrangements and handwheel positions shall be as shown on the Drawing or as directed by the Engineer.

C. All valves shall be provided with a manual operator of the handwheel type unless otherwise shown on the Drawings or specified herein.

D. Unless otherwise shown on the Drawings or specified herein, 6-inch and smaller butterfly valves shall be provided with a square nut type operator and 8-inch and larger butterfly valves shall be provided with a weatherproof, enclosed worm gear operator. Gear operators shall be sized for the hydrostatic test pressure in the line or the pressure rating of the valve. All valves shall be equipped with a visual position indicator.

E. Wrench nuts shall be provided on all buried valves where shown on the Drawings. Not less than two operating keys shall be furnished for operation of the square nut operated valves.

2.02 BURIED VALVES

A. Each valve which is installed with any portion below grade shall be provided with a valve box of the type and design shown on the Drawings.

B. Valves and valve boxes shall be set plumb. Each valve box shall be placed directly over the valve it serves, with the top of the box brought three inches above the finished grade. After being placed in proper position, earth shall be filled in around each valve box and thoroughly tamped for a distance on each side of the box of four feet at the top of the pipe and two feet measured at the top of the trench.

C. Each valve shall be inspected before installation to ensure that all foreign substances have been removed from within the valve body; and they shall be opened and closed to see that all parts are in first-class working condition. Geared valves shall be inspected to see that all gears are properly lubricated.

D. All valves of the same type shall be of the same make unless otherwise approved by the Engineer. Equals may be substituted for the manufacturers listed with the approval of the Engineer.

E. Valves shall be line size except as shown otherwise on the Drawings. Ratings specified are minimum unless noted otherwise.

F. All automatic operated valves shall be tagged by the manufacturer in accordance with the instrument tag numbers shown on the Drawings.

2.03 PNEUMATIC ACTUATORS

A. The Contractor shall furnish, deliver, and install pneumatic actuators. The valve/actuator assembly shall be assembled by one supplier who will be responsible for the proper functioning of the unit (valve and actuator).

B. The actuators shall be mounted in their standard position and shall be direct-acting providing driptight shutoff at pressure differentials to the full rating of the valve. Valves shall be tested to 110 percent of rated working pressure. Each operator shall be equipped with a travel indicator to indicate Open and Closed position of the valve. Pneumatic rotary actuators shall be of the rack and pinion type. All units shall be tested to ensure proper operation and shall be factory lubricated. Actuator assembly shall mount directly to valve top plate, without the use of special brackets.

C. Actuators shall be spring return capable of a driptight shutoff under "fail close" conditions. A declutchable manual override shall be provided.

D. A limit switch box with two DPDT switches for Remote Open and Close indications shall be provided for each valve.

E. A three-way, normally closed, solenoid valve shall be installed in the instrument air supply line to the control valve. When the solenoid valve is energized, the instrument supply air will activate the valve to the full open position.

END OF SECTION

SECTION 15 - MECHANICAL AND PLUMBING

SUBSECTION C15900
PRESSURE TESTING OF PIPE

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. Leak testing shall be conducted by the Contractor on the following lines:

1. Landfill gas collection headers and main lines to the proposed Flare Station.
2. Landfill gas blower discharge piping.
3. Instrument air supply piping.
4. Propane gas piping.

B. The procedure and equipment to be used shall be approved by the Engineer prior to testing any line. Vacuum leakage tests shall be performed on the headers and main lines after installation and before backfilling where pipe is buried or encased. The entire gas collection system should be vacuum tested after all pipes are buried. Air and condensate lines will be pressure tested after backfilling.

PART 2: TESTING EQUIPMENT

2.01 GENERAL

The Contractor shall provide necessary piping connections between the section of line being tested and the nearest available source of air, or test fluid, together with test pumping equipment, pressure gauge and other equipment, materials and facilities necessary to make the specified tests. The Contractor shall provide temporary sectionalizing devices and vents as required for testing. Vents are to be left plugged if not required for the permanent installation.

PART 3: EXECUTION

3.01 TESTING PROCEDURE

A. The specified test pressures shall be as measured at the horizontal centerline of the lowest point of the piping under test.

B. Each pipeline shall be adequately braced and supported before tests are made. On lines which thrust blocks, these blocks shall have been poured and the concrete set before the test is conducted. Partial backfilling between joints of pipelines in trenches is permissible to prevent movement under test pressure, subject to approval by the Engineer.

C. Pipelines that have no valves shall be closed with blind flanges or caps on the ends of the section to be tested.

D. Tests shall be made before the piping has been enclosed in any manner that will prevent inspection during the test.

E. Leakage testing for the headers and main lines and blower discharge piping shall consist of pressurizing or evacuating the lines, either individually or in common, to a pressure or vacuum of approximately $\pm$ 2 psig. All joints and connections shall be visually inspected for leaks after applying the leakage detecting fluid. Because PVC is shock sensitive and brittle at low temperatures, the Contractor shall regulate the test pressure or vacuum such that when pressurizing or evacuating any PVC or PE line with air, the test pressure shall never exceed $\pm$ 2 psig. The Contractor is cautioned that high test pressures can shatter a considerable length of PVC pipe when a gas testing fluid is used, and pieces of the pipe can be propelled for long distances.

F. The test pressure in air, condensate, and propane lines shall be 135 psig and shall be held for one hour, during which time there shall be no drop in pressure, unless otherwise specified herein.

G. The Contractor, at his own expense, shall make necessary repairs or replacements in accordance with the Specifications. Repairing and testing shall be repeated until the pipeline installation conforms to the specified requirements and is acceptable to the Engineer.

H. After the test has been concluded, the pipeline shall be restored to a condition satisfactory to the Engineer.

I. Pumps, air compressors, instrumentation and similar equipment shall not be subjected to the pressure tests.

J. It is intended that piping, whether tested after installation or not, shall be air-tight and free from visible leaks. Each leak which is discovered within one year after final acceptance of the work by the City shall be repaired by and at the expense of the Contractor.

END OF SECTION

SECTION 16 - ELECTRICAL

SUBSECTION C16010
CELL A FLARE STATION ELECTRICAL EQUIPMENT

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall furnish all labor, equipment, and material as required to install complete and in operational condition the electrical system for the Cell A Flare Station, as shown on the Drawings and specified herein.

PART 2: EQUIPMENT

2.01 CONTROL PANEL ENCLOSURE

A. A steel backboard shall be furnished for the control panel and other electrical equipment as shown on the Drawings.

2.02 ENCLOSURES

All enclosures, unless otherwise specified, shall be Hoffman Engineering.

2.03 MOTOR STARTERS

A. An Allen Bradley 2100 series motor control center Size 3, NEMA 12 with three (3) each overload heaters shall be furnished and installed.

B. Blower starters shall be furnished with four (4) normally open auxiliary contacts.

C. Circuit breaker shall be furnished with one normally open factory-installed Form C auxiliary contact.

2.04 VARIABLE FREQUENCY DRIVE

An Allen Bradley Series 1336-VT shall be furnished and installed.

2.05 AIR CONDITIONER

A Hoffman Model D-ACCE082 with outdoor kit shall be furnished and installed.

2.06 ELECTRICAL DISTRIBUTION PANEL

The Electrical distribution panel shall be a Square D Model MPZ10S40F mini substation, or equal.

2.07 FIELD WIRING

A. Conduit shall be rigid galvanized steel. All conduit terminations shall be threaded. Threadless fittings are not acceptable. Exposed conduits shall be installed in a neat and workmanlike manner. They shall be level and parallel to adjacent surfaces or piping. The area within ten feet of the blower is classified as Class 1, Division II, Group D. All wiring within this area shall be done in a manner approved for this classification. Minimum conduit size is to be 3/4 inch, except for final connection to individual devices.

B. 120-vac wiring shall be Type THWN stranded. All wires shall be identified at both ends with wire markers to match the wiring diagrams.

C. Grounding wire shall be minimum #4 AWG Bare Copper Wire.

D. Rupture disk and monitor shall use special BDI cable as supplied by the manufacturer.

E. Instrument signal wiring shall be shielded coaxial Cable Belden #8719.

F. Thermocouple wiring shall be 18-gauge Type K thermocouple extension wire.

G. Motors and field devices shall be connected by means of Sealtite flexible conduit with approved connectors. The maximum length of flexible conduit shall be 18 inches. Wire connections shall be accomplished with solderless ring terminals, bolted and taped. Wire-nut type connections are not acceptable.

H. All seal-off fittings shall be properly packed with fiber material and poured with approved sealing compound after proper system operation has been verified.

2.08 AREA LIGHTING

A. Area lighting for the Flare Station shall be by means of four (4) 250 watts each, Ruud Model FS 3525M High Pressure Sodium Lamps. The fixtures will be Ruud Model PS3S2051bZ Poles with PB-1A-3 Hardware Kit located on the flare as indicated on the assembly drawing. The ON/OFF switch shall be located by the control panel.

2.09 TELEPHONE

A. The Contractor will be responsible for supplying all necessary telephone service conduits and auxiliary equipment to the alarm system as required.

2.10 ALARM SYSTEM

A. A four channel autodialing system will be installed at the Flare Station. The intent of the installation of this alarm system is to provide remote notification in the event of system failure. A single pole double arrow (SP/DT) dry contract shall be provided for each of the following:

1. Instrument air pressure low.
2. Flare station failure.
3. Spare
4. Spare

2.11 IGNITION TRANSFORMER

A. The ignition transformer shall be a Dougan Model 612, as identified in the Equipment Data Sheets, and shall be mounted in the Hoffman enclosure attached to the flare.

B. Secondary wiring shall be rated for 20,000 volts unless otherwise specified.

PART 3: EXECUTION

3.01 GENERAL REQUIREMENTS

A. All electrical work shall conform to the latest edition of the National Electrical Code, City of Phoenix and State of Arizona Code and Regulations, and latest revisions of the Regulations of the State Fire Marshal.

B. All electrical work and equipment shall be in accordance with the National Electrical Code for the area classification given. Inside flare enclosure, unclassified except for an area 10 feet from blower, valves, piping, or vessels, shall be Class 1, Division II, Group D.

C. All materials used under this Contract shall be new and of the quality herein specified or approved as a substitute by the City. All materials shall be approved by the Underwriters' Laboratories, and each class shall be the same type throughout the project.

3.02 INTENT OF DRAWINGS

A. The Drawings indicate diagrammatically the intent of all the work of the Contract. The electrical contractor shall examine the electrical drawings for any discrepancies that may occur between his trade and all other applicable project trade drawings as to indicate location, dimensions, deviations, as-built conditions, codes, and these specifications, and the Contractor shall immediately notify the City of any conflict.

B. All minor deviations or conflicts required to conform to any as-built conditions or to fit the installed work of other subcontractors shall be made by the Contractor. Drawings show typical installation and are not to be construed to be of a specific supplier.

3.03 AS-BUILTS

A. A set of blueline prints shall be kept on the job and marked in red pencil to show as-built conditions. These prints shall be signed and dated by the Contractor and delivered to the City prior to final approval by the City.

END OF SECTION

SECTION 16 - ELECTRICAL

SUBSECTION C16020
CELL A-1 FLARE STATION ELECTRICAL EQUIPMENT

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall furnish all labor, equipment, and material as required to install complete and in operational condition the electrical system for the Cell A-1 Flare Station Assembly, as shown on the Drawings and specified herein, but not to include electrical components supplied with the flare skid assembly.

PART 2: EQUIPMENT

2.01 CONTROL PANEL ENCLOSURE

A. A steel backboard shall be furnished for the control panel and other electrical equipment as shown on the Drawings.

2.02 ENCLOSURES

All enclosures, unless otherwise specified, shall be Hoffman Engineering.

2.03 MOTOR STARTERS

A. Motor starters shall be Allen Bradley 2100 Series NEMA 12 with three (3) each overload heaters.

B. Blower starters shall be furnished with four (4) normally open auxiliary contacts.

C. A circuit breaker shall be furnished with one normally open factory-installed Form C auxiliary contact.

2.04 FIELD WIRING

A. Conduit shall be rigid galvanized steel. All conduit terminations shall be threaded. Threadless fittings are not acceptable. Exposed conduits shall be installed in a neat and workmanlike manner. They shall be level and parallel to adjacent surfaces or piping. The area within ten feet of the blower is classified as Class 1, Division II, Group D. All wiring within this area shall be done in a manner approved for this classification. Minimum conduit size is to be 3/4 inch, except for final connection to individual devices.

B. 120-vac wiring shall be Type THWN stranded. All wires shall be identified at both ends with wire markers to match the wiring diagrams.

C. Grounding wire shall be sized as shown on Drawings.

D. Rupture disk and monitor shall use special BDI cable as supplied by the manufacturer.

E. Instrument signal wiring shall be shielded coaxial Cable Belden #8719.

F. Thermocouple wiring shall be 18-gauge Type K thermocouple extension wire.

G. Motors and field devices shall be connected by means of Sealtite flexible conduit with approved connectors. The maximum length of flexible conduit shall be 18 inches. Wire connections shall be accomplished with solderless ring terminals, bolted and taped. Wire-nut type connections are not acceptable.

H. All seal-off fittings shall be properly packed with fiber material and poured with approved sealing compound after proper system operation has been verified.

2.05 AREA LIGHTING

A. Area lighting for the Flare Station shall be by means of four (4) 250 watts each, Ruud Model FS 3525M High Pressure Sodium Lamps. The fixtures will be Ruud Model PS3S2051bZ Poles with PB-1A-3 Hardware Kit located on the flare as indicated on the assembly drawing. The ON/OFF switch shall be located by the control panel.

2.06 TELEPHONE

A. The Contractor will be responsible for supplying all necessary telephone service conduits and auxiliary equipment to the alarm system as required.

2.7 ALARM SYSTEM

A. A four channel autodialing system will be installed at the Flare Station. The intent of the installation of this alarm system is to provide remote notification in the event of system failure. A single pole double arrow (SP/DT) dry contact shall be provided for each of the following:

1. Instrument air pressure low.
2. Flare station failure.
3. Spare
4. Spare

PART 3: EXECUTION

3.01 GENERAL REQUIREMENTS

A. All electrical work shall conform to the latest edition of the National Electrical Code, City of Phoenix and State of Arizona Code and Regulations, and latest revisions of the Regulations of the State Fire Marshal.

B. All electrical work and equipment shall be in accordance with the National Electrical Code for the area classification given. Inside flare enclosure, unclassified except for an area 10 feet from blower, valves, piping, or vessels, shall be Class 1, Division II, Group D.

C. All materials used under this Contract shall be new and of the quality herein specified or approved as a substitute by the City. All materials shall be approved by the Underwriters' Laboratories, and each class shall be the same type throughout the project.

3.02 INTENT OF DRAWINGS

A. The Drawings indicate diagrammatically the intent of all the work of the Contract. The electrical contractor shall examine the electrical drawings for any discrepancies that may occur between his trade and all other applicable project trade drawings as to indicate location, dimensions, deviations, as-built conditions, codes, and these specifications, and the Contractor shall immediately notify the City of any conflict.

B. All minor deviations or conflicts required to conform to any as-built conditions or to fit the installed work of other subcontractors shall be made by the Contractor. Drawings show typical installation and are not to be construed to be of a specific supplier.

3.03 AS-BUILTS

A. A set of blueline prints shall be kept on the job and marked in red pencil to show as-built conditions. These prints shall be signed and dated by the Contractor and delivered to the City prior to final approval by the City.

END OF SECTION

SECTION 16 - ELECTRICAL

SUBSECTION C16100
CELL A FLARE STATION CONTROL PANEL

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

The Contractor shall provide all necessary labor, equipment, and materials for construction of the Cell A flare station control panel, complete and operational, as shown on the Drawings and specified herein.

PART 2: PRODUCTS

2.01 CONTROL PANEL ENCLOSURE

A. The Contractor shall furnish, install, and wire Hoffman control panel enclosures as specified in the Drawings.

B. The control panel shall be fabricated by a UL certified fabricator.

2.02 BURNER CONTROL SYSTEM

A. As specified in the electrical drawings, the Contractor shall furnish and install a burner control system.

B. Contractor shall fabricate mounting bracket to swing out panel.

C. The burner control system model number and options are shown in the Equipment Data Sheets (a part of these Specifications).

2.03 TEMPERATURE INDICATOR CONTROLLER

A. As specified in the electrical drawings, the Contractor shall furnish and install a temperature controller for each flare assembly.

B. The temperature indicator controller model number and options are shown in the Equipment Data Sheets.

2.04 SWITCHES AND PUSHBUTTONS

A. Pilot lights shall be of the dual-input transformer type, Allen Bradley 800T-PDT16 series. There shall be installed on the control panel one "lamp test" pushbutton to test all lamps simultaneously.

B. Emergency stop push-pull units shall be Allen Bradley 800T-FXP16AA1.

C. Pushbuttons and selector switches shall be Allen Bradley 800T.

2.05 CONTROL RELAYS

A. Control relays shall be Allen Bradley Model 700-HA32A1 with Allen Bradley octal sockets mounted on DIN rail.

B. Time-delay relays shall be Allen Bradley Series 700-HT installed in octal sockets mounted on DIN rail.

2.06 TERMINAL STRIPS

Terminal strips shall be track-mounted tubular screw type sections, Allen Bradley 1492 series.

2.07 NAMEPLATES

Nameplates shall be custom engraved phenolic, white background with black letters, 2-1/4 inches by 5/8 inch with self-sticking double-faced tape backing.

2.08 PLASTIC WIREWAYS

Plastic wireways shall be of the sizes shown on the Drawings and manufactured by Panduit.

2.09 DATA RECORDER

The data recorder shall be as specified in the Equipment Data Sheets.

2.10 ANNUNCIATOR

The annunciator shall be as shown in the Drawings and as specified in the Equipment Data Sheets.

2.11 24 VDC - POWER SUPPLY

A. An Accopian Model 24U100 24 VDC power supply shall be installed in the control panel as shown on the Drawings.

B. The power supply is provided for the flow transmitter described in the instrumentation section.

PART 3: EXECUTION

3.01 GENERAL REQUIREMENTS

A. All electrical work shall conform to the latest edition of the National Electrical Code, City of Phoenix and State of Arizona Code and Regulations, and latest revisions of the Regulations of the State Fire Marshal.

B. All materials used under this Contract shall be new and of the quality herein specified or approved as a substitute by the City. All materials shall be approved by the Underwriters' Laboratories, and each class shall be the same type throughout the project.

C. The control panel shall be fabricated to JIC standards. Terminal blocks shall be installed for all field-wired devices and all wires going to door-mounted devices. Spare terminals equal to ten percent of the required amount (ten minimum) shall be furnished. Plastic wireways shall be utilized for routing wiring within panel. Door wiring shall be neatly routed and tied with nylon tie straps. A minimum of eight (8) spare wires shall be included in the door loom. The spare wires shall be identified as S1, S2, etc., on both ends. They shall be neatly coiled and tied at the door end, and coiled and stowed in the terminal strip raceway at the other end.

D. Panel wire shall be minimum AWG 16-gauge stranded and shall be Type THWN. 120-volt wiring shall be red with a white grounded neutral wire. All wires shall be identified at both ends with wire numbers corresponding to the wiring diagrams. All interlock wiring from other systems shall be yellow; 24 VDC wiring shall be blue. Control circuit disconnects shall be furnished on the terminal strip for all interlock wires.

E. Door-mounted pilot devices shall be neatly grouped and arranged in a logical manner for ease of operation. They shall be horizontally spaced on 2-1/4-inch centers and vertically spaced on 2-1/2-inch centers. Engraved phenolic nameplates shall be furnished for all pilot devices.

F. All panel-mounted devices shall be attached to the mounting panel by means of machine screws into tapped hole or self-tapping screws. Nuts are not to be used behind the mounting plate. Plastic wireways and relay tracks may be fastened by means of rivets; double-faced tape shall not be used.

3.02 INTENT OF DRAWINGS

A. The drawings indicate diagrammatically the intent of all the work of the Contract. The electrical contractor shall examine the electrical drawings for any discrepancies that may occur between his trade and all other applicable project trade drawings as to indicate location, dimensions, deviations, as-built conditions, codes, and these specifications, and the Contractor shall immediately notify the City of any conflict.

B. All minor deviations or conflicts required to conform to any as-built conditions or to fit the installed work of other subcontractors shall be made by the Contractor. Drawings show typical installation and are not to be construed to be of a specific supplier.

3.03 SUBMITTALS

A. Approval of Shop Drawing and equipment submittals from the control panel fabricator is required prior to fabrication.

B. A set of blueline prints shall be kept on the job and marked in red pencil to show as-built conditions. These prints shall be signed and dated by the Contractor and delivered to the City prior to final approval by the City.

END OF SECTION

SECTION 16 - ELECTRICAL

SUBSECTION C16110
CELL A-1 FLARE STATION CONTROL PANEL

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

The Contractor shall provide all necessary labor, equipment, and materials for construction of the Cell A flare station control panel, complete and operational, as shown on the Drawings and specified herein.

PART 2: PRODUCTS

2.01 CONTROL PANEL ENCLOSURE

A. The Contractor shall furnish, install, and wire Hoffman control panel enclosures.

B. The control panel shall be fabricated by a UL certified fabricator.

2.02 BURNER CONTROL SYSTEM

A. The Contractor shall furnish and install an approved burner control system.

B. Contractor shall fabricate mounting bracket to swing out panel.

2.03 TEMPERATURE INDICATOR CONTROLLER

A. As specified in the electrical drawings, the Contractor shall furnish and install a temperature controller for each flare assembly.

2.04 SWITCHES AND PUSHBUTTONS

A. Pilot lights shall be of the dual-input transformer type. There shall be installed on the control panel one "lamp test" pushbutton to test all lamps simultaneously.

B. Emergency stop push-pull units shall be included.

2.05 TERMINAL STRIPS

Terminal strips shall be track-mounted tubular screw type sections, Allen Bradley 1492 series.

2.06 NAMEPLATES

Nameplates shall be custom engraved phenolic, white background with black letters, 2-1/4 inches by 5/8 inch with self-sticking double-faced tape backing.

2.07 PLASTIC WIREWAYS

Plastic wireways shall be of the sizes shown on the Drawings and manufactured by Panduit.

2.08 DATA RECORDER

The data recorder shall be strip chart type to monitor both landfill gas flow rate and flare exhaust temperature simultaneously.

2.9 ANNUNCIATOR

An annunciator shall be supplied and indicate first out annunciation.

2.10 24 VDC - POWER SUPPLY

A. A 24 VDC power supply shall be installed in the control panel as shown on the Drawings.

B. The power supply is provided for the flow transmitter.

PART 3: EXECUTION

3.01 GENERAL REQUIREMENTS

A. All electrical work shall conform to the latest edition of the National Electrical Code, City of Phoenix and State of Arizona Code and Regulations, and latest revisions of the Regulations of the State Fire Marshal.

B. All materials used under this Contract shall be new and of the quality herein specified or approved as a substitute by the City. All materials shall be approved by the Underwriters' Laboratories, and each class shall be the same type throughout the project.

C. The control panel shall be fabricated to JIC standards. Terminal blocks shall be installed for all field-wired devices and all wires going to door-mounted devices. Spare terminals equal to ten percent of the required amount (ten minimum) shall be furnished. Plastic wireways shall be utilized for routing wiring within panel. Door wiring shall be neatly routed and tied with nylon tie straps. A minimum of eight (8) spare wires shall be included in the door loom. The spare wires shall be identified as S1, S2, etc., on both ends. They shall be neatly coiled and tied at the door end, and coiled and stowed in the terminal strip raceway at the other end.

D. Panel wire shall be minimum AWG 16-gauge stranded and shall be Type THWN. The 120-volt wiring shall be red with a white grounded neutral wire. All wires shall be identified at both ends with wire numbers corresponding to the wiring diagrams. All interlock wiring from other systems shall be yellow; 24 VDC wiring shall be blue. Control circuit disconnects shall be furnished on the terminal strip for all interlock wires.

E. Door-mounted pilot devices shall be neatly grouped and arranged in a logical manner for ease of operation. They shall be horizontally spaced on 2-1/4-inch centers and vertically spaced on 2-1/2-inch centers. Engraved phenolic nameplates shall be furnished for all pilot devices.

F. All panel-mounted devices shall be attached to the mounting panel by means of machine screws into tapped holes or using self-tapping screws. Nuts are not to be used behind the mounting plate. Plastic wireways and relay tracks may be fastened by means of rivets; double-faced tape shall not be used.

G. Within the electrical panel, the flare assembly fabricator shall provide for electrical requirements and single point connection within the control panel for the following:

1. Air Compressors, C-100 and C-101
2. Electrical signal from LSH-101 and LSL-101 to SOV-103
3. Area lighting
4. High level shutdown, LSHH-102 to shutdown SOV-104

3.02 INTENT OF DRAWINGS

A. The drawings indicate diagrammatically the intent of all the work of the Contract. The electrical contractor shall examine the electrical drawings for any discrepancies that may occur between his trade and all other applicable project trade drawings as to indicate location, dimensions, deviations, as-built conditions, codes, and these specifications, and the Contractor shall immediately notify the City of any conflict.

B. All minor deviations or conflicts required to conform to any as-built conditions or to fit the installed work of other subcontractors shall be made by the Contractor. Drawings show typical installation and are not to be construed to be of a specific supplier.

3.03 SUBMITTALS

A. Approval of Shop Drawing and equipment submittals from the control panel fabricator is required prior to fabrication.

B. A set of blueline prints shall be kept on the job and marked in red pencil to show as-built conditions. These prints shall be signed and dated by the Contractor and delivered to the City prior to final approval by the City.

END OF SECTION

SECTION 16 - ELECTRICAL

SUBSECTION C16500
CELL A FLARE STATION INSTRUMENTATION

PART 1: GENERAL

1.01 REQUIREMENTS INCLUDED

The Contractor shall supply all labor, equipment, and materials necessary to construct, install, and calibrate, if required, all instrumentation for the Cell A Flare Station. Specific information on the instruments listed below are listed in the Equipment Data Sheets (a part of these Specifications) located in the Appendix.

PART 2: PRODUCTS

2.01 ANNUNCIATOR, A-1

2.02 BURNER CONTROL SYSTEM, BS-1

2.03 DATA RECORDER, FR-1, TR-1

2.04 FLOW ELEMENT, FE-1

2.05 FLOW TRANSMITTER, FT-1

2.06 IGNITION TRANSFORMER, IT-1

2.07 LEVEL SWITCH LOW, LSL-1

2.08 LEVEL SWITCH HIGH, LSH-2

2.09 LEVEL SWITCH HIGH HIGH, LSHH-1 AND LSHH-2

2.10 LIMIT SWITCHES, ZS0-1, ZSC-1

2.11 PRESSURE SWITCH LOW, PSL-1

2.12 RUPTURE DISK & RUPTURE DISK MONITOR, RD-1, RDM-1

2.13 SOLENOID OPERATED VALVE, SOV-1, SOV-2 AND SOV-3

2.14 TEMPERATURE INDICATOR CONTROLLER, TIC-1

2.15 TEMPERATURE POSITIONING MOTOR, TZ-1

2.16 TEMPERATURE TRANSMITTER, TT-1

2.17 THERMOCOUPLE, TE-1

2.18 ULTRAVIOLET SCANNER, UV-1

PART 3: EXECUTION

3.01 GENERAL REQUIREMENTS

A. All electrical work shall conform to the latest edition of the National Electrical Code, City of Phoenix and State of Arizona Code and Regulations, and latest revisions of the Regulations of the State Fire Marshal.

B. All materials used under this Contract shall be new and of the quality herein specified or approved as a substitute by the City. All materials shall be approved by the Underwriters' Laboratories, and each class shall be the same type throughout the project.

C. Wiring for instrumentation shall be as shown on the Drawings. Signal wires from the flow transmitter shall be shielded cable.

3.02 INTENT OF DRAWINGS

A. The drawings indicate diagrammatically the intent of all the work of the Contract. The electrical contractor shall examine the electrical drawings for any discrepancies that may occur between his trade and all other applicable project trade drawings as to indicate location, dimensions, deviations, as-built conditions, codes, and these Specifications, and the Contractor shall immediately notify the City of any conflict.

B. All minor deviations or conflicts required to conform to any as-built conditions or to fit the installed work of other subcontractors shall be made by the Contractor. Drawings show typical installation and are not to be construed to be of a specific supplier.

END OF SECTION

SPECIAL PROVISIONS

DIVISION C

GAS MONITORING AND MIGRATION CONTROL SYSTEM

APPENDIX

EQUIPMENT DATA SHEETS INDEX

SPEC.# 9019
SHEET OF
BY MPM, GDG, WAN
DATE 11/22/91
REV. 1 DATE 09/12/94

	CELL A	CELL A-1
LANDFILL GAS FLARE STATION ASSEMBLY		FLARE
ANNUNCIATOR	A	
GAS BLOWER	B	B
BURNER CONTROL SYSTEM	BS	
AIR COMPRESSOR	C	C
DIFFERENTIAL PRESSURE INDICATOR	DPI	
FLAME ARRESTER	FA	FA
FLOW ELEMENT	FE	
DATA RECORDER	FR, TR	
FILTER REGULATOR AND LUBRICATOR	FRL	FRL
CHECK VALVES	FSV	FSV
FLOW TRANSMITTER	FT	
HAND OPERATED VALVES	HV	HV
IGNITION TRANSFORMER	IT	
LEVEL GAUGE	LG	
LEVEL SWITCH	LSL, LSH, LSHH	LSHH
PUMP	P	P
PRESSURE CONTROL VALVE	PCV	
PRESSURE INDICATOR	PI	
PRESSURE SWITCH LOW	PSL	
RUPTURE DISK AND MONITOR	RD, RDM	
SHUT-DOWN VALVE	SDV	
SOLENOID OPERATED VALVE	SOV	SOV
CONDENSATE STORAGE TANK	T	T
THERMOCOUPLE	TE	
TEMPERATURE INDICATOR	TI	
TEMPERATURE INDICATING CONTROLLER	TIC	
TEMPERATURE POSITIONING MOTOR	TZ	
ULTRA VIOLET SCANNER	UV	
FUEL FILTER/CONDENSATE KNOCKOUT	V	V
GRANULATED ACTIVATED CARBON VESSEL	V	V
LIMIT SWITCH	ZSO, ZSC	

SPECIAL PROVISIONS

DIVISION C

GAS MONITORING AND MIGRATION CONTROL SYSTEM

CELL A EQUIPMENT DATA SHEETS

ANNUNCIATOR (A)

SPEC.# 9019-A
SHEET ____ OF ____
BY MPM
DATE 7/16/92
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	A-1	
QUANTITY REQUIRED	1	
MANUFACTURER OR APPROVED EQUAL	PANALARM	
MODEL NO.	910-AC120-KC120-H1	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	CONTROL PANEL CELL A FLARE STATION	

GAS BLOWER (B)

SPEC.# 9019-B
SHEET OF
BY K. AYSTER
DATE 11/22/91
REV. 1 DATE 08/30/94

IDENTIFICATION NUMBER	B-1, B-2	
QUANTITY	2	
MANUFACTURER OR APPROVED EQUAL	HAUCK	
MODEL NO.	TBGB-071-271-E	
HOUSING MATERIAL	FIBERGLASS W/URETHANE LINING	
WHEEL MATERIAL	ALUMINUM	
COATING ON HOUSING	POLYURETHANE COATING ON INSIDE OF HOUSING ONLY	
INLET CONNECTION	12", MFR SHALL SUPPLY A 12" 150# ANSI F.F. FLANGE ON INLET AND A FLEXIBLE COUPLING	
OUTLET CONNECTION	8 1/4", MFR SHALL SUPPLY AN 8" 150# ANSI F.F. FLANGE ON DISCHARGE AND A FLEXIBLE COUPLING	
TYPE OF GAS & S.G.	LANDFILL GAS, APPROXIMATELY 1.0	
GAS TEMP.	80 - 120 ° F	
BLOWER DIFFERENTIAL PRESSURE	62" W.C. AT 1500 SCFM (CORRECTED FOR LANDFILL GAS AND ELEVATION)	
BLOWER RPM	4400 RPM	
MOTOR INFORMATION	480V, 3-PHASE, 60 HZ, TEFC, MILL AND CHEM DUTY, 30 HP, CLASS I, DIV. 2, GROUP D FOR USE WITH VFD	
DIRECTION OF ROTATION WHEN LOOKING FROM THE DRIVE END	CLOCKWISE	
DISCHARGE NOZZLE POSITION	BOTTOM, HORIZONTAL	
REQUIREMENTS, ACCESSORES	GAS TIGHT CONSTRUCTION, DOUBLE SHAFT SEAL, VIBRATION ISOLATION PADS, AND BLOWER SHALL BE CONSTRUCTED WITH IMPELLER E.	
NOISE LEVEL	LESS THAN 85 dBA AT 3 FEET	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	CELL A FLARE STATION	

BURNER CONTROL SYSTEM (BS)

SPEC.# 9019-BS
SHEET ____ OF ____
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	BS-1	
QUANTITY REQUIRED	1	
MANUFACTURER OR APPROVED EQUA	HONEYWELL	
FLAME SAFE GUARD CONTROL MODEL NO.	BC7000L/PM720-G-2005	
BASE MODEL NO.	Q520A	
PROGRAM CHIP (MODEL NO.)	PM720	
U.V. FLAME DETECTOR MODEL NO.	C7012E-1104	
PREPURGE TIME	40 SECONDS	
FLAME ESTABLISH TIME (PILOT)	10 SECONDS	
MAIN FLAME ESTABLISH TIME	15 SECONDS	
FLAME SIGNAL AMPLIFIER	R7247C	
U.V. DETECTOR PIPE MOUNTING SIZE	3/4" NPT	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	CONTROL PANEL	

AIR COMPRESSOR ASSEMBLY (C)

SPEC.# 9440-1
SHEET ____ OF ____
BY G. GLASSER
DATE 8/30/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	C-1, C-2	
QUANTITY	2	
MANUFACTURER OR APPROVED EQUAL	ATLAS COPCO/BENZ ENGINEERING	
MODEL NO.	10LT11120H	
STYLE	DUPLEX TWO STAGE BELT DRIVE STRADDLING ASME APPROVED 120 GAL RECEIVER TANK	
ELECTRIC MOTOR	480 VAC/3 PHASE, 10 HP, TEFC	
CAPACITY	30 SCFM AT 150 PSI	
LOCATION	CELL A FLARE STATION	
COMMENTS	EACH COMPRESSOR ASSEMBLY IS TO BE SKID MOUNTED. EACH SKID (6' X 8') SHALL HAVE TWO DUPLEX COMPRESSORS AND THE FOLLOWING COMPONENTS: 1. ZEKS AIR DRIER CORP., REFRIGERATED DRYER, 35 SCFM, 38 DEG F DEW POINT, 150 PSIG, WITH 1/3 HP MOTOR, MODEL 35HSD OR EQUAL 2. ZEKS AIR DRIER CORP., PARTICULATE PREFILTER, 3 MICRON ABSOLUTE REMOVAL, 150 PSIG, ACCRAFLOW MODEL 150PT OR EQUAL 3. ZEKS AIR DRIER CORP., PARTICULATE AFTERFILTER, 0.7 MICRON , 95% DOP EFFICIENCY, 150 PSIG, ACCRASEIVE MODEL 130RT OR EQUAL 4. ZEKS AIR DRIER CORP., OIL WATER SEPARATOR, MODEL 45WOS 5. FILTER REGULATOR WITH PRESSURE INDICATOR, SHUT-OFF VALVE AND PRESSURE SWITCH ALARM 6. NEMA 4 CONTROL PANEL, POP-OFF SAFETY VALVE, AND CONDENSATE AUTO DRAIN.	

DIFFERENTIAL PRESSURE INDICATOR (DPI)

SPEC.# 9019-DPI
SHEET ____ OF ____
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	DPI-1, 3	DPI- 2
QUANTITY	2	1
MANUFACTURER OR APPROVED EQUAL	DWYER MAGNEHELIC	DWYER MAGNEHELIC
MODEL NO.	2010	2080
INPUT PRESSURE RANGE	0 - 10" W.C.	0 - 80" W.C.
MAX. PROCESS TEMP.	120° F	120° F
UL/FM APPROVAL REQUIRED	N/A	N/A
ACCESSORIES	MODEL A-610 MOUNTING BRACKET	
LOCATION	ACROSS FLAME ARRESTER AND KNOCK-OUT DRUM CELL A FLARE STATION	ACROSS BLOWERS B-1 AND B-2 CELL A FLARE STATION

FLAME ARRESTER (FA)

SPEC.#	9019-FA
SHEET	OF
BY	K. AYSTER
DATE	11/22/91
REV.	0 DATE 04/14/94

IDENTIFICATION NUMBER	FA-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	GROTH	
MODEL NO.	7628-10-11-FOZ	
HOUSING MATERIAL	ALUMINUM	
FLAME CELL MATERIAL	ALUMINUM	
HORIZONTAL OR VERTICAL	HORIZONTAL	
GAS FLOW RATE	150 - 1600 SCFM	
SIZE AND CONNECTIONS	10" 125# FF FLANGE	
COMMENTS	1. THE CONTRACTOR SHALL SUPPLY ONE SPARE FLAME CELL. 2. THE LETTER "Z" IN THE MODEL NUMBER REFERS TO DRILLING 1/2" NPT TAPS ON BOTH SIDES OF THE INTERNAL ELEMENT TO MEASURE DIFFERENTIAL PRESSURE ACROSS THE UNIT. THE TAPS SHALL BE DRILLED ON THE TOP OF EACH BASE (END PIECE).	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	INLET TO FLARE CELL A FLARE STATION	

FLOW ELEMENT (FE)

SPEC.# 9019-FE
SHEET ____ OF ____
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	FE-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	DWYER	
MODEL NO.	DS-200-10	
STYLE	AVERAGING PITOT TUBE	
GAS FLOW RANGE	150 - 1500 SCFM LANDFILL GAS	
UL/FM APPROVAL REQUIRED	N/A	
LOCATION	DISCHARGE HEADER CELL A FLARE STATION	

DATA RECORDER (FR, TR)

SPEC.#	9019-FR, TR
SHEET	OF
BY	K. AYSTER
DATE	11/22/91
REV.	0 DATE 04/14/94

IDENTIFICATION NUMBER	FR-1, TR-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	YOKOGAWA	
MODEL NO.	4152-5-5-0-3-2/BU/PS/AK-04	
INPUTS	Vdc and TC °F (TYPE K)	
CHART SPEED	5 TO 12,000 mm/hr	
CHART NUMBER	B 9565AW	
NO. PENS	2	
PEN NUMBER	B 9565AP - RED B 9565AQ - GREEN	
VOLTAGE	120 VAC, 60 HZ	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	CONTROL PANEL CELL A FLARE STATION	

FILTER REGULATOR AND LUBRICATOR (FRL)

SPEC.# 9440-1
SHEET ____ OF ____
BY G. GLASSER
DATE 9/8/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	FRL-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	NORGREN	
MODEL NO.	P4A-460-M3DA/5532-04	
SIZE	1/2" NPT	
MAXIMUM PRESSURE	250 PSIG	
ADJUSTABLE PRESSURE RANGE	5-150 PSIG	
FILTER RATING	5 MICRON	
UL/FM APPROVAL REQUIRED	YES	
SERVICE	INSTRUMENT AIR	
LOCATION	INSTRUMENT AIR TO PUMP, P-1 CELL A FLARE STATION	
COMMENTS	INCLUDE PRESSURE INDICATOR 0-250 PSIG	

CHECK VALVES (FSV)

SPEC.# 9440-1
SHEET ____ OF ____
BY W. NAKAGAWA
DATE 9/8/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	FSV-1, FSV-2	FSV-3
QUANTITY	2	1
MANUFACTURER OR APPROVED EQUAL	GRAINGER/CONTROL DEVICES INC.	HARRINGTON
MODEL NO.	CB-50	TC10075ST
STYLE	GLOBE STYLE	BALL CHECK
BODY MATERIAL	BRONZE	PVC
BALL MATERIAL	STANDARD	PVC
SEAL MATERIAL	TEFLON	VITON O-RING
SIZE	1/2" IPS, SOCKET	3/4" IPS, SOCKET
SERVICE	INSTRUMENT AIR	CONDENSATE
LOCATION	INSTRUMENT AIR HEADER FROM COMPRESSORS CELL A FLARE STATION	CONDENSATE FROM PUMP, P-1 CELL A FLARE STATION

CHECK VALVES (FSV)

SPEC.# 9440-1
SHEET ____ OF ____
BY W. NAKAGAWA
DATE 9/8/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	FSV-4	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	HARRINGTON	
MODEL NO.	TC10150ST	
STYLE	BALL CHECK	
BODY MATERIAL	PVC	
BALL MATERIAL	PVC	
SEAL MATERIAL	VITON O-RING	
SIZE	1-1/2" IPS, SOCKET	
SERVICE	CONDENSATE	
LOCATION	CONDENSATE FROM PUMP AND FIELD CELL A FLARE STATION	

FLOW TRANSMITTER (FT)

SPEC.# 9019-FT
SHEET ____ OF ____
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	FT-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	ITT BARTON	
MODEL NO.	6002-02-02-01-01-01-01-02	
DIFFERNTIAL RANGE	0 - 0.8" WC	
OUTPUT RANGE	4-20 mA	
POWER SUPPLY	ACCOPIAN 24U100 24VDC	
SAFE WORKING PRESSURE	150 PSI	
DIAPHRAM MATERIAL	316 S.S.	
PROCESS CONNECTIONS	1/4" NPT	
ACCESSORIES	UNIVERSAL MOUNTING BRACKET	
CLASSIFICATION	NEMA 7	
FLOW INDICATOR	NOT REQUIRED	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	DISCHARGE HEADER CELL A FLARE STATION	

HAND OPERATED VALVES (HV)

SPEC.# 9019-HV
SHEET ____ OF ____
BY MPM
DATE 7/16/92
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	HV-1, 2, 4, 7, 9	HV-8, 10
QUANTITY	5	2
MANUFACTURER OR APPROVED EQUAL	GRINNELL	GRINNELL
MODEL NO.	LC-8172-4-FP	LC-8172-4-FP
STYLE	BUTTERFLY, LUG TYPE	BUTTERFLY, LUG TYPE
BODY MATERIAL	CAST IRON ASTM A-126 CLASS B	CAST IRON ASTM A-126 CLASS B
CONNECTION SIZE	10" DIAMETER	8" DIAMETER
SEAT MATERIAL	BUNA-N	BUNA-N
DISK MATERIAL	316 S.S.	316 S.S.
SHAFT MATERIAL	316 S.S.	316 S.S.
MODE OF OPERATION	GEAR	GEAR
HANDWHEEL GEAR OPERATOR MODEL NO. OR APPROVED EQUAL	MASTER GEAR TYPE MY	MASTER GEAR TYPE MY
ACTUATOR TYPE AND MFG.	N/A	N/A
INSTRUMENTS	N/A	N/A
LIMIT SWITCH	NONE	NONE
COMMENTS	NONE	NONE
UL/FM APPROVAL REQUIRED	YES	YES
LOCATION	INLET, OUTLET AND BYPASS OF KNOCK-OUT DRUM, INLET TO BLOWERS CELL A FLARE STATION	OUTLET OF BLOWERS CELL A FLARE STATION

HAND OPERATED VALVES (HV)

SPEC.# 9019-HV2
SHEET ____ OF ____
BY MPM
DATE 7/16/92
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	HV-3, 21 ,22	HV-13, 23
QUANTITY	3	2
MANUFACTURER OR APPROVED EQUAL	HARRINGTON	APOLLO
MODEL NO.	HAYWARD-TB10075ST	70-103-01
STYLE	TRUE UNION BALL	BALL
BODY MATERIAL	PVC	BRASS
BALL MATERIAL		CHROME PLATED
SEAT MATERIAL		TFE
SIZE	3/4" IPS, SOCKET	1/2" NPT
SERVICE	CONDENSATE	PROPANE, AIR COMPRESSOR
LOCATION	FILTER SEPARATOR CONDENSATE LINE BEFORE PUMP CONDENSATE LINE AFTER PUMP CELL A FLARE STATION	PROPANE TANKS, AIR COMPRESSOR AIR LINE TO PUMP AIR LINE TO PRESS. SWITCH CELL A FLARE STATION

HAND OPERATED VALVES (HV)

SPEC.# 9019-HV3
SHEET ____ OF ____
BY MPM
DATE 7/16/92
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	HV-5, 6, 11, 12, 14, 15, 17, 18	HV-19
QUANTITY	8	1
MANUFACTURER OR APPROVED EQUAL	NUPRO	SATURN
MODEL NO.	B-4P4V	96-101-01
STYLE (NEEDLE, BALL, GLOBE, GATE, ETC.)	3-WAY, PLUG	BALL, S.S.
BODY MATERIAL	BRASS	S.S.
TRIM MATERIAL	STANDARD	
CONNECTIONS SIZE	1/4" TUBE	1/4" NPT
OPERATOR TYPE	1/4 TURN HANDLE	LEVER HANDLE
MAXIMUM BODY PRESSURE	3000 PSI	800 PSI
UL/FM APPROVAL REQUIRED	N/A	N/A
LOCATION	AT THE DIFFERENTIAL PRESSURE INDICATORS FOR THE KNOCK-OUT VESSEL, BLOWERS, FLAME ARRESTER, AND FLOW ELEMENT AT CELL A FLARE STATION	DISCHARGE HEADER CELL A FLARE STATION

HAND OPERATED VALVES (HV)

SPEC.# 9440-1
SHEET ____ OF ____
BY W. NAKAGAWA
DATE 9/6/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	HV-24	HV-16, 20
QUANTITY	1	2
MANUFACTURER OR APPROVED EQUAL	HARRINGTON	APOLLO
MODEL NO.	HAYWARD-TB10200ST	70-105-01
STYLE	TRUE UNION BALL	BALL
BODY MATERIAL	PVC	BRASS
BALL MATERIAL		CHROME PLATED
SEAT MATERIAL		TFE
SIZE	2" IPS, SOCKET	1" NPT
SERVICE	CONDENSATE	AIR COMPRESSOR
LOCATION	DRAIN PIPE FROM CONDENSATE STORAGE TANK CELL A FLARE STATION	AIR COMPRESSOR AIR LINE TO PUMP AIR LINE TO PRESS. SWITCH CELL A FLARE STATION

IGNITION TRANSFORMER (IT)

SPEC.# 9019-IT
SHEET ____ OF ____
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	IT-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	DONGAN	
MODEL NO.	A06-SA6	
PRIMARY VOLTAGE	120V	
SECONDARY VOLTAGE	6,000V	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	ELECTRICAL ENCLOSURE AT CELL A FLARE STATION	

LEVEL GAUGE (LG)

SPEC.# 9019-LG
SHEET ____ OF ____
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	LG-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	ESSEX BRASS	
MODEL NO.	#0000	
PROCESS CONNECTION	1" NPT	
FLUID	CONDENSATE	
BODY MATERIAL	BRASS	
CYLINDER	PYREX	
GAUGE LENGTH	14"	
SEALS	BUNA-N	
ACCESSORIES	PROTECTIVE RODS	
LOCATION	FILTER/SEPARATOR	
COMMENTS	LG-1 IS PART OF ASS'Y V-1 SUPPLIED BY FILTER/SEPARATOR MANUFACTURER FOR CELL A FLARE STATION	

LEVEL SWITCH
(LSL, LSH, LSHH)

SPEC.# 9440-1
SHEET ____ OF ____
BY G. GLASSER
DATE 8/30/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	LSL-1, LSH-1, LSHH-1, LSHH-2	
QUANTITY	4	
MANUFACTURER OR APPROVED EQUAL	ENDRESS & HAUSER	
MODEL NO.	LSC 1132	
OPERATING PRINCIPLE	HIGH FREQUENCY (RF) CAPACITANCE	
NEMA CLASSIFICATION	4	
OUTPUT RELAY	5 AMPS DPDT	
POWER SUPPLY	120 VAC/60HZ	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	FUEL FILTER/KNOCKOUT DRUM AND CONDENSATE STORAGE TANK T-1 AT CELL A FLARE STATION	
COMMENTS		

PUMP (P)

SPEC.# 9440-1
SHEET ____ OF ____
BY W. NAKAGAWA
DATE 8/30/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	P-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	WILDEN	
MODEL NO.	M-2-PT-TF-TF-PT	
HOUSING MATERIAL	POLYPROPYLENE	
DIAPHRAGM MATERIAL	TEFLON	
BALL MATERIAL	TEFLON	
O-RING MATERIAL	TEFLON	
INLET CONNECTION	1" NPT	
OUTLET CONNECTION	3/4" NPT	
SERVICE	LANDFILL GAS CONDENSATE	
MAXIMUM TEMPERATURE	110 DEG F	
AIR SUPPLY INLET PRESSURE	NOT TO EXCEED 150 PSIG	
AIR SUPPLY TYPE AND SIZE	1/4" NPT	
SUCTION LIFT	WET - 25 FEET DRY - 18 FEET	
MAXIMUM GPM	37	
DESIGN OPERATION	2 SCFM AIR AT 50 PSIG, 3 GPM	
LOCATION	CONDENSATE DISCHARGE FROM KNOCK-OUT DRUM CELL A FLARE STATION	

PRESSURE CONTROL VALVE (PCV)

SPEC.# 9019-PCV
SHEET ____ OF ____
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	PCV-1	PCV-2
QUANTITY	1	1
MANUFACTURER OR APPROVED EQUAL	WILKERSON	FISHER
MODEL NO.	CB6-04-000	95L
BODY MATERIAL		CAST IRON
MAXIMUM INLET PRESSURE	150 PSI	300 PSI
ADJUSTABLE PRESSURE RANGE	5 - 125 PSIG	0 - 6 PSIG
PROCESS CONNECTION	1/2" NPT	1/2" NPT
FILTER	5μ	N/A
DRAIN BOWL	TRANSPARENT WITH METAL GUARD AND MANUAL DRAIN	N/A
ORIFICE PRESSURE INDICATOR	0 - 160 PSI	N/A
SERVICE	INSTRUMENT AIR	PROPANE
LOCATION	SOV-2 CELL A FLARE STATION	PROPANE TANKS CELL A FLARE STATION

PRESSURE INDICATOR (PI)

SPEC.# 9019-PI
SHEET ____ OF ____
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	PI-2	PI-1
QUANTITY	1	1
MANUFACTURER OR APPROVED EQUAL	MARSHALLTOWN	WILKERSON
MODEL NO.	83 K	N/A
PROCESS CONNECTION, SIZE & TYPE	1/4" NPT	1/8" NPT
MOUNTING (BOTTOM, BACK, ETC..)	BOTTOM	BACK
DIAL SIZE	2 1/2"	1 1/2"
PRESSURE RANGE	0 - 15 PSI	0 - 160 PSI
LOCATION	PILOT GAS SUPPLY CELL A FLARE STATION	INSTRUMENT AIR CELL A FLARE STATION
COMMENTS		INCLUDED WITH PCV-1

PRESSURE SWITCH LOW (PSL)

SPEC.# 9019-PSL
SHEET OF
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	PSL-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	ASCO	
MODEL	SA12B-TG10A11	
HOUSING	NEMA 7D	
ADJUSTABLE OPERATING RANGE	6 - 200 PSI	
DEADBAND	ADJUSTABLE 10 - 190 PSI	
MAXIMUM PRESSURE	400 PSI	
MANUAL RESET	NO	
SWITCH ACTION	BREAKS ON FALL	
SWITCH RATING	5 AMPS @ 125 VAC	
CONDUIT CONNECTION	3/4" NPT	
SERVICE	INST AIR	
INLET CONNECTION	1/4" NPT	
SERVICE LOCATION	AIR COMPRESSOR CELL A FLARE STATION	

RUPTURE DISK & MONITOR (RD), (RDM)

SPEC.# 9019-RD, RDM
SHEET OF
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	RD-1, RDM-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	CONTINENTAL	
DISK MODEL NO.	ENVIRO-SEAL 1	
MONITOR MODEL NO.	BB-100A	
CONNECTION SIZE	10" DIAMETER	
MATERIAL	316 S.S.	
BURST PRESSURE	8 PSIG	
AREA CLASSIFICATION	CLASS I, DIV. 2, GROUP D	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	RD-1 ON DISCHARGE HEADER, RDM-1 IN CONTROL PANEL CELL A FLARE STATION	

SHUT-DOWN VALVE (SDV)

SPEC.# 9019-SDV
SHEET ____ OF ____
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	SDV-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	GRINNELL	
MODEL NO.	LC-8175-3-FP	
STYLE	BUTTERFLY, LUG-TYPE	
BODY MATERIAL	CAST IRON ASTM A-126 CLASS B	
CONNECTION SIZE	10" DIAMETER	
SEAT MATERIAL	BUNA-N	
DISK MATERIAL	316 S.S.	
SHAFT MATERIAL	416 S.S. WITH BRONZE BUSHING	
MODE OF OPERATION	PNEUMATIC ACTUATION	
HANDWHEEL GEAR OPERATOR	MANUAL OVERRIDE, GH BETTIS HD SERIES SPRING RETURN, MECHANICAL MODEL M3	
ACTUATOR TYPE AND MFG.	PISTON, GH-BETTIS HD-SERIES, MODEL 721-SR SPRING RETURN, FAIL CLOSE	
SOLENOID VALVE	120 VAC 3-WAY SOLENOID VALVE (SEE SOV-2)	
REGULATOR	REGULATOR WITH PRESSURE INDICATOR AND FILTER	
LIMIT SWITCH	GH-BETTIS ER-021-AFC DIRECT COUPLED 2-SPDT (SEE ZS0-1 AND ZSC-1)	
APPROVALS	EQUIPMENT SHALL BE UL OR FM APPROVED. ALL ENCLOSURES SHALL BE NEMA 4. AREA CLASSIFICATION: CLASS I, DIV. 2, GROUP D	
COMMENTS	NONE	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	INLET TO FLARE CELL A FLARE STATION	

SOLENOID OPERATED VALVE (SOV)

SPEC.# 9019-SOV
SHEET ____ OF ____
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	SOV-1	SOV-2
QUANTITY	1	1
MANUFACTURER OR APPROVED EQUAL	ASCO	ASCO
MODEL NO.	8215C20B	8320A185
2 WAY, 3 WAY, 4 WAY, ETC.	2 WAY	3 WAY
TEMPERATURE RANGE	104° F	200° F
CONNECTIONS (SIZE AND TYPE)	1/2" NPT	1/4" NPT
BODY MATERIAL	BRASS	BRASS
NEMA CLASSIFICATION	7D	7D
MAXIMUM OPERATING PRESSURE	50 PSI	150 PSI
INPUT	120 VAC, 60 HZ	120 VAC, 60 HZ
SERVICE	PROPANE	INST. AIR
UL/FM APPROVAL REQUIRED	YES	YES
LOCATION	PILOT GAS SUPPLY CELL A FLARE STATION	SHUT-DOWN VALVE CELL A FLARE STATION
COMMENTS		INCLUDED W/SDV-1 AND SUPPLIED BY VALVE MANUFACTURER

SOLENOID OPERATED VALVE (SOV)

SPEC.# 9440-1
SHEET ____ OF ____
BY G. GLASSER
DATE 9/8/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	SOV-3, SOV-4	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	ASCO	
MODEL NO.	8215C20B	
2 WAY, 3 WAY, 4 WAY, ETC.	2 WAY	
TEMPERATURE RANGE	104° F	
CONNECTIONS (SIZE AND TYPE)	1/2" NPT	
BODY MATERIAL	BRASS	
NEMA CLASSIFICATION	7D	
MAXIMUM OPERATING PRESSURE	150 PSI	
INPUT	120 VAC, 60 HZ	
SERVICE	INST. AIR	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	INSTRUMENT AIR SUPPLY AND PUMP, P-1 CELL A FLARE STATION	
COMMENTS		

CONDENSATE STORAGE TANK (T)

SPEC.# 9440-1
SHEET ____ OF ____
BY G. GLASSER
DATE 8/30/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	T-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	POLY CAL PLASTICS	
MODEL NO.	ZORB TANK SP-025-U	
CAPACITY AND MATERIAL	9200 GALLON CAPACITY, HDPE	
DIMENSIONS	12' DIA X 12' H UPRIGHT	
MANWAY	24" TOP MOUNTED	
LOCATION	CELL A FLARE STATION	
COMMENTS	TO BE FURNISHED AND INSTALLED COMPLETE, IN-PLACE AND READY FOR SERVICE WITH THE FOLLOWING: 1. POLY CAL PLASTICS, SECONDARY CONTAINMENT TANK 10360 GAL. HDPE, 14' DIA X 9' H, WITH 8" INTERNAL FLANGE, MODEL SP-772-XL 2. ALL INLET AND OUTLET TANK CONNECTIONS SHALL BE 2" FPT.	

THERMOCOUPLE (TE)

SPEC.# 9019-TE
SHEET ____ OF ____
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	TE-1	
QUANTITY	2*	
MANUFACTURER OR APPROVED EQUAL	HONEYWELL	
MODEL NO.	Y2K3M22.G.24/3	
ASSEMBLY	SCREW COVER HEAD	
SHEATH MATERIAL AND LENGTH	INCONEL, 24" LONG	
TYPE OF JUNCTION	GROUNDED	
SHEATH DIAMETER	4.8 MM	
TYPE OF THERMOCOUPLE WIRE	K	
WIRE SIZE	20 GA	
RECOMMENDED MAX. SERVICE TEMP.	1600° F	
CONDUIT SIZE CONNECTION	3/4" NPT	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	FLARE AT CELL A FLARE STATION	
COMMENTS	SUPPLIED BY FLARE MANUFACTURER. *ONE SPARE THERMOCOUPLE SHALL BE SUPPLIED	

TEMPERATURE INDICATOR (TI)

SPEC.# 9019-TI
SHEET ____ OF ____
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	TI-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	ASHCROFT	
MODEL NO.	30EI-60E-040-0/200° F	
MATERIAL	STAINLESS STEEL	
MOUNTING	1/2" NPT	
DIAL FACE SIZE	3"	
STEM LENGTH	4"	
TEMPERATURE RANGE	0 - 200° F	
ACCURACY	2° F	
SERVICE	LFG	
LOCATION	DISCHARGE HEADER CELL A FLARE STATION	

TEMPERATURE INDICATOR CONTROLLER (TIC)

SPEC.# 9019-TIC
SHEET ____ OF ____
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	TIC-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	HONEYWELL	
MODEL NO.	UDC-3002-0-00A-1-000	
TYPE	UNIVERSAL DIGITAL CONTROLLER	
INPUT CALIBRATION	TYPE K	
TEMPERATURE RANGE	O - 2400° F	
ACCURACY	PLUS OR MINUS 0.2% OF SPAN	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	CONTROL PANEL CELL A FLARE STATION	

TEMPERATURE POSITIONING MOTOR (TZ)

SPEC.# 9019-TZ
SHEET ____ OF ____
BY MPM
DATE 7/16/92
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	TZ-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	HONEYWELL	
MODEL NO.	M744Y	
OPERATING TORQUE (LB-IN)	150	
AUXILIARY SWITCH	SPDT	
INPUT	120V/60 HZ	
WEATHER PROOFING KIT	7640JS	
SPAN	1.8 - 20 mA	
ZERO	0.8 - 18 mA	
INPUT IMPEDENCE	100 OHMS	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	MOUNTED ON DAMPER ASSEMBLY ON THE FLARE AT CELL A FLARE STATION	
COMMENTS	SUPPLIED BY FLARE MANUFACTURER	

ULTRA VIOLET SCANNER (UV)

SPEC.# 9019-UV
SHEET ____ OF ____
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	UV-1	
QUANTITY REQUIRED	1	
MANUFACTURER OR APPROVED EQUAL	HONEYWELL	
MODEL NO.	C7012E-1104	
VOLTAGE	120 VAC	
TEMPERATURE RANGE	-20 TO +175° F	
HOUSING MATERIAL	CAST ALUMINUM	
ELECTRICAL CLASSIFICATION	NEMA 4	
U.V. DETECTOR PIPE MOUNTING SIZE	3/4" NPT	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	FLARE AT CELL A FLARE STATION	
COMMENTS	INCLUDED WITH BS-1 SUPPLIED BY FLARE MANUFACTURER	

FUEL FILTER/CONDENSATE KNOCKOUT DRUM (V)

SPEC.# 9019-V
SHEET ____ OF ____
BY K. AYSTER
DATE 11/22/91
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	V-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	PEGO SYSTEMS	
MODEL NO.	PO261V1C	
HOUSING MATERIAL	SCH 10 C.S PIPE	
DEMISTER PAD	YORK MESH, STYLE 326, 316 S.S., 14" 0.D. X 6" THICK	
REMOVAL EFFICIENCY	99.7% AT 5μ	
GAS FLOW RATE	150 TO 1500 SCFM	
SIZE	14" O.D. X 58" HIGH 15 GAL. CAPACITY	
COMMENTS	1. TWO 1/2" NPT 3000# HALF COUPLINGS SHALL BE INSTALLED ON THE SIDE OF THE INLET AND OUTLET NOZZLE PIPING TO MEASURE DIFFERENTIAL PRESSURE ACROSS THE UNIT. 2. PRESSURE DIFFERENTIAL ACROSS INLET AND OUTLET SHALL BE LESS THAN 3" W.C. FOR CLEAN STAGE. 3. 45" W.C. INLET VACUUM. 4. SUPPLY LEVEL GAUGE LG-1 SEE SPECIFICATION SHEET.	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	INLET TO BLOWERS CELL A FLARE STATION	

GRANULATED ACTIVATED CARBON VESSEL (V)

SPEC.# 9440-1
SHEET ____ OF ____
BY G. GLASSER
DATE 8/30/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	V-3	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	BARNEBY & SUTCLIFFE CORP	
MODEL NO.	V-20	
VESSEL TYPE	PLASTIC CONTAINER	
ADSORBENT	GRANULATED ACTIVATED CARBON	
CAPACITY	5 GALLON	
LOCATION	CELL A FLARE STATION	
COMMENTS	TO BE CONNECTED TO VENT LINE OF T-1 TO CONTROL ORGANIC VAPORS	

LIMIT SWITCHES (ZSO, ZSC)

SPEC.# 9019-ZS
SHEET ____ OF ____
BY MPM
DATE 7/16/92
REV. 0 DATE 04/14/94

IDENTIFICATION NUMBER	ZSO-1, ZSC-1	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	G. H. BETTIS	
MODEL NO.	ER-021-AFC	
NUMBER OF CIRCUITS	2	
TYPE	SPDT	
CLASSIFICATION	NEMA 7D	
ELECTRICAL RATING	125 VAC, 15 AMPS	
ANGULAR ROTATION	2 DEGREES	
ACTUATION	DIRECT COUPLED	
UL/FM APPROVAL REQUIRED	YES	
COMMENTS	INCLUDED WITH SDV-1 AND SUPPLIED BY VALVE MANUFACTURER CELL A FLARE STATION	

SPECIAL PROVISIONS

DIVISION C

GAS MONITORING AND MIGRATION CONTROL SYSTEM

CELL A-1 EQUIPMENT DATA SHEETS

LANDFILL GAS FLARE STATION

SPEC.# 9440-1
SHEET ____ OF ____
BY MPM
DATE 4/10/92
REV. 1 DATE 8/15/94

IDENTIFICATION	CELL A-1 LANDFILL GAS FLARE STATION	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	PERENNIAL ENERGY, INC.	
MODEL NO.	EGFS	
OVERALL FLARE HEIGHT	APPROX. 16 FEET	
OUTSIDE FLARE DIAMETER	APPROX. 3.5 FEET	
SHELL MATERIAL	CARBON STEEL, ASTM A-36	
REFRACTORY TYPE	TWO (2) IN. MIN THICKNESS 2300 F REFRACTORY BLANKET ATTACHED WITH INCONEL STUDS AND WASHERS.	
EARTHQUAKE DESIGN	UBC ZONE 2	
LOCATION	CELL A-1 FLARE STATION	
COMMENTS	1. FURNISH AND INSTALL COMPLETE SKID MOUNTED GAS HANDLING/FLARE ASSEMBLY INCLUDING ALL PIPING, VALVES, FITTINGS, SUPPORTS, CONTROLS AND ACCESSORIES. 2. COMPLIANCE WITH STANDARDS OF AISC, AGA, ASME, AWS, NFPA. 3. FUEL FILTER/CONDENSATE KNOCK-OUT W/ 99.7% AT 5μ PARTICULATE REMOVAL EFFICIENCY. 4. WILDEN PNEUMATIC DIAPHRAGM PUMP MODEL NO. M2 TO DRAIN OF KNOCKOUT DRUM. 5. TWO LAMPSON CORP. MODEL 310 EXHAUSTERS W/ 1003 IMPELLERS AND TEFC MOTORS. 6. GROTH FLAME ARRESTOR, MODEL 7628-06-14-F00, 6" HORI. TYPE, W/ ALUM. HOUSING AND SS ELEMENT. 7. PROPANE GAS PILOT W/ TWO 5 GAL. BOTTLES. 8. AUX. FUEL (NATURAL GAS) CONNECTIONS.	9. AUTO-SHUTDOWN AND AUTO-DIALER SYSTEM FOR K/O DRUM HIGH LEVEL, RUPTURE DISK FAIL, FLARE FLAME OUT, HIGH TEMP., AUX FUEL OUT, AND LOW INSTRUMENT AIR PRESS. 10. FLOW MEASUREMENT ELEMENT INSTALLED IN INLET TO FLARE. 11. FLARE EQUIPPED WITH AIR DAMPER ASSEMBLY AUTOMATIC ACTUATED BY FLARE TEMPERATURE. 12. ALL ELECTRICAL AND CONTROL INSTRUMENTATION PANEL MOUNTED ON FLARE STATION SKID. 13. DPI INSTALLED ACROSS FLAME ARRESTOR, KNOCK-OUT VESSEL, AND BLOWERS COMMON HEADERS. 14. RUPTURE DISK AND MONITOR INSTALLED ON BLOWER DISCHARGE. NOTE: SEE SPECIFICATION SHEETS FOR COMPONENT PERFORMANCE PARAMETERS.

GAS BLOWER (B)

SPEC.# 9440-1
SHEET ____ OF ____
BY W. NAKAGAWA
DATE 8/30/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	B-100, B-101	
QUANTITY	2	
MANUFACTURER OR APPROVED EQUAL	LAMSON CORP	
MODEL NO.	310 EXHAUSTER W/ 1003 IMPELLER	
CASING MATERIAL	CAST IRON	
IMPELLER MATERIAL	ALUMINUM W/ BISONITE COATING	
COATING ON CASING	BISONITE COATING ON INSIDE OF CASING ONLY	
INLET CONNECTION	CONTRACTOR SHALL SPECIFY. CONTRACTOR SHALL ALSO SUPPLY FLEXIBLE COUPLING	
OUTLET CONNECTION	CONTRACTOR SHALL SPECIFY. CONTRACTOR SHALL ALSO SUPPLY FLEXIBLE COUPLING	
TYPE OF GAS & S.G.	LANDFILL GAS, APPROXIMATELY 1.0	
GAS TEMP.	80 - 120 ° F	
BLOWER DIFFERENTIAL PRESSURE	58" W.C. AT 100 SCFM (CORRECTED FOR LANDFILL GAS AND ELEVATION)	
BLOWER RPM	5075 RPM	
MOTOR INFORMATION	460VAC, 3-PHASE, 60 HZ, TEFC, 30 HP	
DIRECTION OF ROTATION WHEN LOOKING FROM THE DRIVE END	ONE-CLOCKWISE,	
REQUIREMENTS, ACCESSORES	GAS TIGHT CONSTRUCTION, NON-CONTACT LABYRINTH SHAFT SEAL WITH BABBIT INSERTS, VIBRATION ISOLATION PADS, AND BLOWER SHALL BE CONSTRUCTED WITH 1003 IMPELLER. ONE BLOWER MIRROR IMAGE OF OTHER	
NOISE LEVEL	LESS THAN 85 dBA AT 3 FEET	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	CELL A-1 FLARE STATION SKID	

AIR COMPRESSOR ASSEMBLY (C)

SPEC.# 9440-1
SHEET ____ OF ____
BY G. GLASSER
DATE 8/30/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	C-100, C-101	
QUANTITY	2	
MANUFACTURER OR APPROVED EQUAL	ATLAS COPCO/BENZ ENGINEERING	
MODEL NO.	DT580H/V	
STYLE	DUPLEX TWO STAGE DIRECT DRIVE STRADDLING ASME APPROVED 80 GAL RECEIVER TANK	
ELECTRIC MOTOR	480 VAC/3 PHASE, 5 HP, TEFC	
CAPACITY	15 SCFM AT 150 PSI	
LOCATION	CELL A-1 FLARE STATION	
COMMENTS	EACH COMPRESSOR ASSEMBLY IS TO BE SKID MOUNTED. EACH SKID (6' X 7') SHALL HAVE TWO DUPLEX COMPRESSORS AND THE FOLLOWING COMPONENTS: 1. ZEKS AIR DRIER CORP., REFRIGERATED DRYER, 18 SCFM, 38 DEG F DEW POINT, 150 PSIG, WITH 1/5 HP MOTOR, MODEL 18HSB OR EQUAL 2. ZEKS AIR DRIER CORP., PARTICULATE PREFILTER, 3 MICRON ABSOLUTE REMOVAL, 150 PSIG, ACCRAFLOW MODEL 75PT OR EQUAL 3. ZEKS AIR DRIER CORP., PARTICULATE AFTERFILTER, 0.7 MICRON , 95% DOP EFFICIENCY, 150 PSIG, ACCRASEIVE MODEL 80RT OR EQUAL 4. ZEKS AIR DRIER CORP., OIL WATER SEPARATOR, MODEL 45WOS 5. FILTER REGULATOR WITH PRESSURE INDICATOR, SHUT-OFF VALVE AND PRESSURE SWITCH ALARM 6. NEMA 4 CONTROL PANEL, POP-OFF SAFETY VALVE, AND CONDENSATE AUTO DRAIN.	

FLAME ARRESTER (FA)

SPEC.# 9440-1
SHEET ____ OF ____
BY W. NAKAGAWA
DATE 8/30/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	FA-100	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	GROTH	
MODEL NO.	7628-06-14-FOO	
HOUSING MATERIAL	ALUMINUM	
FLAME CELL MATERIAL	ALUMINUM	
HORIZONTAL OR VERTICAL	HORIZONTAL	
GAS FLOW RATE	10 - 100 SCFM	
SIZE AND CONNECTIONS	6" 125# FF FLANGE	
COMMENTS	THE CONTRACTOR SHALL SUPPLY ONE SPARE FLAME CELL.	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	INLET TO FLARE CELL A-1 FLARE STATION	

FILTER REGULATOR AND LUBRICATOR (FRL)

SPEC.# 9440-1
SHEET ____ OF ____
BY G. GLASSER
DATE 9/8/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	FRL-101	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	NORGREN	
MODEL NO.	P4A-460-M3DA/5532-04	
SIZE	1/2" NPT	
MAXIMUM PRESSURE	250 PSIG	
ADJUSTABLE PRESSURE RANGE	5-150 PSIG	
FILTER RATING	5 MICRON	
UL/FM APPROVAL REQUIRED	YES	
SERVICE	INSTRUMENT AIR	
LOCATION	INSTRUMENT AIR TO PUMP, P-100 CELL A-1 FLARE STATION	
COMMENTS	INCLUDE PRESSURE INDICATOR 0-250 PSIG	

CHECK VALVES (FSV)

SPEC.# 9440-1
SHEET ____ OF ____
BY W. NAKAGAWA
DATE 9/12/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	FSV-101	FSV-103
QUANTITY	1	1
MANUFACTURER OR APPROVED EQUAL	HARRINGTON	GRAINGER/ CONTROL DEVICES INC.
MODEL NO.	TC10075ST	CB-50
STYLE	BALL CHECK	GLOBE STYLE
BODY MATERIAL	PVC	BRONZE
STOPPER MATERIAL	PVC	STANDARD
SEAL MATERIAL	VITON O-RING	TEFLON
SIZE	3/4" IPS, SOCKET	1/2" IPS, SOCKET
SERVICE	CONDENSATE	INSTRUMENT AIR
LOCATION	CONDENSATE FROM PUMP, P-100, TO TANK, T-100 CELL A-1 FLARE STATION	INSTRUMENT AIR TO CONDENSATE MANAGEMENT SYSTEM CELL A-1 FLARE STATION

CHECK VALVES (FSV)

SPEC.# 9440-1
SHEET ____ OF ____
BY W. NAKAGAWA
DATE 9/12/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	FSV-102	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	HARRINGTON	
MODEL NO.	TC10150ST	
STYLE	BALL CHECK	
BODY MATERIAL	PVC	
BALL MATERIAL	PVC	
SEAL MATERIAL	VITON O-RING	
SIZE	1-1/2" IPS, SOCKET	
SERVICE	CONDENSATE	
LOCATION	CONDENSATE FROM SUMPS IN FIELD CELL A-1 FLARE STATION	

HAND OPERATED VALVES (HV)

SPEC.# 9440-1
SHEET ____ OF ____
BY WAN
DATE 9/12/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	HV-111	HV-112
QUANTITY	1	1
MANUFACTURER OR APPROVED EQUAL	HARRINGTON	HARRINGTON
MODEL NO.	HAYWARD-TB10010ST	HAYWARD-TB10075ST
STYLE	TRUE UNION BALL	TRUE UNION BALL
BODY MATERIAL	PVC	PVC
BALL MATERIAL	PVC	PVC
SEAT MATERIAL	VITON	VITON
SIZE	1" IPS, SOCKET	3/4" IPS, SOCKET
SERVICE	CONDENSATE	CONDENSATE
LOCATION	FILTER SEPARATOR CONDENSATE LINE BEFORE PUMP CELL A-1 FLARE STATION	CONDENSATE LINE AFTER PUMP CELL A-1 FLARE STATION

HAND OPERATED VALVES (HV)

SPEC.# 9440-1
SHEET ____ OF ____
BY W. NAKAGAWA
DATE 9/12/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	HV-113	HV-115
QUANTITY	1	1
MANUFACTURER OR APPROVED EQUAL	APOLLO	HARRINGTON
MODEL NO.	70-103-01	HAYWARD-TB10200ST
STYLE	BALL	TRUE UNION BALL
BODY MATERIAL	BRASS	PVC
BALL MATERIAL	CHROME PLATED	PVC
SEAT MATERIAL	TFE	VITON
SIZE	1/2" NPT	2" IPS, SOCKET
SERVICE	AIR COMPRESSOR	CONDENSATE
LOCATION	INSTRUMENT AIR HEADER TO PUMP, P-100 CELL A-1 FLARE STATION	DRAIN PIPE FROM CONDENSATE STORAGE TANK CELL A-1 FLARE STATION

LEVEL SWITCH
(LSHH)

SPEC.# 9440-1
SHEET ____ OF ____
BY G. GLASSER
DATE 9/12/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	LSHH-102	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	ENDRESS & HAUSER	
MODEL NO.	LSC 1132	
OPERATING PRINCIPLE	HIGH FREQUENCY (RF) CAPACITANCE	
NEMA CLASSIFICATION	4	
OUTPUT RELAY	5 AMPS DPDT	
POWER SUPPLY	120 VAC/60HZ	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	CONDENSATE STORAGE TANK T-100 AT CELL A-1 FLARE STATION	
COMMENTS	LSHH-102 IS CONNECTED TO CONTROL LOGIC TO SHUTDOWN FLARE STATION AND INITIATE AUTODIALER WHEN ACTIVATED	

PUMP (P)

SPEC.# 9440-1
SHEET ____ OF ____
BY W. NAKAGAWA
DATE 8/30/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	P-100	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	WILDEN	
MODEL NO.	M-2-PT-TF-TF-PT	
HOUSING MATERIAL	POLYPROPYLENE	
DIAPHRAGM MATERIAL	TEFLON	
BALL MATERIAL	TEFLON	
O-RING MATERIAL	TEFLON	
INLET CONNECTION	1" NPT	
OUTLET CONNECTION	3/4" NPT	
SERVICE	LANDFILL GAS CONDENSATE	
MAXIMUM TEMPERATURE	110 DEG F	
AIR SUPPLY INLET PRESSURE	NOT TO EXCEED 150 PSIG	
AIR SUPPLY TYPE AND SIZE	1/4" NPT	
SUCTION LIFT	WET - 25 FEET DRY - 18 FEET	
MAXIMUM GPM	37	
DESIGN OPERATION	2 SCFM AIR AT 50 PSIG, 3 GPM	
LOCATION	CONDENSATE DISCHARGE FROM KNOCK-OUT DRUM CELL A-1 FLARE STATION	

SOLENOID OPERATED VALVE (SOV)

SPEC.# 9440-1
SHEET ____ OF ____
BY G. GLASSER
DATE 9/8/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	SOV-103	SOV-104
QUANTITY	1	1
MANUFACTURER OR APPROVED EQUAL	ASCO	ASCO
MODEL NO.	8210G2	8210G4
2 WAY, 3 WAY, 4 WAY, ETC.	2 WAY	2 WAY
TEMPERATURE RANGE	104° F	104° F
CONNECTIONS (SIZE AND TYPE)	1/2" NPT	1" NPT
BODY MATERIAL	BRASS	BRASS
NEMA CLASSIFICATION	7D	7D
MAXIMUM OPERATING PRESSURE	150 PSI	150 PSI
INPUT	120 VAC, 60 HZ	120 VAC, 60 HZ
SERVICE	INST. AIR	INST. AIR
UL/FM APPROVAL REQUIRED	YES	YES
LOCATION	INSTRUMENT AIR SUPPLY TO PUMP, P-100 CELL A-1 FLARE STATION	INSTRUMENT AIR SUPPLY CELL A-1 FLARE STATION
COMMENTS		

CONDENSATE STORAGE TANK (T)

SPEC.# 9440-1
SHEET ____ OF ____
BY G. GLASSER
DATE 8/30/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	T-100	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	POLY CAL PLASTICS	
MODEL NO.	ZORB TANK 077-U	
CAPACITY AND MATERIAL	1400 GALLON CAPACITY, HDPE	
DIMENSIONS	7'-5" DIA X 5'-2" H UPRIGHT	
MANWAY	17" TOP MOUNTED	
LOCATION	CELL A-1 FLARE STATION	
COMMENTS	TO BE FURNISHED AND INSTALLED COMPLETE, IN-PLACE AND READY FOR SERVICE WITH THE FOLLOWING: 1. POLY CAL PLASTICS, SECONDARY CONTAINMENT TANK 2900 GAL. HDPE, 10' DIA X 5' H, WITH 8" INTERNAL FLANGE, MODEL SP-096-XL 2. ALL INLET AND OUTLET TANK CONNECTIONS SHALL BE 2" FPT.	

FUEL FILTER/CONDENSATE KNOCKOUT DRUM (V)

SPEC.# 9440-1
SHEET ____ OF ____
BY W. NAKAGAWA
DATE 8/30/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	V-100	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	PEGO SYSTEMS	
MODEL NO.	PO261V1C	
HOUSING MATERIAL	SCH 10 C.S. PIPE	
DEMISTER PAD	YORK MESH, STYLE 326, 316 S.S., 14" 0.D. X 6" THICK	
REMOVAL EFFICIENCY	99.7% AT 5μ	
GAS FLOW RATE	10 TO 100 SCFM	
SIZE	14" O.D. X 58" HIGH 15 GAL. CAPACITY	
COMMENTS	1. TWO 1/2" NPT 3000# HALF COUPLINGS SHALL BE INSTALLED ON THE SIDE OF THE INLET AND OUTLET NOZZLE PIPING TO MEASURE DIFFERENTIAL PRESSURE ACROSS THE UNIT. 2. PRESSURE DIFFERENTIAL ACROSS INLET AND OUTLET SHALL BE LESS THAN 3" W.C. FOR CLEAN STAGE. 3. 45" W.C. INLET VACUUM. 4. SUPPLY LEVEL GAUGE LG-1 SEE SPECIFICATION SHEET.	
UL/FM APPROVAL REQUIRED	YES	
LOCATION	INLET TO BLOWERS CELL A-1 FLARE STATION	

GRANULATED ACTIVATED CARBON VESSEL (V)

SPEC.# 9440-1
SHEET ____ OF ____
BY G. GLASSER
DATE 8/30/94
REV. ____ DATE ____

IDENTIFICATION NUMBER	V-102	
QUANTITY	1	
MANUFACTURER OR APPROVED EQUAL	BARNEBY & SUTCLIFFE CORP	
MODEL NO.	V-20	
VESSEL TYPE	PLASTIC CONTAINER	
ADSORBENT	GRANULATED ACTIVATED CARBON	
CAPACITY	5 GALLON	
LOCATION	CELL A FLARE STATION	
COMMENTS	TO BE CONNECTED TO VENT LINE OF T-1 TO CONTROL ORGANIC VAPORS	

SPECIAL PROVISIONS

DIVISION D

LANDSCAPING AND IRRIGATION (INCLUDING PAINTING)

CONTENTS

DIVISION D - LANDSCAPING AND IRRIGATION

SECTION D01212
TOPSOIL FILL CONSTRUCTION

Topsoil Fill Construction shall conform to MAG Sections 211 and 795 that shall dictate except as modified herein:

211.1 DESCRIPTION

Replace Section 211.1 of the MAG Standard Specifications with:

> Topsoil Fill Construction shall consist of final fill construction as landfill cover over the 36'' thick clayey material as specified in Section B01211 and shown in the plans. The Topsoil shall consist of a layer with a minimum 12'' thickness.

211.3 COMPACTING

Change the second sentence of the fifth paragraph to read:

> Each layer of shall be compacted in accordance with the following requirement to a uniform density of between 60% and 80%.

795.2 TOPSOIL

Delete the following from the first sentence in the second paragraph:

> .. and it shall contain approximately 1 1/2%, by dry weight, of organic matter either natural or added.

Delete the first sentence of the second paragraph and the relate table and substitute the following:

> Gradation shall be for a soil principally classification of Sandy Loam and/or a Loamy Sand with the acceptance of additional gravel and rock content in accordance with the following table:

Sieve Size	Total Volume Percentage Passing	Material
12''	0 - 100	Rock
1/2''	0 - 95	Gravel
No. 4 (1/4")	0 - 90	Gravel
No. 10 (1/10")	0 - 80	Coarse Sand
No. 200 (1/200")	0 - 50	Silt
No. 550 (1/500")	0 - 20	Clay

211.4 TESTS

Add:

Topsoil material shall be sampled for testing at the source by the Engineer. The Contractor shall schedule with the Engineer to provide for appropriate time for testing (by City forces) and acceptance of material by the Engineer prior to delivery. The Contractor shall provide access for sampling by the Engineer at all grade levels of proposed excavation for borrow. The intervals of sample spacing shall not exceed an areas of four acres. The general intent is to sample the borrow site on a grid of 200'.

END OF SECTION

SECTION D02810
SPRINKLER IRRIGATION SYSTEM

Landscape shall conform to MAG Sections 440 and 757, that shall dictate except as modified herein:

440.1 GENERAL

Following the third sentence in the first paragraph insert the following:

> "The layout of the equipment in the drawings is schematic in nature. The Contractor shall coordinate all bubbler/emitter head locations with graded depressions at individual plant material where specified. When specified, spray heads shall be located at spacings per plan and shall not exceed the manufacturer's spacing."

Delete third paragraph and replace with the following paragraphs:

> "The Contractor shall maintain a redlined-record blueprint of the construction on a daily basis, which may be reviewed by the Engineer on-site during normal business hours."
>
> The Engineer will provide the contractor with a reproducible copy of the drawings with a block noting "as-built" Drawing by:_____" . The Contractor shall modify the drawing, by the means of a skilled draftsman, to depict the "as-built" conditions prior to final acceptance. The modifications shall include dimensions to depict the main piping layout and control wire layout (when not located below main pipe) in relation to fixed points of reference such buildings, walls, roadways, and sidewalks. Buried equipment such as valves, filters, and pressure regulators shall be dimensioned from two points of reference. The Architect shall reserve the right to reject any "as-built Drawing" that is illegible or not complete."

440.2 TRENCHING AND BACKFILL

Paragraph one, item (B), add:

> "with control wires below" after the word "pressurized". Add "(E) Control wires in trench separate from main pipe - 18 inches"

440.4 VALVES AND VALVE BOXES

Paragraph four:

> Delete the last sentence: "All Backflow preventers.....steel."
> Add: All backflow preventers shall be with risers of copper material.
>
> Add: Provide an approved, 36'' tall (above grade), green painted steel stake at each valve box.

440.6 AUTOMATIC CONTROL SYSTEM INSTALLATION:

Modify second sentence of paragraph three to read:

The valve is to be housed in a plastic box with locking cover, and it shall be set to grade with a 3" clearance from the valve cross handle to the bottom of the lid. Controller letter and station number are to be branded on the lid of each valve box (both bubbler valve and drip valve assemblies). Letter and number size to be no smaller than 1" and no greater in size than 1-1/2", depth of branding to be no more than 1/8" and no less than 1/16" into valve box lid. Splice boxes shall be labeled with the words "low voltage electrical splice" in the same manner.

Prior to final acceptance, and prior to the completion of "as-built" Drawings, the Contractor shall provide a blackline operational chart depicting the entire irrigation system, with paste colored high-light of the separate laterals, and at the smallest legible scale for approval by the Engineer. After approval of the chart the Contractor shall laminate it in 20 mil. plastic, both sides and secure it to the interior of the controller.

440.7 FLUSHING AND TESTING

Delete paragraph (A) and substitute:

"(A) Pipeline Pressure Test. The main pipe shall be tested in dry trenches, with fittings exposed, with solenoid valves in the closed position, and with static city pressure for twelve hours. Any leaks in the main pipe shall be repaired. Leaks in the main pipe or laterals shall be repaired until piping is accepted by the Engineer before Substantial Completion."

When backflow prevention devises are include in the scope of work, provide for the certified testing of the device with documentation to the Engineer.

440.7.1 Operation Instruction and Maintenance Manual

Add new Subsection 440.7.1 as follows:

Provide a bound copy to the Engineer including catalog part sheets with specific equipment highlighted that have been installed in the construction. Provide a copy of the receipt that identifies the purchase date of mechanically and electrically operated equipment such as heads, controller, valves, and backflow preventers along with their manufacturer's guarantee statement and operating manual. Meet with the Owner's maintenance personnel at the completion of the Plant Establishment Period to provide operation instruction on the system and turn over controller keys. Document the persons attending, the time, and the date in a letter to the Engineer.

757.2.2 Plastic Pipe

Add the following:

When specified in the drawings, low-pressure pipe for laterals to emitters and/or as a part of a riser assembly of piping to an irrigation head, shall be of I.P.S. flexible vinyl (PVC) pipe as manufactured by Ag. Products or equal.

757.2.4 Adhesive Cement

Add Subsection 757.2.4 as follows:

Socket connections of standard PVC fittings to flexible PVC pipe shall be completed with an adhesive manufactured for such a connection, such as Weld-On #795, and per manufacturer's recommendations.

440.8 MEASUREMENT AND PAYMENT

Add the following:

When individual components of the irrigation system have not been separately listed, payment for such items is included in proportionately in the itemized water emitting device at the time such devise is operational.

END OF SECTION

SECTION D02900
LANDSCAPING AND PLANTING

Landscaping and Planting shall conform to MAG Sections 430 and 795 that shall dictate except as modified herein:

430.02 GENERAL

Add:

Application of chemical herbicides shall be by a certified applicator.

Delete the last paragraph and substitute the following:

Planting areas to receive granite gravel finish along 19th Avenue and the north crest of the Salt River bank shall receive an application of pre-emergent herbicide, Dacthol, or approved equal per manufacture's recommendations. Other areas shall be untreated.

430.3.1 Lawn Areas

Delete the subsection and add the following:

430.3 SEEDING

Add the following new subsection as 430.3 SEEDING

The scope of work in this subsection shall include site preparation and application of seed mix for un-irrigated areas depicted in the plans.

The following planting scopes of work shall be scheduled for middle to late summer (ideally from mid-June to September 1) as specially scheduled by the General Contractor, or as otherwise approved by the Engineer.

Prepare the area with an additional ripping of the top 6" of the site. Ripper blades shall be space at approximately thirty (30) inches on center. Ripping shall be parallel to contour lines of the rough graded site slope. The disruption of the site surface in preparation for seeding shall begin only as immediately-prior to the seeding operations. Operations shall take place when moisture content is favorable. During operations competitive vegetation shall be uprooted and the surface shall remain with a furrowed condition.

Seed application shall be by commercial hand-held spreader with the application taking place in two passes, each application pass perpendicular to the previous. Within 24 hours of applying seed to an area, apply straw at a uniform rate by pneumatic equipment an area. Within 24 hours of applying the seeds in an area, hydro-slurry apply the mulch in a uniform rate. Within 24 hours of applying the seeds in an area, apply the final hydro-slurry of wood, tackifier, and starter fertilizer. If the site is seeded in individual areas

at a time of less than 24 hours, the areas shall be marked in an identifying manner approve by the Engineer.

Apply slurry mixtures using a commercial-type hydroseeder with a built-in agitation system with an operating capacity sufficient to agitate, suspend and homogeneously mix the slurry. Distribution lines shall be large enough to prevent stoppage and to provide even distribution of the slurry over the ground. The pump must be capable of exerting up to 150 psi at the nozzle. Minimum capacity of the slurry tank shall be 1,000 gallons. Tank shall be mounted on a traveling unit which will place the spray nozzles within sufficient proximity to the areas to be seeded so as to provide uniform distribution without waste. Slurry mixes shall contain 700 gallons of water per acre.

Prepare slurry mixture on-site of work. Add materials in quantities to meet specifications listed below. Mix ingredients to form a homogenous slurry. Using the color of the mulch as a metering agent, spray the slurry mixture uniformly over the designated seeded area.

The seeding process shall proceed in the order as follows:

1. prepare areas by ripping
2. hydro slurry apply: seed, starter fertilizer, organic soil conditioner, fiberized wood mulch
3. apply straw
4. hydo-slurry apply: tackifer and fiberized wood mulch

The quantities of seeding materials shall be as follows:

Ingredient	Rate per acre
Seed Mix	19.75 # PLS
Starter Fertilizer	600 pounds
Organic Soil conditioner	2500 pounds
Fiberized wood mulch	150 pounds (in seeding process)
Straw fiber	3500 pounds
Plantago mucilloid organic tackifier	150 pounds
Fiberized wood mulch	450 pounds (in final tacking process)

Slurry mixture which has not been applied within four hours of mixing shall not be used and shall be removed from the site and disposed of in a legal manner.

Areas of seeding shall be reviewed for application of payment 30 days after seeding. At least 75 percent of the applied tackifier and straw shall remain in place for a minimum period of 30 days after application. Any area of seeding that has less than 75 percent of the straw remaining after 30 from application, shall be rejected and shall be completely re-seeded with all materials and methods of the original seeding, except for the ripping.

430.5.6 Shrub and Tree Pits

Delete this subsection except for the quantity and type of fertilizer tablets specified which shall be provided with this work and add the following information:

Pits for shrubs shall be excavated twice the width and depth of the rootball of the plant. Typical pits for trees shall be excavated to an equal depth below and twice the width of the tree rootball plus a additional 12"x12" at the pit perimeter and additional depth below the sides as depicted in the standard detail. Pits for trees shall be filled with a water, if pit does not drain completely within twenty four hours, a gravel sump shall be provided.

Adjacent to the planting pit provide a "blended backfill mixture" containing one part mulch, three parts native soil, one-half part gypsum, with sulfur/iron mixture at the following rate:

one handful per six one gallon-sized plants;
one-half handful per each five gallon-sized plant;
one handful per each fifteen gallon-sized plant;
and one handful per caliper inch of tree, each tree.

Fill shall placed to provide a four (4) inch deep irrigation water retaining area above the entire pit area for tree; two inch deep for shrubs.

Set out fertilizer tablets to be incorporated in plant container for observation by the Architect.

Remove plants from containers without disturbing the rootball. Set plants on "blended backfill mixture" in pit, cradling and supporting the rootball from disruption during the operation. When the plant is set the top of the rootball shall be level with the edge of the pit. Rotate the plant for the "best side" view and for minimum obstruction to traffic on adjacent pavement.

Backfill the pit with the "blended backfill mixture", installing the fertilizer tablets evenly around the pit at an elevation midpoint at the rootball, and water-settle to provide a level grade.

Apply root stimulator at the rate of one tablespoon per gallon. Apply mixture at rate of 1 gallon per 100 square feet of bedding material, 1 gallon per shrub, and 2 gallons per tree, minimum.

Stake trees as per detail, minimum, or as directed to properly support the plant material supplied. Brace each palm tree with 2x wood bracing as is appropriate for the size and planted depth of the trunk/rootball.

Prune each tree and shrub to preserve the natural character of the plant per "American Standard for Nursery Stock" as published by the American Association of Nurserymen. Prune to remove all suckers, deadwood, and broken or badly bruised branches. Paint

cuts over three-fourths (3/4) inch in diameter and exposed cambrium of bruised areas with tree paint as specified herein.

430.5.7 Cactus and Succulent Planting

Add new subsection 430.5.7 CACTUS AND SUCCULENT PLANTING AS FOLLOWS:

Establish Location: Stake out saguaros and set out other cactus and succulents in locations shown on the plans per MAG Specification 430.5.4 - Plant Location.

Dig Planting pits as per MAG Specifications 430.5.6 and to the sizes shown in the appropriate planting detail. Roughen sides of the pit to remove any compacting or glazing. Mix loosened soil with specific backfill.

Backfill Material: Cactus and succulent planting pits shall be backfilled with on-site soil only, no amendments.

Root prune all shredded or damaged roots. Ensure all wounds to the root system are sealed before planting by allowing time for self-healing or application of wettable dusting sulfur (1.5 pounds).

Planting depth shall be that at which plant was grown except saguaro shall be planted one foot deeper. For saguaro, cut through taproot to provide a flat base with diameter sufficient to hold the weight of the unsupported saguaro. Match new orientation with old, i.e., north side facing north.

Check drainage of plant pits by filling with water twice in succession. Conditions permitting, the retention of water in the planting pits for more than 24 hours shall be brought to the attention of the Engineer and submit, in writing, a proposal for correcting the drainage problem before proceeding with work.

Fill the planting pit with soil and tamp to compact. Do not water in saguaros or ocotillos.

No irrigation is required for saguaro or ocotillo installations.

430.9 PLANT ESTABLISHMENT PERIOD

Paragraph one, modify third sentence:

"The Plant establishment period...necessary." to increase the period to ninety (90) calendar days.

430.10 MEASUREMENT AND PAYMENT

Add the following paragraph:

A maximum of ninety percent (90%) of the containerized-plant material unit cost bid items shall be paid at substantial completion. The remaining ten percent (10%) shall be retained until the end of the Plant Establishment Period and paid when maintenance has been performed and the value of guaranteed plant material has completed the specified period of establishment.

795.4 MULCH for container material planting and ORGANIC SOIL CONDITIONER for seeding

Add:

Provide test data and manufacturer's literature on all organic amendments to the Landscape Architect for acceptance."

Delete the two paragraphs of the section and substitute the following in lieu:
Organic soil conditioner shall be a humanic acid based, composted blend of forest products, waste water treatment plant sludge, and other elements in the following proportions of dry weight composition: 1% nitrogen, 1% potash .4% manganese, .1% zinc, .05% copper, 2% phosphate, 1.9% calcium .7% iron, .01% manganese; a pH of less than 7.0, Omni as manufactured by Western Agricultural Products Co., Phoenix, or equal. When directed by the Engineer, the Contractor shall use a 1/4 inch screened conditioner material provided by and to a location on the site by the City

795.8.2 Tree Stakes

Delete:

"2x2 redwood posts"

Add:

"2 diameter x 8' lodgepole pine stakes".

795.8.5 Seed

Add the following:

The seed shall be deliver to the site in sealed containers. Each container shall be labeled in accordance with the Arizona Revised Statutes and the US Department of Agriculture rules and regulations under the Federal Seed Act. Labels shall indicate the variety or stain of the seed, the percentage of germination, purity and weed content, and the date of analysis which shall not be more than 9 months prior to the delivery date.

Application rates of seed as specified are for Pure Live Seed (PLS). PLS is determined by multiplying the sum of the germination and the hard or dormant seed by the purity. Weed content of the seed shall not exceed 0.5 percent.

The seed mix shall contain the following quantity of pure live seed (PLS):

PLS pounds per acre	Species
1.0	Atriplex polycarpa/Desert Saltbush
2.0	Atriplex canescens/Four Wing Saltbrush (dewinged) (from a Sonoran Desert seed source only)
1.5	Encelia farinosa/Brittlebush
2.0	Ambrosia deltoidea/Bursage
4.0	Larrea tridentata/Creosote
0.75	Sphaeralcea ambigua/Desert Globe Mallow (hulled black seed, husk removed)
0.5	Bailyea multiradiata/Desert Marigold
0.5	Haplopappus acradenius/Turpentine Bush
0.25	Celtis pallida/Desert Hackberry
4.0	Plantago insularis/Indian Wheat
1.0	Cassia Covesii/Desert Senna
0.5	Schismus barbatus/Schismus Grass
2.0	Aristida purpurea/Purple Three Awn
Total 19.75 PLS	

Seed mixes may be available from Wild Seed, Inc., P.O. Box 27751, Tempe, Arizona 85285, Contact: Rita Jo Anthony.

759.8.6 Additional Materials

Added the following miscellaneous materials:

Fiberized Wood Mulch: 100% Virgin wood fiber mulch containing no growth inhibiting factors, in a form that will remain uniformly suspended in water under agitation to form a homogenous slurry as manufactured by Weyerhauser or equal

Tackifier: plantago mucilliod -type tackifier shall have a 70% minimum purity Psyllium mucilliod organic tactifier as derived from plantago ovata-insularis husk. Material shall be free flowing, non-corrosive powder produced from natural plant mucilloid.

Straw Mulch: Straw shall be of barley or wheat only. Straw shall be from the current season's crop. Provide a letter of certification from the supplier stating the to the effect that the straw was baled less than 12 months from the delivery date. Straw in such an advanced stage of decomposition as to smother or retard the normal growth of grass will

not be accepted. Old straw mulch which breaks during crimping, if applicable, will not be accepted.

Iron/sulfate amendment: shall contain not less than 80% soluble sulfur and 5% celated iron, Disper-sul as manufactured by Chemical Enterprises Inc., Houston, Texas.

Starter Fertilizer: Ammonia Phosphate 16-20-0

END OF SECTION

SECTION D09900
PAINTING

Painting shall conform to MAG Standard Specifications, Section 530, that shall dictate except as noted herein.

530.2 PAINTING

Delete Section 530.2 and substitute the following:

All paint materials for coating systems for each type of surface shall be the product of Griggs Paint , Phoenix, Arizona.

All paint material listed herein, unless otherwise designated in the 'Painting Schedule', are the product of the stated manufacturer and require no other approvals as to the manufacture or catalog number.

Equivalent products of Frazee/Deer-O, Glidden, and Sherwin Williams may be used when in compliance with MAG Section 106.4.

All paint materials and equipment shall be compatible in use: finish coat shall be compatible with the prime coats: prime coat shall be compatible with the surface to be coated; all tools and equipment shall be compatible with the coating applied as follows:

Exterior Metal, Ferrous:

1.	First, prime coat:	Epoxy Polyamide
2.	Second coat:	Acrylic Polyurethane (Color - Ripe Date)

Exterior Masonry

1.	First coat:	Hydropoxy Block Filler (voids of standard or slump-type smooth face CMU)
2.	Second coat:	Acrylic Hydropox #1
3.	Third coat:	Acrylic Polyurethane (Color - Desert Rose)

Colors will be identified further on the plans and shall be verified with the Engineer in the field with samples. A two foot square area surface of each finish color shall be applied to each condition, such as poles, rails, metal gates, walls, and accents areas, for each approved color. The Engineer may specify one alternate sample for each color as a part of the base bid construction cost prior to the acceptance of the final color(s) for the project. The request for alternate color samples may be requested at the time of the first sample application or after such time.

Painted surfaces, where the paint appearance or coating integrity has been damaged, during erection or the coarse of construction prior to FINAL ACCEPTANCE or PARTIAL ACCEPTANCE, shall be re-painted.

END OF SECTION

INDEX NO. SA-884163

BOND ISSUE OR BUDGET PROJECT
CITY OF PHOENIX, ARIZONA
ENGINEERING AND ARCHITECTURAL SERVICES DEPARTMENT

PROPOSAL to the City Engineer of the City of Phoenix.

In compliance with the Advertisement for Bids, by the City Engineer, the undersigned bidder:

Having examined the contract documents, site of work and being familiar with the conditions to be met, hereby submits the following proposal for furnishing the material, equipment, labor and everything necessary for the completion of the work listed and agrees to execute the contract documents and furnish the required bonds and certificates of insurance for the completion of said work, at the locations and for the prices set forth on the inside pages of this form.

Understands that construction of this project shall be in accordance with all applicable Maricopa Association of Governments' (MAG) Uniform Standard Specifications and Uniform Standard Details, latest revision and the City of Phoenix Supplements, latest revision to the MAG Uniform Standard Specifications and Details, except as otherwise required by the project plans and specifications.

Understands that his proposal shall be submitted with a proposal guarantee of cash, certified check, cashier's check or surety bond for an amount not less than ten (10) percent of the amount bid, as referenced in the Call for Bids.

Agrees that upon receipt of Notice of Award, from the City of Phoenix, he will execute the contract documents within 10 calendar days.

Work shall be completed within 365 calendar days, beginning with the day following the starting date specified in the Notice to Proceed. The time allowed for completion of the work includes lead time for obtaining the necessary materials and/or equipment and approvals.

The bidder hereby acknowledges receipt of and agrees his proposal is based on the following addenda:

_____

_____

_____

Revised October 6, 1992

ENGINEERING AND ARCHITECTURAL SERVICES DEPARTMENT - CITY OF PHOENIX

INDEX NO. SA-884163

CONSTRUCTION PROPOSAL

PAY ITEM NO.	DESCRIPTION	APPROX QUANTITY & UNIT	UNIT PRICE	AMOUNT
A1	Fill Construction	1,381,200 CY		
A2	Borrow Excavation	1,274,400 CY		
A3	Landfill Clay Cap w. On-site Calyey Material	747,400 CY		
A4	Landfill Caly Cap w. Imported Clayey material	238,100 CY		
A5	Class A Soil Cement - 750 psi	106,060 CY		
A6	Class B Soil Cement - 1,000 psi	12,410 CY		
A7	Portland Cement for Soil Cement	16,480 TON		
A8	Fly Ash for Soil Cement	3,660 TON		
A9	Routine Material Handling	50,000 CY		
A10	Special Material Handling	333,300 CY		
A11	54" Culvert Outlet - w. Salvaged Access Barrier	1 EA		
A12	60" Culvert Outlet - w. Salvaged Access Barrier	1 EA		
A13	60"/96"Double Culvert Outlet w. Flap Gates	1 EA		
A14	48" Culvert Outlet w. Flap Gate	2 EA		
A15	36" Culvert Outlet w Flap Gate	2 EA		
A16	36" RGRCP for Culvert Outlet	247 LF		
A17	48" RGRCP for Culvert Outlet	167 LF		
A18	60" RGRCP for Culvert Outlet	231 LF		
A19	Remove Existing Culvert Outlet	2 EA		
A20	Plain Riprap	780 SY		
A21	Modification of Existing Groundwater Wells	7 EA		
A22	Re-install Existing Redi-Flo2 Pump & Seal	1 EA		
A23	Install Redi-Flo2 Pump & Seal	6 EA		
A24	Chain Link Fence & Gate - Permanent	15,950 LF		
A25	Curb, Gutter & Sidewalk	250 LF		
A26	Armorflex Channel Lining	437,130 SF		
A27	Reinforced Concrete Box Culverts - Armorflex Channel Crossings, 3 Total	208 CY		
A28	24" RGRCP - Cell A Storm Drain	163 LF		

ENGINEERING AND ARCHITECTURAL SERVICES DEPARTMENT - CITY OF PHOENIX

INDEX NO. SA-884163

CONSTRUCTION PROPOSAL

PAY ITEM NO.	DESCRIPTION	APPROX QUANTITY & UNIT	UNIT PRICE	AMOUNT
A29	36" RGRCP - Cell A Storm Drain	192 LF		
A30	42" RGRCP - Cell A Storm Drain	384 LF		
A31	48" RGRCP - Cell A Storm Drain	92 LF		
A32	54" RGRCP - Cell A Storm Drain	92 LF		
A33	60" RGRCP - Cell A Storm Drain	792 LF		
A34	96" RGRCP - 15th Ave Storm Drain	1,819 LF		
A35	Catch Basin - Cell A Storm Drain	9 EA		
A36	Pressure Manhole - 15th Ave Storm Drain	4 EA		
A37	Riser - Sediment Pond	3 EA		
A38	Interior Access Road & Maintenance Road	8,310 SY		
A39	Aggregate Lined Valley Surface Drainageway	2,670 SY		
A40	HDPE Liner - Sediment Ponds & 15th Ave Storm Drains	31,330 SY		
A41	R.C. Pipe Collar	1 LS		
A42	Traffic Control	1 LS		
A43	NPDES Permit	1 LS		
SUBTOTAL AMOUNT OF BID - ITEM A1 THROUGH A43, INCLUSIVE				

_____ & _____/100 DOLLARS

WRITTEN WORDS

ENGINEERING AND ARCHITECTURAL SERVICES DEPARTMENT - CITY OF PHOENIX

INDEX NO. SA-884163

CONSTRUCTION PROPOSAL

PAY ITEM NO.	DESCRIPTION	APPROX QUANTITY & UNIT	UNIT PRICE	AMOUNT
B1	Remove Existing Flare Stations, Equipment & Structures	1 LS		
B2	Modification of Existing Gas Well Heads	32 EA		
B3	Remove Existing FRP Header Pipe from Cells A & A-1	1 LS		
B4	Install Landfill Gas Extraction Wells	79 EA		
B5	Install Gas Monitoring Probes	63 EA		
B6	Abandon Existing Wells	7 EA		
B7	Abandon Existing Probes	18 EA		
B8	Install Condensate Sumps	16 EA		
B9	HDPE Gas Collection Header & Lateral Pipes	12,500 LF		
B10	Connect Existing & New Gas Wells to Collection Header	111 EA		
B11	Flare Station Foundations - Cells A & A-1	1 LS		
B12	Install Mechanical Equipment for Cell A, except the gas Flare Assembly	1 LS		
B13	Install Gas Flare Assembly - Cell A	1 LS		
B14	Flare Station Electrical, telephone, Instrumentation & Controls, and Ancillary Equipments - Cells A & A-1	1 LS		
B15	Cell A-1 Gas Handling and Flare Assembly Skid	1 LS		
B16	Mobilization & Demobilization	1 LS		
B17	HDPE Compressed Air Line Piping	11,900 LF		
B18	HDPE Condensate Piping	11,900 LF		
B19	Cell A Air Compressor Assembly Skids (2)	1 LS		
B20	Cell A-1 Air Compressor Assembly Skids (2)	1 LS		
B21	Cell A 9,200-Gal Condensate Storage Tank, including 10,360-Gal Secondary Containment Tank, Granulated Activated Carbon Vessel and Appurtenances	1 LS		
B22	Cell A-1 1,400-Gal Condensate Storage Tank, including 2,900-Gal Secondary Containment Tank, Granulated Activated Carbon Vessel and Appurtenances	1 LS		
SUBTOTAL AMOUNT OF BID - ITEM B1 THROUGH B22, INCLUSIVE				

_____ & _____/100 DOLLARS
WRITTEN WORDS

ENGINEERING AND ARCHITECTURAL SERVICES DEPARTMENT - CITY OF PHOENIX

INDEX NO. SA-884163

CONSTRUCTION PROPOSAL

PAY ITEM NO.	DESCRIPTION	APPROX QUANTITY & UNIT	UNIT PRICE	AMOUNT
C1	Concrete Wall Foundation	204 lf		
C2	8' Architectural Masonry Fence Wall	1520 sf		
C3	3' Hollow Metal Door with Hardware	1 ea		
C4	12' Wide Metal Service Yard Gate	1 ea		
C5	Paint Fence Wall, Door, and Gate	3300 sf		
C6	Topsoil Fill Construction (asethetic @ corner Cell A Flare)	360 cy		
C7	Topsoil Fill Construction (1 foot layer Cell A/A-1)	326,796 cy		
C8	Demo Tree and Cap Irrigation	1 ea		
C9	Saguaro - 8' Tall	15 ea		
C10	Cholla	40 ea		
C11	Tree - 24" Box	16 ea		
C12	Tree - 15 Gallon with guard	74 ea		
C13	Tree - 5 Gallon, unstaked with guard	121 ea		
C14	Shrubs - 5 Gallon with guard	538 ea		
C15	Shrubs - 1 Gallon with guard	406 ea		
C16	Seeding	191 ac		
C17	6' Boulder	10 ea		
C18	Tree Well Header Repair	41 ea		
C19	1 1/2" main pipe, quick couplers and control wire	5900 lf		
C20	12 Station Controller with security enclosure	1 ea		
C21	Tree Emitter Assembly with lateral equipment	211 ea		
C22	Shrub Emitter Assembly with lateral equipment	944 ea		
C23	1-1/2" Irrigation water meter with tap	1 ea		
C24	120v non-metered Electrical Service Entry	1 ea		
C25	Backflow preventer, enclosure, testing	1 ea		
C26	Gravel finish	305,800 sf		
C27	Gravel drive finish	12,200 sf		
C28	Pressure regulator assembly and lateral pipe	25 ea		
C29	Solenoid Valve	12 ea		
SUBTOTAL AMOUNT OF BID - ITEM C1 THROUGH C29, INCLUSIVE				

_____ & _____/100 DOLLARS

WRITTEN WORDS

THIS PROPOSAL IS SUBMITTED BY _____

a corporation organized under the laws of the State of _____

a partnership consisting of _____

_____

a joint venture consisting of _____

_____

or individual trading as _____

_____

of the City of _____

Arizona Licenses _____

City of Phoenix Privilege License No. _____

FIRM _____

ADDRESS _____

CITY _____ STATE ___ ZIP CODE _____

PHONE _____ FAX _____

*BY _____
Officer and Title (signature)

_____
Officer and Title (print or type)

_____
Date

_____
WITNESS: If Contractor is an individual - (signature)

_____
ATTEST: If Contractor is Corporation or Partnership - (signature and title)

* See page I.B. - __ for section on Contractor's License.

SURETY BOND

That we,_____ as Principal, (hereinafter called the Principal) and the_____, a corporation duly organized under the laws of the State of _____, as Surety, (hereinafter called the Surety) are held and firmly bound unto the City of Phoenix as Obligee, in the sum of ten (10) percent of the total amount of the bid of Principal, submitted by him to the City of Phoenix for the work described below, for the payment of which sum, well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents and in conformance with A.R.S. #34-201.

WHEREAS, the said Principal is herewith submitting its proposal for _____
_____
_____

NOW, THEREFORE, if the City of Phoenix shall accept the proposal of the Principal and the Principal shall enter into a contract with the City of Phoenix in accordance with the terms of such proposal and give such Bonds and Certificates of Insurance as specified in the Standard Specifications with good and sufficient Surety for the faithful performance of such contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter into such contract and give such Bonds and Certificates of Insurance, if the Principal shall pay to the City of Phoenix the difference not to exceed the penalty of the bond between the amount specified in the proposal and such larger amount for which the Obligee may in good faith contract with another party to perform the work covered by the proposal, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this _____ day of _____ A.D., 19_____

_____
Principal

_____
TITLE

_____

_____
Surety

_____
WITNESS:

Revised: October 20, 1992