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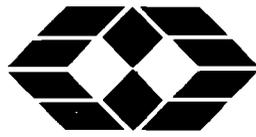
PREPARED FOR:

CITY OF PHOENIX  
ENGINEERING AND ARCHITECTURAL SERVICES DEPARTMENT  
200 WEST WASHINGTON STREET, 7<sup>TH</sup> FLOOR  
PHOENIX, ARIZONA 85003-1611



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**HEALTH AND SAFETY PLAN  
RIO SALADO PROJECT AREA  
BETWEEN 19<sup>TH</sup> AVENUE AND THE INTERSTATE 10 BRIDGE  
PHOENIX, ARIZONA**

**SA&B Job No. 99158BJ**

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**SEPTEMBER 28, 1999**

## Table of Contents

1.0	Project Background.....	1
1.1	Introduction .....	1
1.2	Site Location .....	1
1.3	Scope of Construction Activities .....	1
1.4	Site Safety Regulatory Requirements .....	1
2.0	Health and Safety-Key Personnel and Responsibilities .....	2
3.0	Hazard Analysis .....	4
3.1	Job Hazard Summary.....	4
3.2	General Safety Hazards .....	4
3.3	Chemical Hazards .....	5
	Table 1 Potential Chemical Hazards Rio Salado Project Area .....	6
3.4	Physical Hazards.....	7
3.4.1	Heavy Equipment Operations .....	7
3.4.2	Slip-Trip-Fall Hazards .....	7
3.4.3	Lifting Hazards.....	7
3.4.4	Tool and Equipment Hazards.....	8
3.4.5	Electrical Hazards .....	8
3.4.6	Open Excavations.....	8
3.4.7	Confined Spaces.....	8
3.4.8	Noise Levels .....	9
3.4.9	Weather .....	9
3.4.10	Fire and Explosion .....	10
3.4.11	Traffic Hazards.....	11
3.5	Biological Hazards.....	11
3.5.1	Hospital or Medical Waste .....	11
3.5.2	Hanta Virus .....	11
4.0	Sanitation .....	12
5.0	Training Requirements.....	12
5.1	General Workers .....	12
5.2	“Suspicious Materials” Handlers .....	13
5.3	Record of Training .....	13
6.0	Air Monitoring .....	13
6.1	Air Monitoring Procedures .....	14
6.2	Air Monitoring Decision Criteria .....	14
	Table 2 Air Monitoring Decision Criteria.....	15
6.3	Air Monitoring Equipment and Analysis .....	16
6.4	Record Keeping.....	16
7.0	Personal Protective Equipment.....	16
7.1	Minimum Level of Protection .....	17
7.1.1	Level D .....	17
7.2	Respiratory Protection .....	17



8.0	Noise Monitoring .....	17
9.0	Work Zones and Security Measures.....	18
	9.1 Work Zones .....	18
	9.2 Security Measures .....	18
10.0	Medical Surveillance .....	18
	10.1 Heat Stress Monitoring .....	19
11.0	Confined Space Entry Procedures .....	20
	11.1 Site Inspection and Air Monitoring Recommendation.....	21
	11.2 Ventilation Procedures.....	21
	11.3 Isolation Procedures .....	21
	11.4 Means of Egress.....	22
	11.5 Emergency Rescue Procedures .....	22
12.0	Emergency Response Contingency Plan .....	22
	12.1 Illness .....	22
	12.2 Serious Injury.....	23
	12.3 Fatal Accident.....	23
	12.4 Site Emergency Procedures .....	23
	12.5 Unexpected Hazards .....	24
	12.6 Fire and/or Explosion.....	24
	12.7 Chemical Release/Spill Evacuation Plan .....	25
	12.8 Natural Disaster Plan.....	26
	12.9 Equipment .....	26
	12.9.1 Field Equipment .....	26
	12.10 Communications.....	27
	12.11 Emergency Notifications .....	27
	12.12 Accident Reporting .....	27
	12.12.1 Immediately.....	27
	12.12.2 Contractor Notification Procedures.....	28
13.0	"Suspicious Material" Management .....	28

Figure 1 – Vicinity Map

Figure 2 – Rio Salado Project Area Map

Attachment A – Rio Salado Project Area Health and Safety Statement

Attachment B – Emergency Telephone Numbers

**HEALTH AND SAFETY PLAN  
RIO SALADO PROJECT AREA  
CITY OF PHOENIX  
PHOENIX, ARIZONA**

**Job No. 99158BJ**

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**1.0 PROJECT BACKGROUND**

**1.1 INTRODUCTION**

This Health and Safety Plan (HSP) sets forth the minimum health, safety, and emergency response requirements for activities involving, or potentially involving, employee exposure to Health and Safety hazards and accidents associated with the site operations at Rio Salado Project Area in Phoenix, Arizona

**1.2 SITE LOCATION**

The proposed Rio Salado Project Area (RSPA) is located along the Salt River in Phoenix, Arizona. A vicinity map is presented as Figure 1. The general project area extends from 19<sup>th</sup> Avenue on the west to the Interstate 10 bridge on the east, and consists of the river channel, extending approximately 50 feet beyond the top of the river bank. Several landfills and abandoned dumps have been identified within this area. This area may pose special hazards to workers due to previous chemical and/or debris disposal practices. Please refer to Figure 2.

**1.3 Scope of Construction Activities**

The anticipated construction activities consist of excavation, backfill, consolidation of soil and debris, demolition, water diversion, concrete reinforcement, and concrete placement.

**1.4 Site Safety Regulatory Requirements**

Work activities must comply with provision of the United States Army Corps of Engineers (USACE) Safety and Health Requirements Manual EM 385-1-1 (September, 1996), applicable Federal, State of Arizona, City of Phoenix, and local safety and occupational health laws, regulations, and policies. Where the requirements of this specification, applicable laws, criteria, ordinances, policies, regulations, and referenced documents vary, the most stringent should be followed.

## 2.0 HEALTH AND SAFETY

The Contractor is responsible for developing a site specific Health and Safety Plan for this project. The Contractor must establish Organization and Management procedures and structure to implement an effective and practical Health and Safety Program

Typically this organizational and management structure includes the following positions and functions. Please note that position title and assignment of responsibilities may vary, however, the functions must be addressed.

### Key Personnel and Responsibilities

#### Project Manager :

- Overall management of the project and subcontractors
- Project liaison with outside agencies
- Overall project safety and health management
- Carries primary stop-work authority for site activities

#### Project Engineer:

- Management of project engineering
- Management of on-site safety and health program
- Carries secondary stop-work authority for site activities
- Conduct safety orientation for all on-site contractors , subcontractors, engineers, owner(s) and visitors

#### Health and Safety Officer(s) (HSO):

- Implement the site Health and Safety Plan and monitor for compliance
- Ensure all on-site personnel have been properly trained and certified as physically fit to perform field activities
- Issues a stop-work order authorized by the Project Manager and Certified Industrial Hygienist where a safety hazard or potentially dangerous situations exists
- Selects the proper level of personal protective equipment (PPE) and ensures its use by all employees



- Regularly inspects all PPE and monitors proper maintenance and storage of PPE
- Monitor workers for signs of stressors (e.g., heat stress, cold exposure, and general fatigue)
- Conduct safety briefings and site-specific safety training
- Attend daily project construction/safety meetings and provide input on Health and Safety concerns
- Notify the Project Engineer where suspicious materials are identified on-site

**Certified Industrial Hygienist:**

- Modify and/or develop new Health and Safety procedures as required.
- Maintain medical surveillance procedures as outlined in the Contractor's site specific Health and Safety Plan.
- Authorize a stop-work order if it is determined, in consultation with the Project Manager and site HSO, that a safety hazard or potentially dangerous situations exists.
- Ensures the proper level of personal protective equipment (PPE) and clothing, and monitor its use by all on-site employees.
- Conduct on-site audits of Health and Safety procedures as outlined in Contractor's site specific Health & Safety Plan ( i.e. use, maintenance, storage of PPE, etc.)

**Project Personnel/Employees:**

All personnel who perform work activities which may result in contact with the potential hazards present at this site will have the following responsibilities:

- Read and be thoroughly familiar with all aspects of the Contractor site specific Health and Safety Plan
- Complete all assigned tasks in compliance with the Health and Safety Plan
- Notify the Safety and Health Officer of any potentially unsafe conditions
- Attend all on-site safety meeting

## 2.0 Hazard Analysis

### 2.1 Job Hazard Summary

Exposure to chemical hazards are not anticipated during routine operations performed during this job. However, during the course of excavation, potential chemical hazards may be encountered when "Suspicious Materials" are uncovered. Suspicious Materials are defined under Section 3.3 – Chemical Hazards of this plan. When "Suspicious Materials" are uncovered the worker is to immediately contact the Project Manager or Engineer and vacate and cordon off the area, if necessary. The Contractor's work in this area will be stopped and moved to an area not affected by the "suspicious materials". The City of Phoenix's Emergency Response Contractor will be notified and will manage the "Suspicious Materials." During the occasions where handling is required these operations should be considered potentially hazardous. Exposure to the general public is considered negligible due to the fact that the public's access to this site and work zone is limited.

Heavy equipment operation during excavation and handling of suspicious materials pose a risk to workers. The risk of injury from the use of heavy equipment is considered to be the most significant risk to site workers. Potential of a serious injury caused by heavy equipment will be reduced by daily safety meetings, worker awareness, and the presence of a HSO on-site.

### 2.2 General Safety Hazards

Potential safety hazards may include, but are not limited to general excavation-type hazards, such as:

- Unstable surfaces and uneven terrain
- Unstable slopes
- Noise
- Improperly operated equipment
- Unguarded machinery contact points
- Confined spaces
- Lifting heavy objects
- Fire

The contractor must address these in the Contractor's site specific Health and Safety Plan.

## 2.3 Chemical Hazards

During construction operations "suspicious materials" that present the potential for inhalation, ingestion, or skin absorption may be encountered. These materials are chemicals of unknown or uncertain hazard, which may be encountered during excavation. Through identification and separation, such materials may be classified as "Hazardous or Special Waste" (as classified by the Arizona Department of Environmental Quality – ADEQ). These materials may include industrial waste, construction debris, tires, materials contaminated by the spillage of petroleum fuel, oils or greases exceeding the ADEQ cleanup levels; and materials containing asbestos. Other possible "suspicious materials" that may be encountered during excavation include: Metals or Volatile Organic Compounds (VOC), stained sand or soil, batteries, liquids stored in containers or drums, and medical wastes or hospital wastes. Polychlorinated biphenyl's (PCB), lead associated with batteries, acids (sulfuric acid) introduced from batteries, caustic medical wastes or soil, and drums could contain volatile as well as semi-volatile compounds. Data obtained during investigative studies indicates the presence of materials that may omit organic vapors. Priority pollutant metals could also be encountered during excavation, as expected in a landfill setting. Table 1 lists the potential health hazards and Permissible Exposure Limits (PELs) associated with possible contaminants that may be encountered within the Rio Salado Project Area.

TABLE 1. POTENTIAL CHEMICAL HAZARDS RIO SALADO PROJECT AREA

CHEMICAL	PEL	PRIMARY HEALTH HAZARD
Benzene	1 ppm	May cause irritation to eyes, skin, nose & respiratory system. Can cause CNS disturbances, headache, nausea, and dizziness. Can be absorbed through the unbroken skin. Considered to be a human carcinogen.
Ethylbenzene	100 ppm	May cause irritation to the eyes, skin and mucous membranes,. Can cause headache, skin damage, dizziness, CNS disturbances, and extremely high exposures may cause coma.
Stoddard Solvent (Petroleum hydrocarbons)	500 ppm	May cause eye, throat, and nose irritation. Can cause dizziness, skin damage, and if ingested, can cause chemical pneumonias.
Arsenic	0.01 mg/m <sup>3</sup>	May cause damage to the liver, kidneys, skin, lungs, and lymphatic system.
Selenium	0.2 mg/m <sup>3</sup>	May cause damage to the eyes, skin, respiratory tract, liver, kidneys, blood, and spleen.
Chromium	0.5 mg/m <sup>3</sup>	May cause damage to the eyes, skin, and respiratory tract.
Zinc	5.0 mg/m <sup>3</sup> (Respirable Dust)	May cause damage to the respiratory system.
Cadmium	0.005 mg/m <sup>3</sup>	May cause damage to the respiratory tract, kidneys, prostate, and blood.
Lead	0.05 mg/m <sup>3</sup>	May cause damage to the eyes, GI tract, CNS, kidneys, blood, and gingival tissue.
Nickel	1.0 mg/m <sup>3</sup>	May cause damage to the nasal cavities, lungs, and skin.
Beryllium	0.002 mg/m <sup>3</sup>	May cause damage to the eyes, skin, and respiratory tract. Beryllium may cause granulomas if contacted with exposed skin.
Copper	1 mg/m <sup>3</sup>	May cause damage to the eyes, skin, respiratory tract, liver and kidneys.
Silver	0.01 mg/m <sup>3</sup>	May cause damage to the nasal septum, skin and eyes.
Naphthalene	10 ppm	May cause damage to the eyes, skin, blood, liver, kidneys and CNS.
Coal Tar Derivatives	0.2 mg/m <sup>3</sup>	May cause damage to respiratory tract, skin, bladder, and kidneys. Symptoms will vary depending upon the specific compound.
Xylene	100. ppm	May cause damage to the eyes, skin, respiratory tract, CNS, GI tract, blood, liver, and kidneys.
Toluene	200 ppm	May cause damage to the eyes, skin, respiratory tract, CNS, liver, and kidneys.
Poly-chlorinated biphenyl (PCBs)  (PCBs 1016, 1221, 1232, 1242, 1248, 1254, 1260)	0.5 mg/m <sup>3</sup>	There are no known acute toxic effects of PCB's. In general, PCB's are absorbed through the skin, with minor contributions from the lungs and GI tract. PCB's have an extremely low vapor pressure and do not present an inhalation hazard unless some physical process causes them to become airborne. Burning of PCB's produces Dioxin which is a known cancer causing agent. Long-term exposure to PCB's may cause chloracne or liver injury.
Asbestos	0.1 fibers/cc	There are no known acute toxic effects of asbestos. Chronic exposures may not show symptoms till 20 years later. May cause damage to respiratory system at extremely high concentrations.

General site workers should avoid these "suspicious materials" or areas when these materials have been identified. The City of Phoenix Emergency Response Contractor will manage these materials or areas.

## 2.4 Physical Hazards

Physical hazards are inherently present during field operation. Physical hazards present at this site may include mechanical hazards and noise exposure associated with the operation of heavy equipment, slip-trip-fall hazards associated with operation conducted in a field environment, thermal hazards, and muscular-skeletal injury hazards resulting from work performed outdoors. The contractor must address the following physical hazards in its Health and Safety plan.

### 2.4.1 Heavy Equipment Operations

The safety hazards associated with the operation of heavy equipment can be effectively eliminated by the worker if constant awareness of these hazards is maintained. Constant visual contact with the equipment operator will facilitate such awareness. Back up alarms should be functional on all heavy equipment with obstructed rear view. Where required, the equipment should be equipped with Rollover Protection (ROP's) and seat belts. Operational daily inspections should be performed on all equipment and inspections records should be maintained at the job site.

### 2.4.2 Slip-Trip-Fall Hazards

While it is difficult to prevent slip-trip-fall hazards, risk of injury can be minimized by implementing proper site control measures, such as daily safety meeting, proper footwear, by keeping the work area free of obstructions where possible, and/or marking areas with caution devices.

### 2.4.3 Lifting Hazards

Field operations often require that heavy physical labor tasks be performed. Employees should be encouraged to perform pre-work stretching exercises and follow proper lifting techniques. All employees should be instructed in proper lifting techniques during the site specific training.

#### **2.4.4 Tool and Equipment Hazards**

Safety hazards present during the use of tools and/or equipment are generally associated with improper tool handling and inadequate maintenance. Management of these hazard involve rigorous maintenance of tools and equipment and effective training of employees in the proper use of tools.

#### **2.4.5 Electrical Hazards**

Overhead power lines, downed electrical wires, and buried cables all pose danger of shock or electrocution if workers contact or sever them during construction operations. OSHA Standard 29 CFR 1910.137 describes clothing and equipment for protection against electrical hazards that may be encountered. The Contractor shall ensure that workers are properly trained and equipped for these hazards.

#### **2.4.6 Open Excavations**

Open excavations may be present during the construction and remedial actions at the project site. Excavations must be maintained in compliance with appropriate OSHA regulations for trenching and excavation (29 CFR 1925.650, 1926.651, and 1926.652). Constant employee safety awareness while working near excavating should lessen the associated hazards of excavations. All excavations on this project should be properly sloped and delineated in accordance with the OSHA regulations. Also, the Contractor should have trained "competent persons" to oversee these operations.

#### **3.4.7 Confined Spaces**

It is anticipated that confined spaces will be encountered during excavating activities. Confined space encountered are expected to be classified as "Non Permit Confined Spaces" but must be verified by pre-entry air monitoring results. The procedures outlined in Section 11- Confined Space Procedures in this plan shall be followed by all workers entering a confined space. Any worker who believes a work area could be classified as a confined space shall immediately report the condition to the Project Engineer and/or HSO. The contractor must develop specific provisions to address Confined Space Entry. They must be consistent with 29 CFR 1910.147 and 29 CFR 1926.21.

### 3.4.8 Noise Levels

Noise levels identified as exceeding 90 decibels must be addressed and when feasible reduced by means of engineering controls. These controls will include isolation, enclosure, and application of noise reduction materials. Hearing protection shall be worn at all times when noise levels are suspected of being equal to or exceeding 90 decibels (dBA). Use of portable "Walkman-type" radios are prohibited at any time on this project. When applicable, a hearing conservation programs should be implemented in accordance with OSHA standards when the daily noise exposures are at or above 85 dBA for an 8-hour day.

### 3.4.9 Weather

The weather condition is an important consideration in planning and conducting site operation in the Southwest. Extremely hot or even mildly cold weather can cause physical discomfort, loss of efficiency and personal injury. Of particular importance is heat stress.

The stress to the body due to excess heat can diminish the body's ability to function properly. Because the incidence of heat stress depends on a variety of factors, all workers should be monitored.

Hazards associated with heat stress include the following:

**Heat Cramps:** Caused by heavy sweating with inadequate electrolyte replacement. Heat cramps can cause muscle spasms and pain in the hands, feet, and abdomen.

**Heat Exhaustion:** Occurs from increased stress on various body organs and ranges from inadequate blood circulation to cardiovascular insufficiency or dehydration. Heat exhaustion is characterized by pale, cool, moist skin, heavy sweating, dizziness, nausea and fainting.

**Heat Stroke:** The most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occurs. Competent medical help must be obtained as soon as possible. Heat stroke is characterized by red, hot, unusually dry skin. Symptoms include lack of, or reduced perspiration, nausea, dizziness, confusions, and strong rapid pulse as well as coma.

A heat stress protection program should be provided in the contractors site specific Health and Safety Plan to address heat related problems. Additional guidance is presented under Section 10.1 of this plan, Heat Stress Monitoring

#### **3.4.10 Fire and Explosion**

Flammable or combustible gases or vapors may be present in the project work area. Typically, these hazards are associated with methane gas which may be found in old landfill areas. The concentration of gases or vapors in the excavation, or the work area may reach flammable (explosive) range before venting is completed and/or safe atmosphere is attained. The contractor's site specific Health and Safety Plan should contain procedures for monitoring for fire and explosion hazards, including emergency response actions. The following precautions must be taken:

- Eliminate all potential sources of ignition from the area (smoking, lighters, matches, non-spark proof equipment, etc.).
- Prevent the discharge of static electricity during venting of flammable vapors
- Minimize the accumulation of vapors at ground level, and in the excavation trenches.
- Containers with unknown quantities of unknown materials may present explosion hazard, in addition, substances in buried containers may contain toxic materials.
- All excavation and trench areas should be tested with gas monitoring instruments before conducting any welding or cutting operations.

### **3.4.11 Traffic Hazards**

Traffic control measures should be instituted to prevent hazards associate with moving equipment and hauling trucks. The Contractor's site specific Health and Safety Plan should address this concern. Daily safety briefing should review the traffic procedure for that day.

## **3.5 Biological Hazards**

Decaying refuse will support the growth of large colonies of bacteria and fungi, both anaerobic (not requiring oxygen) and aerobic. Airborne bacteria and fungi (microbes) can cause illness and long term respiratory irritation. The use of water spraying will reduce the amount of airborne dust carrying spores and bacteria, but will also augment microbial growth and colonization. To reduce the ingestion of microbial and other contaminants no food should be ingested within the project area, and prior to eating workers should wash hands and faces.

### **3.5.1 Hospital or Medical Waste**

Hospitals or medical waste may be encountered at this site. Workers who observe any materials that appear to be hospital or medical waste shall notify the Project Engineer and/or HSO immediately, all employees must avoid direct contact with these materials. Depending on the type and extend of the material present the HSO, will determine the appropriate handling procedures and personal protection equipment.

### **3.5.2 Hanta Virus**

Hanta virus-associated disease has occurred in the Southwest. Rodents are the primary reservoir host of recognized Hanta viruses. A person is thought to contract the virus by handling infected rodents, or their nests or dropping then touching their nose, mouth, or eyes. The virus may also be spread by inhaling airborne particle from urine, droppings, or saliva from infected rodents. This may happen while directly disturbing rodent nests, droppings or burrows. The first symptoms of the illness are much like the symptoms of

the flu and may include fever, feeling tired, muscle aches, cough, headache, and vomiting. To reduce the risk of Hanta virus infection avoid contact with rodents and rodent burrows or disturbing dens (such as pack rat nests). Wash hands and face before eating and drinking. When work activities create a potential for direct contact with rodents or rodent droppings, the HSO may require worker to utilize personal protective equipment.

#### **4.0 Sanitation**

An adequate supply of safe potable drinking water should be supplied by the Contractor. Drinking water should be dispensed by means that prevent contamination between the consumer and the source. A sanitary container for the paper cups and waste receptacle for the used cups should be provided. Containers for drinking water should be clearly marked as to contents and not used for other purposes.

Toilets should be provided at the job side according to USACE Safety and Health Requirements Manual EM 385-1-1 guidance. The toilet(s) should be equipped with metal, plastic or porcelain urinal trough. Provisions for routinely servicing and cleaning all toilets and disposing of the sewage should be established.

#### **5.0 Training Requirements**

##### **5.1 General Workers**

All of the contractor and subcontractor employees shall receive and be able to document training and instruction in the following areas:

- 1) General safety and health work practices, and
- 2) Specific instruction with respect to hazards unique to their job assignment;

Training of these employees shall occur:

- 1) When the project is first initiated
- 2) To all new workers to the project
- 3) To all workers given a new job assignments for which training has not previously been received,

- 4) Whenever new substances, processes, procedures, or equipment are introduced to the project and represent a new hazard, and
- 5) Whenever new or previously unrecognized or discovered materials are encountered

## 5.2 "Suspicious Material" Handlers

Additional training is required for any worker, including contractor, subcontractors, City of Phoenix personnel, Health and Safety Consultants and Emergency Response personnel who will be involved in the evaluating and/or handling of any "suspicious material". All affected employees will be required to be trained and be able to document the following:

- 40-hour general site worker HAZWOPER training as specified in 29 CFR 1910.120 (e) and/or
- 8-hour HAZWOPER refresher training as specified in 29 CFR 1910.120 (e), and, if applicable,
- Confined Space Entry Awareness training as specified in 29 CFR 1910.147 and 29 CFR 1926.21, and
- Respiratory Protection training as specified in 29 CFR 1910.134

In addition, all of these "suspicious material" handlers must have documentation for meeting the medical surveillance requirement of the referenced OSHA citations (1910.120(f) and 1910.134(e)). They must be physically capable of working on "hazardous sites" and wearing respiratory protection devices.

## 5.3 Record of Training

Upon completion of the project safety briefing, all personnel will sign a statement indicating that they have read and understand and that they agree to abide by the site specific Health and Safety Plan. A record of attendance should be kept for all safety briefings. A sample health and safety statement is presented as Attachment A.

## 6.0 Air Monitoring

The principal area of concern for air monitoring on this project are confined spaces and excavations where methane or hydrogen sulfide could accumulate.

Air monitoring for oxygen deficiency, combustible vapors, and organic vapors should be conducted as directed by the contractor's HSO. Air monitoring should be determined based on visual conditions and equipment reading encountered during excavation and disturbance of soils and type of production operations taking place (i.e. confined spaces).

## 6.1 Air Monitoring Procedures

Air monitoring should be conducted for the various potential hazards. The reading should be obtained, or samples collected in the breathing zone of the personnel using the instruments listed below for the material of concern.

### **Combustible Gases/Vapors:**

Methane is generally associated with decomposing garbage. Methane is biologically inert (no toxic affects). Methane may cause flammable/explosive atmospheres or displace oxygen. Therefore, the contractor should monitor for the presence of methane using a Multi-gas meter with direct reading Combustible Gas Indicator (CGI) capable of detecting methane and an Oxygen Monitor.

### **Hydrogen sulfide:**

Multi-gas meter having a hydrogen sulfide sensor

### **Oxygen Deficiency:**

Multi-gas meter with a Direct Reading Oxygen Monitor

### **Organic Vapors:**

Direct Reading Photo Ionization Detector (PID). Note: This instrument will not detect methane.

Direct Reading Calorimetric Detector Tubes.

TWA samples using Low Flow Sampling Pumps and activated charcoal or silica gel tubes, using OSHA or NIOSH sampling and analytical methods. Analysis should be conducted by an AIHA accredited laboratory

## 6.2 Air Monitoring Decision Criteria

The following air monitoring action levels should be used to determine the upgrade/downgrade of PPE or to discontinue work in a specific area.

TABLE 2. AIR MONITORING DECISION CRITERIA

CONTAMINANT/ HAZARD	INSTRUMENT	ACTION LEVEL	ACTION TAKEN
Oxygen Level	O2 monitor	< 19.5% Oxygen	Discontinue task. Evacuate immediate work area. Monitor in SCBA equipment. Ventilate area. Determine the cause/source and eliminate.
		≥ 19.5 % Oxygen ≤ 23.5%	Level D-Standard Work Practices.
		> 23.5%	Fire hazard, evacuate immediate work area, discontinue monitoring.
Combustible Atmosphere	Multi-gas meter, Combustible Gas Indicator	< 10% of the Lower Explosive Limit (LEL)	Level D-Standard Work Practices. Be aware that 5 and 6% LEL can be 5000 ppm of a toxic gas. PPE may still be required.
		≥ 10% of the LEL	Discontinue task. Evacuate immediate work area. Ventilate area. Determine the cause/source and eliminate.
Organic Vapors	Photo Ionization Detector (PID)	< 10 meter units (mu)	Level D-Standard Work Practices.
		≥ 10 mu for 5 minutes	Discontinue task. Upgrade to Level C PPE. Conduct sampling for laboratory analysis of specific compound(s). Determine cause/source and eliminate.
Respirable Dust	Mini-Ram	< 2.5 mg/m <sup>3</sup>	Level D-Standard Work Practices.
		≥ background plus 2.5 mg/m <sup>3</sup>	Increase water spraying of operation. If levels persist, discontinue task. Upgrade to Level C PPE. Use wet method handling techniques.
Carbon Monoxide	Multi-gas meter, CO Sensor	< 25 ppm	Level D-Standard Work Practices.
		≥ 25 ppm for 5 minutes	Discontinue task. Evacuate immediate work area. Ventilate and retest. Determine cause/source and eliminate.
Hydrogen Sulfide	Multi-gas meter, H <sub>2</sub> S Gas Sensor	< 10 ppm	Level D-Standard Work Practices.
		≥ 10ppm but <20 ppm	Discontinue task. Evacuate immediate work area. Ventilate area. Determine the cause/source and eliminate.
		≥ 20 ppm	Discontinue task. Evacuate immediate and surrounding work areas. Ventilate area. Determine the cause/source and eliminate.

### 6.3 Air Monitoring Equipment and Analysis

All air monitoring equipment should be calibrated at the beginning and end of each sampling period. Direct reading equipment should be calibrated before use with span gases provided by the manufacturer of the equipment.

Direct reading and continuous monitoring samples should be collected from the workers breathing zone (personnel samples). Area sampling may be conducted when determined by the Contractor HSO that the area sampling is appropriate based on potential hazardous conditions.

Personal breathing zone air samples collected to document employee's 8-hour TWA exposure levels should be analyzed by an American Industrial Hygienist Association (AIHA) accredited laboratory.

The Contractor HSO should determine the sampling type and frequency as the job progresses based on potential hazardous materials encountered.

### 6.4 Record Keeping

Air sampling data logs should be completed daily when sampling occurs. The logs should indicate the sampling protocol and results. Recorded results that exceed established action levels should be reported to the Project Engineer and City of Phoenix representative immediately.

Chain of custody records should be maintained for any sample that is sent to laboratory for analysis. The chain of custody should be kept with air sample data sheets and laboratory reports.

A calibration log should be maintained for each instrument. The calibration should include the date and time calibrated, type of calibration gas used, concentration of calibration gas used, span of instrument, and instrument reading.

### 7.0 Personal Protective Equipment

In order to ensure complete personal protection from physical and chemical agents, employee's may be required to wear protective equipment in various situations

## 7.1 Minimum Level of Protection

Level D should be the minimum level of protection set for general site operations.

### 7.1.1 Level D

- Level D protection is primarily a work uniform and should be selected by the HSO only under the following conditions:
  - The work to be conducted does not include potential for splashing, immersion, or accidental release of chemical substances.
  - No hazardous air contaminants have been measured or assessed.
- Level D equipment includes the following:
  - Regular work clothing
  - Hard hat
  - Work boots  
Steel toed steel shanked work boots will be used by ground crews in open refuse, concrete, or where rolling, falling, puncture hazards exist. For all other operations standard work boots are acceptable. No canvas shoes should be allowed.
  - Safety glasses, goggles, or face shield as specified by the HSO.
  - Standard leather work gloves

## 7.2 Respiratory Protection

No respiratory protection is anticipated for general site workers.

## 8.0 NOISE MONITORING

The contractor should conduct noise monitoring in areas that may exceed 85 decibels. Noise monitoring should be conducted using a sound level meter or dosimeter conforming to the American National Standards Institute (ANSI) S1.4-1983 or S1.25-1991. Whenever feasible, noise levels identified as

exceeding 90 decibels, A-weighted (dBA), should be reduced by means of engineering controls. These controls could include isolation, enclosure, and application of noise reduction materials. Hearing protection must be worn at all times by site personnel when noise levels are suspected of being equal to or exceeding 90 dBA. A hearing conservation program should be implemented in accordance with OSHA standards for noise exceeding 85 dBA.

## **9.0 Work Zones and Security Measures**

### **9.1 Work Zones**

The active work area of the Rio Salado Project Area will be considered a "Restricted Work Zone". This area will be restricted to only authorized personnel and will be designated a Level D PPE zone. When "suspicious materials" are encountered it will, either be managed in place or moved to a designated area by the COP Emergency Response Contractor. An essential measure toward reducing the migration of contaminants is to delineate the "suspicious material" area into three specific work zones. Movement of personnel and equipment must be through designated access control points. All workers entering the "contaminated" area must have fulfilled the training and medical examination criteria for "suspicious material" handling (please refer to Section 5.2). These work zones designations assume the existence of hazardous conditions at these work locations. These designated areas will then be identified as exclusion zones pending lab analytical results. Exclusion zones (EZ) and Contaminated Reduction Zones (CRZ) will be demarcated with barricade tape.

### **9.2 Security Measures**

The Contractor must develop procedures to restrict general public access to the site and their worker access to the "suspicious material" contamination area.

## **10.0 MEDICAL SURVEILLANCE**

Prior to assignment to any task requiring a level of personnel protection above Level D, personnel will submit, if requested by the project manager, evidence that they have received a medical examination within the previous twelve months which meets the requirements of 1910.120 and 1910.134

## 10.1 Heat Stress Monitoring

To aid in the prevention of heat stress, the following should be provided for personnel working at the site, if required:

- Potable Water;  
Potable water with commercial mix (such as Gatorade) can be made available, but adequate consumption of plain water, with appropriate work/break cycles is usually adequate.
- Work Schedules;  
Work/rest regimes should be developed on recommendations by the HSO and CIH in accordance to weather and site conditions.

Personnel should be instructed to look for the following initial symptoms of heat stress:

-Heat Exhaustion:

- Pale, clammy skin;
- Profuse respiration;
- Tiredness, weakness;
- Headache, dizziness (possible vomiting); and
- Possible fainting.

-Heat Cramps:

- Cramping of muscles in legs and abdomen.

-Heat Stroke:

- High body temperature; and
- Skin is characteristically hot, red, and dry (the body's sweating mechanism is blocked)

Heat stress monitoring will commence when the ambient temperature reaches 85 degrees Fahrenheit, or higher. The monitoring should consist of the following:

- Heart rate (HR) can be measured by the radial pulse during 30 seconds as early as possible in the resting period. The heart rate at the beginning of the rest period should not exceed 110 beats per minute. If the HR is in excess of the above value, the next work period should be decreased by 33% while the rest period remains the same. If the HR is in excess of 110 beats/min. at the beginning of the next rest period, the following work period will be shortened by 33%.

Control measures to prevent heat stress include:

- Adequate intake of fluids, preferably cool water
- Work/rest regimen with rest periods taken in a cool, shaded area
- Proper work clothing
- In extreme conditions, cooling vests can be worn.

The HSO should monitor worker activity and should stop employee work activity when signs of heat stress conditions warrant. The HSO may choose to use the ACGIH TLV criteria for heat stress using the Wet Bulb Globe Temperature method. Employees should report any signs and symptoms of heat stress to the HSO. During the day-to-day field work, the Project Manager, Project Engineer, and workers should be alert for the signs and symptoms of heat stresses. The HSO should monitor the ambient air temperature using a thermometer located in the Support Zone. Ambient temperatures should be checked at least three times daily; once in the morning and twice in the afternoon. The field crew members should be observed for the following signs and symptoms of heat stress: dizziness and nausea; profuse sweating; skin color change; vision problems; fainting; weakness; fatigue; cramping; and hot, red, dry skin. Any employee who exhibits these symptoms should be monitored for heat stress. Heat stress monitoring should consist of measuring heart rate and/or body temperature to prevent the onset of heat stress illness. Workers experiencing heat stress that is not relieved by rest period/work period modifications should be removed immediately from field work and be required, if conscious, to consume two to four pints of electrolyte fluid or cool water every hour while resting in a shaded area. The individual should not return to work until symptoms are no longer recognizable. If the symptoms appear critical, persist, or get worse, immediate medical attention should be sought.

## 11.0 CONFINED SPACE ENTRY PROCEDURES

Entry into a trench or excavation, poses the additional hazards associated with confined spaces. These hazards may include, but are limited to: oxygen deficiency; toxic vapors or gases; flammable gases or vapors; contact with chemicals; moving equipment within the space; slips, trips, or falls; and electric shock. The provisions of this section should apply to all site personnel, subcontractors, and site visitors.

### 11.1 Site Inspection and Air Monitoring Recommendation

1. Prior to initial entry, and after each work break, continuous ambient air monitoring for oxygen level, combustible gas level, and when appropriate, toxic gas or vapor level shall be conducted in and around the confined space.
2. The confined space or the trench or excavation must be tested prior to entry.
3. Air monitoring within the space must be conducted from the exterior of the space and must include all levels (bottom, middle, and top) of the space. Whenever possible, monitoring should also be conducted along the length of the space. The person conducting the air monitoring must be trained in the use and calibration of the testing equipment.
4. Instrumentation must be approved for uses in Class I, Division I, Groups A, B, C, and D atmospheres. It must also be calibrated immediately before and after each use.
5. If monitoring reveals levels of combustible gases or vapors at or above 10% of LEL or oxygen levels at or below 19.5% or above 24%, entry is prohibited.
6. All air monitoring results should be recorded on daily field notes.

### 11.2 Ventilation Procedures

1. Prior to and throughout confined space entry procedures the space should be ventilated. In the absence of natural ventilation, the use of mechanical air movers or blowers can be used to assure that sufficient fresh ambient air passes through the space.
2. These devices should be steam or air driven. Oxygen must never be used to ventilate the space.
3. Whenever possible, ducting shall be used to increase the efficiency of the air movement. All air moving equipment should be grounded to prevent build up of static charges.

### 11.3 Isolation Procedures

Before employees are permitted to enter a confined space, steps should be taken to prevent the accidental release of liquid, vapor, or gas into the area via piping, ducts, vents, drains, etc. All piping, duct work, etc should be effectively isolated using disconnection, blank insertion, or double blocking and bleeding of the lines.

Electrical utilities, if present, should also be locked out and tagged out prior to entry. All temporary lighting must be approved for use in Class I, Division I, Groups A, B, C, and D atmospheres, and all electrical equipment and cords should be equipped with ground fault circuit interrupters.

#### **11.4 Means of Egress**

There must be two means of egress present whenever an employee enters a confined space. The primary means is usually a ladder. The secondary means can be a full-body harness attached to a man-rated hoisting device, or it can be the standby person (discussed below) if they are properly protected against the hazards found in the space.

#### **11.5 Emergency Rescue Procedures**

All confined space entry activities should require that one person act as the standby person. The standby should be stationed outside of the space at all times when employees are in the space and shall be prepared to provide emergency assistance.

### **12.0 EMERGENCY RESPONSE CONTINGENCY PLAN**

There is always a possibility that personnel may unexpectedly encounter an emergency situation when working in the field or at the office. The following procedures should be incorporated into the Contractor site specific Health and Safety Plan. In the event of an emergency, the following general procedures should be initiated. Emergency telephone numbers should be listed in site specific Health and Safety Plan.

#### **12.1 Illness**

1. Contact qualified first aid personnel and;
2. Notify Supervisor, Project Manager, and/or Project Engineer.

## 12.2 Serious Injury

1. Notify Supervisor, Project Manager, and/or Project Engineer;
2. Supervisor should call an ambulance if life threatening, or if non-life threatening Project Manager or Project Engineer should call a hospital or physician and transport as soon as possible;
3. Assist first aid and ambulance personnel as directed;
4. Complete appropriate accident information report and witness statements; and notify the HSO or his designee.

## 12.3 Fatal Accident

1. Notify Supervisor, Project Manager, and/or Project Engineer ;
2. Supervisor should call an ambulance if life threatening, or if non-life threatening Project Manager or Project Engineer should call a hospital or physician and transport as soon as possible;
3. Assist first aid and ambulance personnel as directed;
4. Complete appropriate accident information report and witness statements; and notify the HSO or his designee.
5. Notify the appropriate City of Phoenix representative and Arizona Division of Occupational Safety and Health as soon as possible at (602) 542-5795.
6. Collect copies of all reports and submit to Project Manger.

## 12.4 Site Emergency Procedures

In the event of an emergency that necessitates an evacuation of the site, the contractor should initiate an alarm procedures. It should include the following:

1. Equipment and/or portable air horns should be used to alert all site personnel of an evacuation emergency. The Contractor should develop specific procedures to notify all site personnel to exit the site and gather at the predetermined staging area(s). A head count should be completed by the Project Engineer at the meeting place and further directions or response discussions coordinated at that point.

2. In the event that a site wide evacuation is necessary, radio communication should be used to alert the employees to evacuate the site.

Following an Emergency Alarm signal, access to the site and immediate vicinity of the incident should be restricted. Depending upon the severity and location of the incident, physical barriers or banner guards should be used to delineate restricted areas. Site Control should be the responsibility of the Project Manager or Project Engineer who should establish the new work boundaries if necessary. Future entry into restricted areas will require permission from the Project Manager.

## 12.5 Unexpected Hazards

If there is any doubt regarding the degree of hazard of a particular circumstance and personnel are unsure as to what measures to take or what protective equipment to utilize, the following steps should be written into the site specific Health and Safety Plan.

1. Stop Work Immediately - Personnel should remove themselves from the hazard or suspected hazard area.
2. Contact HSO - Personnel should immediately inform their supervisor regarding the situation.
3. Contact the Contractor's Director of Health and Safety or equivalent. Be prepared to give all details of the situation and instructions on how the appropriate representative can contact those involved at the site.

Following these actions, personnel should be given proper direction on how to proceed. By simply removing personnel from the hazard and maintaining good communication, many accidents can be avoided. If there is any doubt about the safety of employees in a particular circumstance, this course of action should be initiated.

## 12.6 Fire and/or Explosion

If a fire or explosion occurs on-site, the following steps should be taken:

1. If the fire is small and manageable, appropriate fire extinguishers should be utilized by properly trained personnel to control the situation.
2. If the fire is beyond control or there is a potential for explosion, all personnel should immediately evacuate the site.

3. Emergency fire department personnel should be contacted immediately. If the fire involves hazardous chemicals, the City of Phoenix Emergency Response Contractor must be informed of such: (Fire Department Call 911).
4. As soon as practical, the appropriate supervisor should be contacted and briefed.
5. The HSO will direct personnel to immediately secure any items from the fire.
6. The HSO shall assist the fire department as necessary in securing the fire or determining the cause.
7. The fire will be reported to all applicable authorities.
8. Necessary arrangements with doctors, fire protection, medical facilities, and emergency transportation should be identified and their respective telephone numbers posted on the job site at conspicuous locations.
9. A telephone should be accessible to all employees in case of an emergency.

#### **12.7 Chemical Release/Spill Evacuation Plan**

In the event that there is an accidental spill, release, discharge, etc., of toxic or hazardous liquid, gas vapor, dust, or mist within the area, the following actions should be taken:

1. Personnel in the immediate area of the incident should quickly assess the degree of danger and contact the HSO or Project Manager.
2. If possible, without danger to the employee, the source of the release should be stopped (i.e., right or plug the drum, etc.). Contact the HSO or Project Manager.
3. If possible, without danger to the employee, immediately eliminate all flames or other possible sources of ignition.
4. If the spill is small and controllable, personnel trained in spill clean up should contain or remediate the problem using proper spill clean up and personal protective equipment. Personnel in areas surrounding the spill may have to be evacuated until clean up is complete.
5. If the spill represents an imminent hazard to all personnel (potential explosion, acid gas release, etc.), or if it is suspected to be a dangerous situation to all personnel, notify the proper authorities (fire department 911) as soon as possible regarding the emergency.
6. All personnel in the area should be instructed to evacuate in an orderly fashion. Upon exiting, personnel should move away from the area to allow all occupants to safely exit and to be clear of arriving emergency vehicles. If practical evacuation should be conducted upwind.
7. At the earliest possible convenience, the Manager must be notified regarding any major chemical release.

## 12.8 Natural Disaster Plan

1. In the event that a weather related or other natural disaster occurs, all employees should be notified immediately. The announcement should alert employees regarding the potential situation.
2. Employees should monitor local radio reports and should immediately notify nearby employees if funnel clouds or other disaster indicators have been sighted in areas near the site.
3. All building (such as a trailer) occupants should take the following precautionary measures:
  - Move inside a building in case of weather disasters (tornado, severe thunderstorms, etc.).
  - Move away from windows and glass doors.
  - Shut off gases valves, heat sources, open flames, etc.
  - Move to interior rooms or hallways.If a tomado strikes a building, seek immediate shelter under a sturdy structure (i.e., desk, countertop, door frame).

## 12.9 Equipment

To properly handle emergency situations, the Contractor should have the following pieces of emergency equipment available if the situation warrants.

### 12.9.1 Field Equipment

1. First Aid Kits - Well stocked first-aid kits must be maintained in all of the Contractor's field vehicles. Additional kits may be necessary at various locations on the project site.
2. Fire Extinguishers - An A, B, C-rated fire extinguisher should be maintained in each of the Contractor's field vehicle. More than one extinguisher may be desirable in situations with a high potential for fire.
3. Eye Wash/Emergency Shower - A portable eye wash and emergency shower should be maintained on-sites where workers may physically contact corrosives or other eye and skin irritants.

## 12.10 Communications

Proper communications channels should be maintained in all phases of the project to insure adequate capability to report and respond to any emergency situations/risks encountered. In addition to the telephone communications in the Contractor's trailer, the following communications equipment should be available and properly maintained:

1. Two-way walkie-talkies or mobile radios to provide communications between Contractor crews
2. One portable cellular telephone that can be in the possession of the HSO/Project Engineer or one of the Contractor crews on the job site.
3. Between the walkie-talkies/mobile radios and the cellular telephone, communication should be possible between all crews and on-site and off-site sources.

## 12.11 Emergency Notifications

The site specific Health and Safety Plan should contain a listing of all phone numbers for emergency contacts. This would include business phone numbers for police, fire and ambulance services plus information on hospital(s), Project Manager, Project Engineer, and Health and Safety Officer including business address, main and emergency phone numbers, and any applicable pager or cell phone numbers. The City of Phoenix Engineering representative should also be included. Please refer to Attachment B for a sample listing.

## 12.12 Accident Reporting

### 12.12.1 Immediately

In the event of an accident or incident or a reportable quantity of a hazardous material or hazardous substance, the following should be contacted immediately:

1. HSO
2. Project Manager
3. City of Phoenix Engineer

## 12.12.2 Contractor Notification Procedures

The Contractor's internal notification procedures should be described in this section.

### 13.0 "SUSPICIOUS MATERIAL" MANAGEMENT

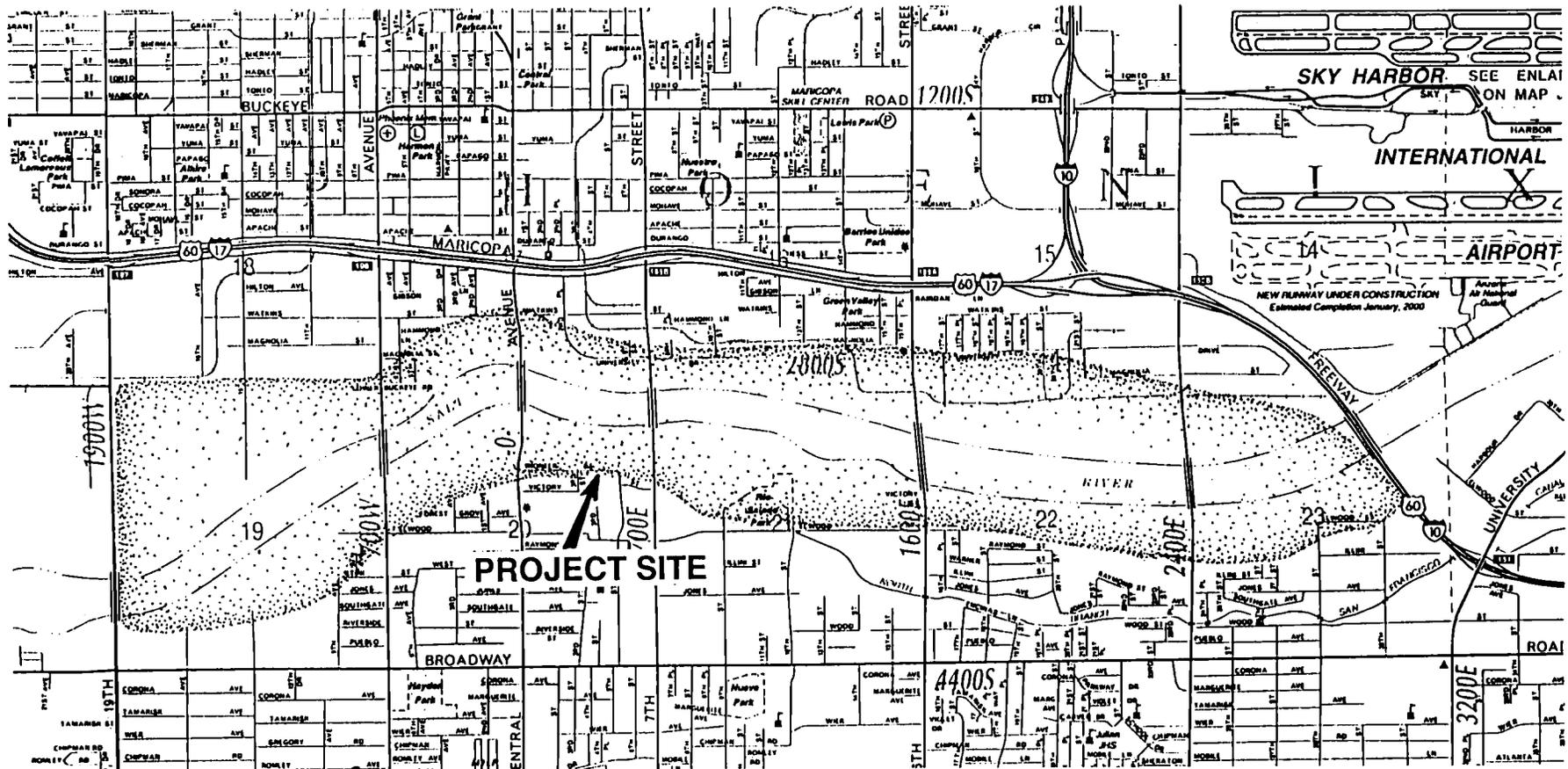
As previously stated "suspicious materials" encountered during the project may be either "special" or "hazardous" as defined by ADEQ. Employees who encounter the following materials listed below should notify the Project Engineer and/or HSO. Suspicious materials should either be left in place until the Project Engineer and CIH can determine the disposition of the waste.

- casting sands and foundry slag
- electrical transformers
- containers, tubs and drums
- stained sand
- batteries
- liquids stored in containers and drums
- medical and/or hospital wastes
- asbestos-containing materials
- materials that cause abnormal readings in field environmental monitoring instruments

As previously mentioned, the City of Phoenix Emergency Response Contractor will manage any "suspicious materials" or areas.

Job No. 99158BJ

# Figure 1 Vicinity Map Rio Salado Project Area, Phoenix AZ



Base Map © Copyright 1999, Wide World of Maps, Inc.



**Environmental & Chemical Consultants**  
Providing Practical Environmental Solutions

3001 W. Indian School Rd., Ste. 312  
Phoenix, Arizona 85017  
(602) 263-0045

Date \_\_\_\_\_

Checked By \_\_\_\_\_

Date \_\_\_\_\_

Prepared By \_\_\_\_\_

19th Avenue

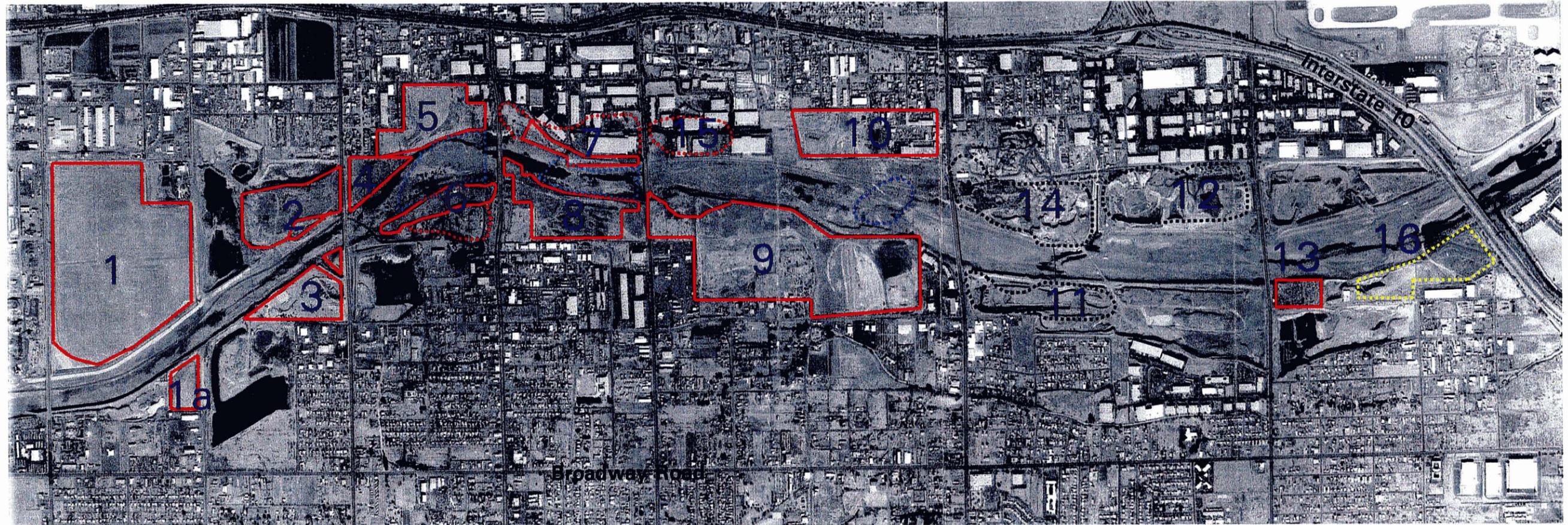
7th Avenue

Central Avenue

7th Street

16th Street

24th Street

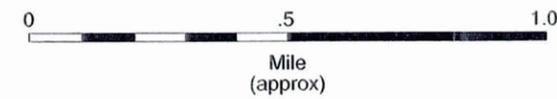


- ▭ Landfill or unknown fill area
- ▭ Landfill or unknown fill area, extent or presence uncertain
- ▭ Known inert material
- ▭ Former fill area removed by excavation
- ▭ Proposed exploratory excavation area within river channel

NOTE: Original figure created by SCS Engineers

Figure 2

### Rio Salado Project Area



**Environmental & Chemical Consultants**  
*Providing Practical Environmental Solutions*

3001 W. Indian School Rd., Ste. 312  
 Phoenix, Arizona 85017  
 (602) 263-0045



## Emergency Telephone Numbers

The Contractor should fill in the appropriate contact, phone numbers and other pertinent information in the site specific Health and Safety Plan.

Fire	Emergency 911
Police	Emergency 911
Ambulance	Emergency 911
Phoenix Memorial Hospital	(602) 258-5111
Emergency Response Contractor (Safety Kleen)	(602) 258-6155
Centers For Disease Control	Day (404) 329-3311 Night (404) 329-2888
National Response Center	1(800) 424-8802
Superfund/RCRA Hotline	1(800) 424-9346

### NAME/TITLE

### PHONE

Project Manager -  
Project Engineer -  
HSO -  
HSO -  
CIH-  
City of Phoenix Contact  
Additional Contractor Support