

- ix. Type, name, and amount of admixtures used
- x. Amount and type of cement
- xi. Total water content
- xii. Water added by receiver of concrete with his or her signature initials

#### **4.2.3 Concrete Reinforcing Steel**

##### **a. Shop Drawing**

Contractor shall submit shop drawings detailing reinforcement placement to the County for review and approval prior to commencement of work.

##### **b. Mill Certificate**

The Contractor shall provide mill certificates to the County for approval prior to delivery of material to the job site.

#### **4.2.4 Conduits**

The Contractor shall submit the manufacturer's product data for conduit, stub-ups, floor seals, fittings, plugs and bends.

#### **4.2.5 Concrete curing compounds**

The Contractor shall submit the manufacturer's product data and installation instructions.

### **4.3 MATERIALS**

#### **4.3.1 Structural Concrete**

Concrete materials shall be of primary quality and of domestic manufacture and shall conform to Section 201, "Concrete, Mortar and Related Materials" requirements of the Standard Specifications.

##### **a. Portland Cement**

Portland cement shall conform to ASTM-C150-89, "Specification for Portland Cement" requirements, Type II and Type V for foundations and shall also meet the requirements of Section 201-1.2.1, "Portland Cement" of the standard specifications.

##### **b. Coarse Aggregate**

Concrete coarse aggregate shall conform to ASTM-C33-86, "Specification for Concrete Aggregates" requirements, and also meet the requirements of Section 201-1.2.2, "Aggregates" of the standard specifications, or nonconforming aggregate which by test or actual service produces concrete of required strength and conforms to local governing codes. Aggregates shall be uniformly graded and conform to ASTM C-131 Test Grading C.

c. Fine Aggregates

Fine aggregates shall conform to ASTM-C33-86, "Specification for Concrete Aggregates" requirements, and also meet the requirements of Section 200-1.5.3, "Sand for Portland Cement Concrete" of the Standard Specifications.

d. Admixtures

The Contractor shall not use calcium chloride or fly ash and related materials. The County does not require admixtures; however, if the Contractor proposes admixtures, they shall conform to SIKA Chemical Corp.'s "Plastiment", or approved equal, and shall be applied in accordance with manufacturer's directions and also conform to Section 201-1.2.4, "Chemical Admixtures" requirements of the standard specifications. Any Admixture proposal shall be approved by the County. Upon review of any proposed admixture, the County may accept or reject any proposal.

e. Water

Water shall be clean, clear, and free from strong acid, alkali, oil or organic matter and conform to Section 201-1.2.3, "Water" of the standard specifications.

f. Compressive Strength

The compressive strength shall be as specified in the final structural report for the PEMB foundation and floor. Unless otherwise specified in the structural report, concrete classification shall be Class 560-C-3250 and shall be placed in conformance with Part 3, Section 303-1 of the Standard Specifications.

#### 4.3.2 Forms

Forms shall be in accordance with sub-section 303-1.3 and 303-1.4 of the Standard Specifications and as specified below:

- a. Wood shall be "construction grade" Douglas fir.
- b. Plywood for forming of concrete, which is exposed, shall be Plyform. All plywood used for forming shall be at least 5/8 -inch thick and edge sealed.
- c. Forming material shall be compatible with concrete finish requirements.

#### 4.3.3 Expansion Joints

Expansion joint filler shall conform to ASTM-D1751 (Pre-molded joint filler) requirements and shall also conform to Section 201-3, "Expansion Joint Filler and Joint Sealants" requirements of the Standard Specifications.

#### 4.3.4 Reinforcement

Reinforcing steel shall conform to ASTM-A15 and ASTM-A305 requirements and also conform to Section 201-2.2.1, "Reinforcing Steel" requirements of the

Standard Specifications. Reinforcing steel shall be Grade 60 and have identification inscriptions and also conform to ASTM A 615-89, "Specification for Deformed & Plain Billet-Steel Bars for Concrete Reinforcement" requirements. Reinforcing steel shall be free of rust, scale, or other bond-reducing coatings.

#### 4.3.5 Patching

If patching is necessary and permissible, a bonding agent such as Weld-Crete as manufactured by Larsen Products, or approved equal, shall be used.

#### 4.3.6 Curing Compound

Concrete curing compound shall be Type 1-D – Clear or translucent with fugitive dye and shall conform to Section 201-4.1, "Membrane Curing Compounds" requirements of the Standard Specifications.

#### 4.3.7 Conduits

Stub-ups and sweeps/bends shall be galvanized rigid steel wrapped with 33 mil tape. Plugs (Appleton, Crouse-Hinds, or equal) shall be recessed type and installed at open ends of conduits. Schedule 40 PVC conduit and fittings shall be as manufactured by Carlon or approved equal. Galvanized rigid steel fittings shall be as manufactured by Republic, Allied, or approved equal.

### 4.4 EXECUTION

All reinforced concrete work for the relocated PEMB foundation and floor slab shall be installed in accordance with the following sections.

#### 4.4.1 Structural Concrete

##### a. Subgrade

Subgrade for the PEMB foundation and slab shall be prepared as required in Section 3, "Earthwork."

##### b. Reinforcement Steel

Placement of reinforcing steel shall conform to Section 303-1.7 of the Standard Specifications.

##### c. Mix Design

The Contractor assumes responsibility for the design mix and guarantees the specified ultimate strength as indicated or specified herein. The concrete quality, proportions, consistency, etc., is subject to the approval of County, and no changes shall be made without prior written approval. The proportions of aggregate to cement shall provide a dense mixture which will readily work into all corners of the forms and around all reinforcements without any segregation of the materials, cause excess free water to collect on the surface, or cause excessive bleeding of the forms.

The recommended practices of the American Concrete Institute (ACI) shall be followed in all applicable procedures. Concrete, minimum 28-day ultimate strength shall be as specified in these Special Provisions or as specified by the design engineer and ready-mixed concrete shall conform to ASTM-C94. The maximum slump shall not exceed (4") four inches for footings, slabs on grade.

d. Mixing and Transporting

Concrete mixing shall conform to Section 201-1.4, "Mixing" requirements of the Standard Specifications.

Mixer shall be an approved AGC Type or ready-mix equipment conforming to requirements of ASTM C 94-89b, "Specification for Ready-Mixed Concrete". All materials shall be accurately and separately weighted and mixing shall continue until the distribution of material is uniform and the mass of concrete is homogeneous.

Transit Mixers shall conform to Section 201-1.4.3, "Transit Mixers" requirements of the Standard Specifications.

The concrete mix shall avoid use of excessive water. Two and one-half (2 1/2) gallons of water per cubic yard, shall be withheld from the mix at the plant, and all or a portion may be added to the mix at the job site as directed by the County. The concrete shall be mixed at least 5 minutes after such water is added and not less than 3 minutes of this time shall be immediately prior to the discharge of the batch. Total mixing time after adding original water shall be at least 15 minutes. If water is added by the transporter or on the job, the specified slump shall not be exceeded.

Each and every concrete load ticket shall be delivered to the County by truck drivers at the point of delivery.

e. Conveying and Placing

Concrete shall be conveyed, deposited, and consolidated as required by Section 303-1.8 "Placing Concrete" of the Standard Specifications. Concrete which is not placed within 90 minutes after the introduction of cement and water, and concrete which has stood for 30 minutes after leaving the mixer, shall not be used.

f. Concrete Washout Area

The Contractor shall provide a temporary concrete washout area at a location approved by the County within the project limits. A designated area for the temporary cleanout washout area is shown on the Project Drawings and shall be used by all concrete delivery trucks. In addition, any miscellaneous concrete debris shall be cleaned up by the Contractor and deposited in the designated temporary concrete washout area. The concrete washout area shall conform to BMP detail WM-8, "Concrete Waste Management" as shown in Appendix A of these Contract Documents.

#### **4.4.2 Sequencing and Scheduling**

The Contractor shall allow County to verify locations, grades, installation of embedded concrete components, and shall notify the County at least two (2) working days prior to the construction of the PEMB foundation and slab.

#### **4.4.3 Forms**

Forms shall be constructed in accordance with Section 303-1.3, "Forms" and Section 303-1.4, "Removal of Forms" requirements of the Standard Specifications, the Project Drawing shapes, lines, dimensions and tolerances, and these special provisions.

Prior to pouring, concrete form work shall be inspected for, but not limited to various embedded structural concrete components:

- a. formwork locations, lines, and grades
- b. reinforcing steel
- c. metal building anchors and bolts
- d. conduits and other accessories to be installed in concrete work as required prior to being embedded by concrete pouring.

Forms shall be placed firm and sufficiently tight to prevent leakage.

The Contractor shall make proper form adjustments before, during, and after concreting to meet the project requirements.

If temperature is below 50 degrees Fahrenheit or if concrete depends on the forms for structural support, the Contractor shall leave forms intact for sufficient period for concrete to reach adequate strength.

#### **4.4.4 Expansion Joints and Control Joints**

Placement of expansion joints shall be as directed and determined by layouts of slab markings noted on the design drawings and as required in Section 201-3, "Expansion Joint Filler and Joint Sealants" of the Standard Specifications. Expansion joint material shall be Poly Foam, or approved equal. Expansion joints shall be recessed one-quarter inch from finish surface and sealed with a bead of grey Thiokol sealant or equal. Silica sand to match concrete color shall then be tamped into Thiokol bead.

Control joints and other edges shall be formed in fresh concrete using a clean edging or jointing tool to provide a smooth uniform finish.

#### **4.4.5 Reinforcement**

Reinforcing steel installation shall conform to Section 303-1.7, "Placing Reinforcement" requirements of the Standard Specifications, according to latest edition of ACI "Manual of Standard Practice for Detailing Reinforced Concrete Structures," as shown on the design drawings as submitted by the Contractor and approved by the County and Facilities.

#### **4.4.6 Special Requirements**

a. Slabs

Dusting with cement is not permitted.

For continuous pours, saw cut groove one inch deep at 20 foot spaced grid before shrinkage occurs.

b. Anchor bolts and plates

The Contractor shall grout solidly and shall leave no voids.

#### **4.4.7 Conduits**

Conduits shall be installed 6-inches apart horizontally and located as shown on the Project Drawings or as otherwise directed by the County. Conduits shall be terminated in a County supplied utility vault, at a minimum of 5-feet outside of the building foundation. Contractor shall provide floor seal to completely seal area around conduit that passes through the floor and provide stub-ups with coupling installed flush with the floor. Stub-ups and sweeps/bends shall be galvanized rigid steel wrapped with 33 mil tape. Plugs (Appleton, Crouse-Hinds, or equal) shall be recessed type and installed at open ends of conduits. All conduits that penetrate the gas membrane shall be sealed per membrane manufacturer's recommendations.

#### **4.4.8 Curing Compound**

All concrete shall be cured after the completion of the specified finishing operations and as soon as the condition of the concrete will permit without damaging the concrete. All exposed surfaces of concrete shall be protected from premature drying and freshly placed concrete shall be protected against wash by rain.

All exposed surface of concrete shall be cured by application of curing compound as required by Section 201-4.1, "Membrane Curing Compound" of the Standard Specifications and the manufacturer's recommendations and application instructions.

All concrete shall be kept wet for a period of ten (10) calendar days after placing.

#### **4.4.9 Concrete Finishes**

Surface Finishes shall conform to Section 303-1.9, "Surface Finishes" requirements of the Standard Specification and these special provisions:

a. Rough

Top of buried footings

b. Rubbed Finish

Exposed foundation walls:

After removing forms, remove joints, marks, bellies, projections, loose materials, and cut back metal ties from surfaces to be exposed.

Fill up voids with cement mortar, 1:2 mix, and rub exposed surface with carborundum to smooth, even surface.

c. Steel Trowel Finishes

Interior flatwork:

Float and steel trowel interior slabs after concrete has set enough to avoid bringing water and fines to surface.

If power troweling is used, get approval of finish from County.

#### 4.4.10 Concrete Tolerances

ACI Standards shall govern concrete work except where specified differently.

Allowable Tolerances:

- a. Variation from plumb:
  - 0 to 10 feet - 1/4" maximum
  - 20 feet or more - 3/8" maximum
- b. Variation in thickness:
  - 1/4" to 1/2" standard, 5% for footings
- c. Variation in grade:
  - 0 to 10 feet - 1/4" standard, 1/8" for floor slabs
  - 10 to 20 feet - 3/8" standard, 1/4" for floor slabs
  - 40 feet or more - 3/4" standard, 3/8" for floor slabs
- d. Variation in plan:
  - 0 to 20 feet - 1/2"
  - 40 feet or more - 3/4" standard, plus 1/2" for footings.
- e. Variation in eccentricity
  - 2% for footings
- f. Variation in openings:
  - Size - plus 1/8"
  - Location - 1/4"

#### 4.4.11 Clean up

Upon completion of all concrete work and before final acceptance, Contractor shall remove all tools, surplus materials, apparatus, debris, etc., from the site and the site shall be left in a clean, neat, and acceptable condition to the County. Hardened concrete material accumulated in the designated washout area for this

project shall be disposed of by the Contractor, using a "no charge" account, at the Lamb Canyon Landfill site. The Contractor shall haul this material through the fee-booth/scale and unload it in an area within the landfill unit designated for construction and demolition debris recycling.

#### **4.4.12 Defective Concrete**

Concrete that is not in accordance with these specifications, out of line, level, or plumb; showing structural cracks, rock pockets, voids, spalls, honeycombing, exposed reinforcing or other damaged surfaces shall be considered as defective concrete. Non repairable defective concrete shall be removed and replaced at the Contractor's expense.

All fines and irregularities shall be removed from exposed concrete surfaces while the concrete is still green. Where patching is required, all loose and uniform concrete shall be removed prior to patching.

#### **4.5 TESTING**

As deemed necessary by the County, sets of four (4) test cylinders of concrete being placed will be cast by the County and/or Material Testing Firm and tested for compressive strength at a certified testing laboratory. One of the test cylinders shall be tested at 7 days for 70 percent of project-specified design strength. The remaining three cylinders will be tested after 14 days, 21 days and 28 days (for full strength) respectively. Contractor shall not be permitted to start installation of the PEMB on the foundation/floor slab until the compressive strength test results have become available and show the specified design strength has been achieved.

#### **4.6 MEASUREMENT AND PAYMENT**

The design and construction of the reinforced concrete structures shall be in accordance with this section and the contract documents.

Limits for measurement of the PEMB foundation and floor slab shall be to the thickness, dimensions, lines and grades as shown on the Project Drawings and specified in the final structural report. No payment shall be made for any concrete placed outside the structure dimensions and limits as shown on the Project Drawings.

##### **4.6.1 Design of PEMB Reinforced Concrete Foundation and Floor Slab**

Measurement and payment for the design of the PEMB reinforced concrete foundation and floor slab system shall be based upon the *lump sum* amount as stated in the Contractor's Proposal, *Bid Item No. 4 - "Prepare Structural Analysis Report for PEMB Reassembly at Lamb Canyon including Design of Reinforced Concrete Foundation and Floor Slab"*. Payments shall constitute full compensation (less retention) for all labor, material, design, and report preparation, by a licensed structural engineer, and submittal of design calculations, drawings, and applicable specifications for the PEMB foundation and floor slab, and all other items necessary and incidental to completion of this item of work. For progress payments, 50% payment (less retention) shall be



made upon initial submittal to the County for review and 50% payment (less retention) shall be made upon approval and issuance of permits by Facilities.

**4.6.2 Construction of PEMB Reinforced Concrete Foundation and Floor Slab**

Measurement and payment for the construction of the PEMB reinforced concrete foundation and floor slab system shall be based upon the *lump sum* amount as stated in the Contractor's Proposal, *Bid Item No.6 – "Prepare Subgrade and Construct Reinforced Concrete Foundation and Floor Slab for PEMB"*. Payments shall constitute full compensation (less retention) for all labor, material, tools, equipment, conduits, and all other items necessary and incidental to completion of this item of work.

END OF SECTION 4

## SECTION 5 - LANDFILL GAS INTERCEPTION SYSTEM

### 5.1 GENERAL

The work in this section shall include furnishing all labor, supervision, tools, equipment, and materials necessary to install a gas interception system under the relocated PEMB foundation. The intent of these specifications is to provide an airtight gas barrier, gas collection and venting system at the completion of the work. Major components of the gas interception system shall include, but not limited to the following:

- A. Gas membrane constructed of 60-mil High-Density Polyethylene (HDPE) dry film or County approved alternative gas barrier design
- B. Sixteen (16) oz/sy geotextile placed above the gas membrane
- C. Two 12-inch x 12-inch gas interceptor gravel trenches with 4-inch slotted HDPE gas collection pipes or County approved alternative gas collection design. Trenches shall be wrapped with 16 oz/sy geotextile and 4" PVC (schedule 80) vent riser pipes shall be connected to the PEMB structure to vent gas collected from the interceptor trenches to at least two (2) feet above the roof structure and at least ten (10) feet away from any window or air intake into building.

The Contractor may submit an alternative gas membrane design using dry film and/or fluid applied lining systems as manufactured by Cetco Remediation Technologies (Liquid Boot), Land Science Technologies (Geo-Seal), Tremco Barrier Solutions (Vapor Lock-m), or approved equal as subject to County approval. If an alternative fluid applied membrane system is proposed, it must consist of 100—mil thick material. In addition, the Contractor may submit an alternative gas collection design, using trenchless technologies as manufactured by Cetco Remediation Technologies (GeoVent), Land Science Technologies (Vapor-Vent), or approved equal as subject to County approval.

### 5.2 SUBMITTALS

Unless stated otherwise, the Contractor shall submit for approval to the County, and/or manufacturers' specifications, samples, installation drawings, certifications and material design at least two (2) weeks before they are scheduled to be integrated into the project.

- A. Prior to shipment of materials, the Contractor shall furnish the following:
  - i. Manufacturer's Quality Assurance/Quality Control (QA/QC) certifications to verify that the supplied materials for the project are in accordance with the requirements of these Contract Documents. This will include the results of actual QA/QC testing on representative rolls of HDPE membrane and geotextile from the project shipment. Testing shall include results for index flux tests in accordance with ASTM D5887.
  - ii. The Contractor shall submit certified results of sieve analysis on the proposed gravel material to the County for approval. Tests must have been completed within ninety (90) calendar days preceding the date of submittal

and certified by an independent laboratory by a California Registered Civil Engineer.

- iii. The Contractor shall submit the manufacturer's product data and installation instructions for HDPE pipe, PVC pipe, membrane penetrations, HDPE to stainless steel transition fitting, turbine ventilator, pipe fittings, and connector/bracket hardware for securing vent riser pipes to the PEMB.

B. Prior to the start of work, the Contractor shall submit the following:

- i. Contractor shall submit manufacturer installation procedures and drawings (using AutoCAD or equivalent software applications) for gas membrane including, but not limited to: panel layout, location of field seams, seaming method, and pipe penetration details.
- ii. Contractor shall submit six (6) 8-inch x 10-inch representative samples of gas membrane and geotextile.
- iii. The Contractor shall submit a complete description of welding procedures for making field welds, repairs, and pipe penetrations to gas membrane.

### 5.3 MATERIALS

#### 5.3.1 Gas Membrane

Gas membrane shall be 60-mil thick smooth, dry film HDPE as manufactured by GSE, Poly-flex, Cetco, Agru America, or approved equal.

HDPE membrane shall meet or exceed the following Minimum Average Roll Values (MARV):

Property	Unit	Test Method	Value
			60-mil
Thickness MAV	Mils	ASTM D 5994	60
Minimum thickness (lowest individual for any of 10 values)	mils	ASTM D 5994	54
Density	g/cm <sup>3</sup>	ASTM D1505	0.94 min.
Tensile Strength at Yield	ppi	ASTM D638 TYPE IV Specimen 2 ipm	126
Elongation at Break	%	ASTM D638 TYPE IV Specimen 2 ipm	≥ 150
Elongation at Yield	%	ASTM D638 TYPE IV Specimen 2 ipm	≥ 12
Tear Resistance	lbs	ASTM D1004	42

Property	Unit	Test Method	Value
			60-mil
		Die C	
Stress Crack Resistance	Hours	ASTM D5397	200
Carbon Black Content	%	ASTM D1603	2 to 3
Puncture Resistance	lbs	ASTM D4833	90

Resin for the membrane shall be virgin, first quality high density polyethylene (HDPE) resin produced in North America and compounded and manufactured specifically for the purpose of producing HDPE membranes. There shall be no intermixing with other resin types. Reclaimed polymer shall not be added to the membrane resin.

HDPE resin shall meet the following minimum specifications:

Test	Test Method	Unit	Requirements
Density*	ASTM D1505	g/cc	0.94 minimum
Melt Flow Index	ASTM D1238 Condition E	g/10 min	<1.0

\*Base resin density without carbon black added.

### 5.3.2 Geotextile

The geotextile material shall be a new, high quality product designed and manufactured specifically for the purposes of this project. Its suitability and durability for this type of work shall have been adequately demonstrated by prior applications. The geotextile shall be 100 percent polyester or polypropylene, needle-punched, and non-woven. Geotextile rolls shall be shipped and stored in opaque and watertight wrappings. The geotextile fabric installation shall be performed under the ongoing observation of the County, and according to the Contract Documents. The Contractor shall be responsible for detecting and repairing all damaged areas.

The manufacturer's certification shall demonstrate that the geotextile meets or exceeds the following Minimum Average Roll Values MARV (in the weakest principal Direction):

Property	Unit	Test Method	Value
Mass per unit Area	oz/sy	ASTM D5261	16
Apparent Opening Size	US Std. Sieve	ASTM D4751	70-140

Property	Unit	Test Method	Value 16 oz.
Permittivity	sec <sup>-1</sup>	ASTM D4491	0.7
Puncture Resistance	lbs	ASTM D4833	170
Static Puncture Strength	lbs	ASTM D6241	900
Trapezoidal Tear Strength	lbs	ASTM D4533	145
Grab Tensile/Elongation	lbs/%	ASTM D4632	320/50
UV Resistance – 70% Strength Retained	hrs	ASTM D4355	500

### 5.3.3 Piping

HDPE pipes shall be sized as shown on the Project Drawings and described in these specifications. All pipes shall have a design working pressure of 160 psi or greater at 73.4°F and an SDR of 11 or less. Pipe material shall be of ultra-high molecular weight, high-density polyethylene conforming to ASTM 3350 Cell Classification PE 345434C through 355434C, manufactured from PE 3408 resin.

The material shall exceed 1,500 hours on environmental stress crack resistance (ESCR) with no failures and no indication of stress crack initiation, as determined by ASTM D1693, Condition C. Certified laboratory test results documenting cell classification, melt flow index, and tensile strength of actual pipe to be used on the project shall be submitted to the County for approval prior to delivery.

Additional, nominal, engineering design specifications required are:

Property	Unit	Test Method	Value
Elongation at Break	%	ASTM D638	600-900
Modules of Elasticity	psi	ASTM D882	>100,000
Impact Strength	N/A	ASTM D256	no break
Resin Density	Gm/cm <sup>3</sup>	ASTM D1505/D792	0.95-0.96
Melt Index	gm/10 min	ASTM D1238*	0.11**
Hardness	shore "D"	ASTM D2240	62-65

\* Perform test at 216 kg/190°C

\*\* Average melt index value with a standard deviation of 0.01

The HDPE pipe shall be homogeneous throughout, and shall be free of visible cracks, holes, foreign inclusions, or other defects. Any pipe with nicks, scrapes,

or gouges deeper than 5% of the nominal wall thickness shall be rejected. Pipe material shall be uniform in color, capacity, density, and other physical properties.

The following shall be continuously printed on the pipe:

- a. Name and trademark of the pipe manufacturer
- b. Nominal pipe size
- c. Standard dimension ratio (SDR)
- d. The letters HDPE, followed by the hydrostatic design basis in 100's of psi
- e. Manufacturing standard reference (e.g. ASTM D-3035 or ASTM F-714)
- f. A production code from which date and place of manufacture can be determined

HDPE fittings shall be molded from polyethylene compound having a cell classification equal to or exceeding the compound used in the pipe or shall be manufactured using polyethylene compound having a cell classification equal to or exceeding the cell classification of the pipe as specified herein.

HDPE to stainless steel transition fittings shall consist of HDPE SDR 11 and 304 stainless steel male-threaded transition section.

PVC (polyvinyl chloride) pipe and fittings shall be Schedule 80 extruded rigid in accordance with Underwriters Laboratories (UL) Standard UL 651 as manufactured by Carlon or approved equal. All PVC piping shall be solvent welded in accordance with the manufacturer's recommendation.

Turbine ventilator shall be galvanized steel Model No. TV04G as manufactured by Empire Ventilation Equipment, Inc. or approved equal.

#### 5.3.4 Gravel

The gravel material shall consist of washed gravel with a 3/4-inch maximum particle size. The Contractor shall submit certified results of sieve analysis on the proposed gravel material to the County for approval. Tests must have been completed within ninety (90) calendar days preceding the date of submittal and certified by an independent laboratory by a California Registered Civil Engineer. The material shall meet the following gradation requirements as determined by sieve analysis (ASTM D 422):

U.S. Standard Sieve	PERCENT PASSING BY WEIGHT
3/4 inch	100
3/8 inch	0-30
No. 4	0-10
No. 8	0-5
No. 200	0-1

## 5.4 EXECUTION

### 5.4.1 Subgrade Preparation

Contractor shall prepare surfaces receiving gas membrane in accordance with Section 3.4.3 of these Special Provisions. Prior to installation of gas membrane, surface preparation shall be inspected by the County and the Contractor to verify measurements and surface conditions to receive the membrane. The membrane shall be installed only on surfaces for which the County has inspected and verified subgrade preparation.

### 5.4.2 Gas Membrane

The County will arrange for a pre-installation meeting with the membrane installation contractor prior to the installation of the membrane. Topics for review/discussion shall include, as a minimum, Project Drawings and specifications, approved submittals, training and qualification procedures for the membrane installation contractor's personnel, and demonstration of making field weld(s).

The gas membrane shall be installed as shown on the approved panel layout installation drawings. Sheets of membrane shall be of such lengths and widths and shall be placed in such a manner as to reduce field welding to a minimum.

The membrane shall be terminated and sealed to pipes and other types of penetrations in accordance with the details shown on the Project Drawings, manufacturer's recommendations and the approved panel layout installation drawings.

All changes in approved panel layout installation plans and procedures must be approved by the County in writing in advance. Requests for field changes to the approved installation drawings, procedures, and schedules shall be submitted in writing to the County for review and comment. No changes shall be allowed prior to written approval by the County. The Contractor shall document changes on record drawings.

Extreme care shall be taken during installation of the membrane to be certain no damage is done to the prepared supporting surfaces, or to any part of the installed membrane. Dragging of the material on any rough surfaces shall not be permitted. Smoking shall not be permitted within 100 feet of the membrane by anyone connected with the Contractor's work. No foot traffic shall be allowed on the membrane except with approved smooth-sole shoes. No equipment traffic shall be allowed on the membrane. No gasoline powered generators, gasoline cans, or solvent shall be placed directly on the membrane. Under no circumstances shall the membrane be used as a work area or to store tools and supplies. If needed, a tarpaulin of approved material shall be spread out as a work area.

During installation, the Contractor shall be responsible for protecting the membrane against adverse effects of high winds such as uplift. Sand bags shall be used as required to hold the material in position during installation. Bags that

are split, torn, or otherwise losing their contents shall be immediately removed from the work area and any spills immediately cleaned up.

The membrane shall not be installed under adverse climatic conditions, unless the Contractor can demonstrate that its installation techniques adequately compensate for such adverse conditions and quality of workmanship is not compromised. Adverse climatic conditions occur when the air temperature measured 6 inches above the membrane surface is less than 40°F or more than 104°F; when the relative humidity is more than 80 percent; when it is raining; or when there is frost on the ground; or during conditions of excessive winds. Installation of membrane at high temperatures (greater than 104°F) may be performed if approved by the County, but no field seaming shall be permitted at those temperatures.

Membrane field seams shall be lap seams formed by lapping the edges of membrane sheets a minimum of 4 inches. The contact surfaces of the sheets shall be wiped clean to remove dirt, dust, moisture, and other foreign objects. For fillet weld seams, the edge of the membrane shall be beveled and oxidation shall be cleaned from the surfaces to receive extrudate by disk grinding or equivalent not more than one hour before welding.

Field seams between sheets of membrane shall be made using approved welding systems, equipment and techniques. Approved welding systems include fillet weld using extrudate, lap weld using extrudate (extrusion welds); and lap weld using either a single or double wedge welder. All wedge welders shall be specifically designed for and be compatible with the membrane material and recommended by the manufacturer.

Any necessary repairs to the membrane shall be made with the membrane material itself, using approved welding systems, equipment and techniques. The patch size shall be 6 inches larger in all directions than the area to be patched. All corners shall be rounded with a 1-inch minimum radius. All seams of the membrane shall be tightly bonded on completion of the work. Any membrane surface showing injury due to scuffing and/or penetration by foreign objects or showing distress shall be replaced or repaired.

Cleanup within the work area shall be an ongoing responsibility of the Contractor. Particular care shall be taken to insure that no trash, tools, and other unwanted materials are trapped beneath the membrane. Care should also be taken to ensure that all scraps of lining material are removed from the work area prior to completion of the installation.

#### **5.4.3 Geotextile**

The geotextile shall be installed as shown on the Project Drawings, approved installation drawings and in accordance with the manufacturer's recommendations. Sheets of geotextile shall be of such lengths and widths and shall be placed in such a manner as to reduce field seaming to a minimum. The County must approve in advance all changes in approved installation plans and procedures.



Extreme care shall be taken during installation of the geotextile to be certain no damage is done to the prepared supporting surfaces. No foot traffic shall be allowed on the geotextile except with approved smooth-sole shoes. No vehicular traffic shall be allowed on the geotextile. Under no circumstances shall the geotextile be used as a work area or to store tools and supplies. If needed, a tarpaulin of approved material shall be spread out as a work area.

During installation, the Contractor shall be responsible for protecting the geotextile against adverse effects of high winds such as uplift. Sand bags shall be used as required to hold the geotextile material in position during installation. Bags that are split, torn, or otherwise losing their contents shall be immediately removed from the work area and any spills shall be cleaned up immediately.

Any necessary repairs to the geotextile shall be made with the geotextile material itself, using approved seaming methods, equipment and techniques. Heat bonding may be used for geotextile seams for installation or for repairs as shown on the approved installation drawings. For repairs, the patch size shall be 12 inches larger in all directions than the area to be patched. All corners shall be rounded. Should any tear exceed 10 percent of the roll width, the roll of geotextile shall be removed and replaced.

All seams of the geotextile shall be tightly seamed on completion of the work. Any geotextile surface showing injury due to penetration by foreign objects or showing distress shall be replaced or repaired. Geotextile field seams shall be made by heat bonding with minimum 12-inch overlap.

All cleanup within the work area shall be an ongoing responsibility of the Contractor. Particular care shall be taken to insure that no trash, tools, and other unwanted materials are trapped beneath the geotextiles.

#### **5.4.4 Piping**

The gas collection and venting piping components shall be installed as shown on the Project Drawings and/or as directed by the County. The gas interception trench pipes shall be HDPE four (4) inches in diameter and shall be slotted based on the schedule shown on the Project Drawings. Riser pipes shall be PVC (Schedule 80) four (4) inches in diameter and solid.

Pipes shall be joined by appropriate techniques and slip fittings. HDPE Butt-fusion welding shall be required only if the elements do not otherwise hold their relative positions. PVC piping shall be solvent welded in accordance with the manufacturer's recommendations. All pipes must be placed, to promote positive drainage along the entire length. Low areas where ponding may occur are not acceptable.

- Pipes shall be installed in such a manner so as to provide for expansion and contraction, as recommended by the manufacturer. Pipes shall be fully supported on the base with no induced strain. Where there is evidence of induced pipe strain, the Contractor shall make the required pipe cuts and install angle fittings as necessary to eliminate the strain. The Contractor shall also remove and replace any fittings that induce either torque or strain to the pipe.

HDPE pipe lengths, fittings, and flange connections to be joined by thermal butt-fusion shall be of the same type, grade, and class of HDPE compound, and shall be supplied from the same raw material supplier. Butt-fusion of pipes and fittings shall be performed in accordance with the pipe manufacturer's recommendations for equipment and technique. Jointing can be performed inside or outside of the work area, at the Contractor's discretion.

Before covering the pipes with gravel, the pipe shall be surveyed by the County's surveyors for verification of alignment, grades, and for as-built records.

Pipe and fittings shall be held firmly in position and protected from damage while gravel is being placed. All pipe and fittings shall be kept clean during the progress of the work. Any pipe that becomes either partially or fully clogged or damaged before final acceptance, shall be cleaned, repaired, or replaced to the satisfaction of the County, by the Contractor, at the expense of the Contractor.

Solid PVC vent riser piping shall be fitted with a turbine ventilator installed per manufacturer's recommendations. Vent riser piping shall be properly secured to the PEMB with non-metallic connectors/brackets as approved by the County and the PEMB manufacturer. Vent riser piping shall terminate at least two (2) feet above the PEMB roof line and at least ten (10) feet away from any window or air intake into the PEMB. Vent riser pipes that penetrate the gas membrane shall be sealed per membrane manufacturer's recommendations.

#### **5.4.5 Gravel**

Gravel layer material shall not be placed on the geotextile until the installation, heat bonding, and inspection of the 16 oz/sy geotextile is complete and is accepted by the County. Areas on which gravel material is to be placed shall conform to the construction details shown on the Project Drawings to permit placement of the full thickness indicated.

The method of placement of material shall be such that it will not cause segregation of particle sizes. The material shall be placed in a manner and with appropriate equipment such that damage does not occur to the underlying geotextile layers.

Any damage or excessive wrinkles/folds in the geotextile in the opinion of the County, caused during placement of gravel material shall be repaired at the Contractor's expense before proceeding with further placement. The Contractor shall maintain the integrity of the gravel material until it has been accepted by the County. Any material displaced by any action of the Contractor shall be replaced at the Contractor's expense.

### **5.5 INSPECTION AND TESTING**

#### **5.5.1 Gas Membrane**

Prior to seaming, each welding and seaming apparatus shall be tested to determine if the equipment is functioning properly. The County shall observe all trial

welding operations and record the results. If at any time the County observes an operator or seaming apparatus not functioning properly, a test shall be performed on a trial weld. If there are significant changes in temperature, humidity, wind speed or if there is an operational shut down, the trial weld test shall be repeated. Laboratory tests may be carried out at the discretion of the County to verify field test results. During seaming operations the County shall verify that:

- a. Equipment used for seaming will not damage the membrane
- b. The extrusion welder is purged prior to beginning a seam until all the heat-degraded extrudate is removed (extrusion welding only)
- c. Seam grinding has been completed less than one hour before seam welding (extrusion welding only)
- d. The ambient temperature measured 6 inches above the membrane surface is between 40 and 104 degrees Fahrenheit and relative humidity is less than 80%. The end of old welds more than 5 minutes old are ground to expose new material before restarting a weld (extrusion welding only)
- e. The weld is free of dust and other debris
- f. For intersecting T seams, the first seam is ground to a smooth incline prior to welding
- g. The seams are overlapped a minimum of four (4) inches
- h. No solvents or adhesives or free moisture are present in the seam area
- i. The procedure used to temporarily hold the panels together does not damage the panels and does not preclude testing
- j. The panels are being seamed in accordance with the installation drawings, specifications or the manufacturers' instructions, using approved proper equipment with gauges giving applicable temperatures
- k. The electric generator is placed on a smooth base such that no damage occurs to the membrane
- l. A smooth insulating plate or fabric is placed beneath the hot welding apparatus after usage
- m. The welded membrane is protected from damage in heavily trafficked areas

Trial Seam Samples: Samples of trial seams are not removed from installed seams, but are made along-side the seaming work area by the membrane installation contractor using the same membrane sheet and the same installation procedures as for the membrane installation itself. As such, they are **nondestructive samples**. Trial seams shall be made on fragment pieces of membrane to verify that seaming conditions are adequate. Such trial seams shall be made at the beginning of each seaming period; which will include the start of day, mid-day, and any time equipment is shut down or seaming operation is suspended more than ½ hour for each seaming equipment used that day. Also, each seamer shall make at least one trial seam each day. Trial seams shall be made under the same conditions as actual seams.

The trial seam sample shall be at least 3 feet long. Trial seam sample width shall be 1 foot plus a seam-width, after seaming with the seam centered lengthwise. The seam overlap shall be as per the specifications.

General Seaming Procedure: Unless otherwise specified, the general seaming procedure to be used by the gas membrane installation contractor shall be as follows:

"Fishmouths" or wrinkles at seam overlaps shall be cut along the ridge of the wrinkle in order to achieve a flat overlap. The cut "fishmouths" or wrinkles shall be seamed, and any portion where the overlap is inadequate shall then be patched with an oval or round patch of the same material extending a minimum of 6 inches beyond the cut in all directions. All corners of the patch shall be rounded with a one-inch minimum radius.

Panel seaming shall extend the full width of all panels, including material placed in the anchor trench.

Panels shall be planned to eliminate the need for cross seams. All intersecting T seams shall be offset at least two feet, and shall be extrusion-welded where they intersect.

The County shall verify that the above seaming procedures are followed.

The Contractor shall smoke test the membrane system (as recommended by the membrane manufacturer) to ensure no leaks exist. Where leaks are identified, appropriate repairs shall be undertaken and smoke testing shall be repeated until no leaks are detected.

#### **5.5.2 Geotextile**

During panel placement, the County shall:

- a. Verify that the surface beneath the geotextile has not deteriorated since previous acceptance
- b. Verify that the method used to unroll the panels does not cause folds in the geotextile and does not damage the supporting surface
- c. Verify that there are no stones, construction debris, or other items beneath the geotextile that could cause damage
- d. Observe and document the geotextile as it is placed and record all defects; all repairs are to be made in accordance with the Specifications
- e. Verify that equipment used does not damage the geotextile or supporting surface by handling, traffic, leakage of hydrocarbons, or by other means
- f. Verify that people working during installation of geotextile do not smoke, wear shoes that could damage the geotextile or membrane, or engage in activities that could damage the geotextile or membrane
- g. Verify that the geotextiles are properly anchored to prevent movement by the wind, and record the procedure used (Securing pins are unacceptable)
- h. Verify that the adjacent panels of geotextile are overlapped a minimum of twelve (12) inches and properly heat bonded as required by the these Special Provisions

- i. Verify that the geotextile is cut only with an approved geotextile cutter, and is not torn or ripped

### 5.5.3 Piping

Piping installations shall be observed and documented by the County to verify that the installations are performed in accordance with manufacturer's recommendations and with the requirements of the Contract Documents.

Prior to beginning this construction, the Contractor shall submit to the County descriptive literature about the fusion equipment to be used for HDPE piping, and shall submit certification from the pipe installer that the jointing technicians are qualified and experienced in heat fusion joining of specified pipe in accordance with Title 49 CFR 192.285.

## 5.6 MEASUREMENT AND PAYMENT

Measurement and payment for the construction of the landfill gas interception system shall be based upon the *lump sum* amount as stated in the Contractor's Proposal, *Bid Item No. 5 – "Furnish and Install Landfill Gas Interception System"*. Payments shall constitute full compensation (less retention) for all labor, material, tools, equipment, and all other items necessary and incidental to completion of this item of work.

END OF SECTION 5

## SECTION 6 - DISASSEMBLY, TRANSPORT, AND REASSEMBLY OF EXISTING PRE-ENGINEERED METAL BUILDING (PEMB)

### 6.1 GENERAL

The work covered by this section shall consist of furnishing all necessary labor, design, disposal, materials, freight, tools, equipment, facilities, disassembly, storage, transportation, services, coordination, reassembly, supervision, and all other items necessary for the relocation of the existing PEMB from its current location in Murrieta (29550 Los Alamos Road, Murrieta, California 92563) to the proposed location at Lamb Canyon Landfill, and including but not limited to:

- A. Review existing PEMB structural design calculations and drawings (Refer to Appendix B) and provide revised calculations and drawings for reassembly of PEMB components at the Lamb Canyon Landfill. This work must be performed by a licensed structural engineer to be hired by the Contractor as required by these Contract Documents.
- B. Remove and relocate PEMB from Murrieta site to the Lamb Canyon Landfill project site, including disassembly, transportation, and reassembly of the approximately 2,500 square-foot (50'x50'x14' eave height) PEMB including, but not limited to:
  - i. Structural steel columns
  - ii. Sub-structural framing including but not limited to: purlins, girts, eave struts, headers, and jambs
  - iii. Roof and wall panels, fascia, flashing and trim
  - iv. Gutter and downspouts
  - v. Cable wire bracing
  - vi. Skylights
  - vii. Roof ventilator and wall vents
  - viii. Windows
  - ix. Roll-up, personnel entrance doors and hardware
  - x. Electrical panel
  - xi. Conduits, outlets, and light fixtures
- C. Furnish and replace all bolts, nuts, washers, screws, clips, rivets, sealant, gaskets, caulking, closed foam closure strips and all other fastener/gasket hardware with new materials.
- D. Furnish and install new primary and secondary structural framing members, anchors, horizontal bracing, and other items required to modify, supplement,

and/or replace existing PEMB materials for reassembly of the PEMB at the Lamb Canyon Landfill.

- E. Furnish and install new 6'x7' half-glass, double-door assembly and hardware. Assembly shall include, but not limited to the following accessories: heavy-duty closers, sub-framing, fire-rated removable center mullion, insulation, and panic devices with lever locksets.

Contractor shall quantify, disassemble, transport, reassemble and perform all work required for a complete working system.

## 6.2 SUBMITTALS

### 6.2.1 Structural Analysis Report for PEMB Reassembly at Lamb Canyon

#### a. Structural Analysis

The Contractor shall submit a report with a review summary of the existing PEMB structural design calculations and drawings (Refer to Appendix B). Report shall include results of structural analysis for the installation of the PEMB at Lamb Canyon Landfill and shall specify structural modifications/additions that may be required (if any) to address project-specific loading for seismic and wind conditions at the Lamb Canyon Landfill. This report shall be prepared, signed, and stamped by a California Registered Structural Engineer. Structural design calculations shall include, but not limited to:

- i. Site specific seismic and wind load calculations for PEMB erection at Lamb Canyon Landfill. Lamb Canyon is located in a high wind area and the PEMB should be designed to withstand wind speeds in excess of 100 mph.
- ii. Column, frame and endwall reactions
- iii. Stress analysis
- iv. Deflection analysis
- v. Foundation loads for each loading case

In addition, the report shall include a Letter of Certification confirming that the relocated PEMB design meets site loading conditions and building codes as required for reassembly at the Lamb Canyon Landfill.

#### b. PEMB Reassembly Drawings

The structural report shall include a complete set of revised drawings (24" x 36") for the proper identification and reassembly of all existing and new components for erecting the PEMB at the Lamb Canyon Landfill. These drawings shall include, but not limited to:

- i. Anchor bolt setting plan and base plate details
- ii. Column size and locations

- iii. Roof framing
- iv. Transverse cross sections
- v. Panel layout
- vi. Location of field located openings (including new double-door personnel entrance)
- vii. Framing details
- viii. Flashing and sheeting details
- ix. Accessory installation details
- x. Required modifications and/or additions to PEMB for installation at Lamb Canyon

In addition, the following information shall be provided on the drawings: builder and contractor responsibilities, general notes, approval notes, product certification, safety guidelines, PEMB description, PEMB loads, drawing index, legend for abbreviations and symbols, title block, revisions, designer name with address and contact information, Contractor name with address and contact information, Riverside County Waste Management Department name with & address and contact information, sheet numbers, and scale if necessary. These drawings shall be signed and stamped by a California Registered Structural Engineer.

The Contractor shall not be allowed to start the reassembly of the PEMB until a building permit is issued by Facilities. Issuance of this building permit is contingent upon Facilities approval of the final compaction/certification report prepared by Material Testing Firm, acceptance of the prepared subgrade, as well as the review and approval of the structural analysis report for the PEMB structure and reinforced concrete foundation and floor slab design. Refer to Section 1.7.3 of these Special Provisions for submittal processing schedule.

#### **6.2.2 PEMB Structural Components and Accessories**

The Contractor shall submit the manufacturer's product data, specifications, shop drawings and installation instructions for all components and hardware required to modify, supplement, and/or replace existing PEMB materials for installation (as specified by the Structural Analysis Report) at the Lamb Canyon Landfill. Contractor shall submit manufacturer's product data, specifications, and installation instructions for all fasteners, bolts, clips, sealants, closed cell foam closure strips, and caulking.

#### **6.2.3 6'x7' Half-Glass, Double-Door Assembly and Hardware**

The Contractor shall submit the manufacturer's product data, shop drawings and installation instructions for door assembly, framing, removable center mullion, lock set, and fasteners.



## 6.3 MATERIALS

### 6.3.1 PEMB Structural Components and Accessories

Contractor shall be aware of the quantity, dimensions and conditions of existing PEMB materials. Any damage to the PEMB components during the relocation and storage of materials shall be the Contractor's responsibility and all costs associated with repairs of such damage or replacement of materials shall be borne by the Contractor.

The Contractor shall furnish and install new primary and secondary structural framing members, anchors, horizontal bracing, and other items required to modify, supplement, and/or replace existing PEMB materials for reassembly of the PEMB at the Lamb Canyon Landfill. These modifications and/or additions (if any) shall be as specified in the Structural Analysis Report as approved by the County and Facilities. Extra payment for furnishing and installing additional materials to modify, supplement and/or replace the existing PEMB materials will not be made by the County.

Unless otherwise specified in the final structural analysis report, all new PEMB components shall be specified as follows:

- a. General Framing
  - i. Structural steel members shall be sheared, formed, punched, welded and painted in the plant of the manufacturer.
  - ii. All shop connections shall be welded in accordance with the AWS "Standard Code for Welding in Building Construction" and CWB "General Specifications for Welding of Steel Structures".
  - iii. Steel for hot rolled shapes shall conform to the requirements of ASTM Specification A-36, with minimum yield of 36, 42, or 50 psi. The component manufacturer shall have on file certified mill test reports that verify that these requirements have been met.
  - iv. All structural framing members shall be prepared according to SSPC-SP2 and given one shop coat of KMAA104: VectroCoat 310 Gray Modified Acrylic paint applied by Anodic Electrocoat process.
  - v. All framing member shall be shop fabricated for field bolted assembly. The surfaces of the bolted connections shall be smooth and free from burrs and distortions.
  - vi. All framing members shall carry an easily visible identifying mark to aid the erector in the erection of the building.
  - vii. All shop connections shall be in accordance with the County approved design documents prepared by the Contractor. Certificate of welder qualifications will be furnished when required and specified in advance.

- viii. Field connections shall be bolted with high strength bolts and nuts (ASTM A325 or SAE J429 Grade 5).
- b. Primary Structural Members
  - i. Primary framing shall be Clear Span (CS) type rigid frames, with standard beam and post and beam endwall frame.
  - ii. The primary structural members shall be rigid framing manufactured of solid web members having tapered or uniform depth rafters rigidly connected to tapered or uniform depth columns.
  - iii. All rigid frames shall be welded, built-up "I" sections. The columns and the rafters may be either uniform depth or tapered. Flanges shall be connected to webs by means of a continuous fillet weld on one side.
  - iv. All endwall roof beams and end wall columns shall be cold-formed "C" sections, mill-rolled sections, or built-up "I" sections as specified in the design documents prepared by the Contractor and approved by the County and Facilities.
  - v. All base plates, splice and flanges shall be shop fabricated to include bolt connections holes. Webs shall be shop fabricated to include bracing holes.
  - vi. Connections for secondary structural (purlins and girts) shall be by means of welded clips or as specified in the design documents prepared by the Contractor and approved by the County and Facilities.
- c. Secondary Structural Members
  - i. Secondary structural framing shall distribute the loads to the primary structural system and shall include endwall columns and rafters, purlins, girts, eave struts, base support, headers, jambs, flange bracing, clips, and other miscellaneous structural framing. Spacing and locations shall be specified in the design documents prepared by the Contractor and approved by the County and Facilities.
  - ii. Steel used for cold-formed members shall conform to the physical characteristics of ASTM A570 or ASTM A607.
  - iii. Light gauge cold-formed sections shall be manufactured by precision roll or brake forming. All dimensions shall be true, and the formed member shall be free of fluting, buckling, or waviness.
  - iv. Endwall rafters shall be manufactured from built-up sections of adequate size and thickness as specified in the County approved design documents prepared by the Contractor.

- v. Endwall columns shall consist of built-up sections or cold formed "C" sections of adequate size and thickness as specified in the design documents prepared by the Contractor and approved by the County and Facilities.
  - vi. Purlins and girts shall be simple or continuous span, and be of adequate design and thickness as specified in the design documents prepared by the Contractor and approved by the County and Facilities. They shall be pre-punched at the factory to provide for field bolting to the rigid frames. Connection bolts shall install through the webs, not flanges.
  - vii. Eave struts shall be of adequate design and thickness as specified in the design documents prepared by the Contractor and approved by the County and Facilities. The upper flange shall slope with the normal roof slope, and the web shall be vertical and free to receive the sidewall covering.
  - viii. Base support shall consist of a continuous base angle, base "C", or Panel edge to which the base of the wall covering shall be attached. The base support shall be securely fastened into the concrete by the erector. This member shall be secured to the concrete slab with ram-sets, expansion bolts, or equivalent anchors as specified on the County approved design documents prepared by the Contractor.
  - ix. Headers and jambs shall be precision roll-formed "C" sections of the same depth as the girts.
  - x. Flange bracing shall consist of angle or tube members connected to the web of the purlin or girt and to the compression flange of the primary structural member.
- d. Bracing
- i. Horizontal load resisting bracing shall be accomplished by diagonal cable bracing, rod bracing, portal frames, and/or diaphragm action of the roof and wall covering.
  - ii. All cables for diagonal bracing shall be fabricated from extra high strength Grade-7 wire Class A coating, left hand lay, galvanized steel strand, conforming to the provisions of ASTM A475. Adjustment shall be provided by an eyebolt assemble.
  - iii. Diagonal bracing in the roof and sidewalls shall be used to remove longitudinal loads (wind, crane, etc.) from the structure. This bracing will be furnished to length and equipment with bevel washers and nuts at each end. It may consist of rods threaded each end or galvanized cable with suitable threaded end anchors. If load requirements so dictate, bracing may be structural angle and/or pipe, bolted in place.

- iv. Rod bracing shall be fabricated from minimum 1/2" diameter steel rod conforming to the provisions of ASTM A36.
  - v. Portal frames shall be fabricated of built-up sections and conform to the same specifications as primary framing.
  - vi. Flange bracing: The compression flange of all primary framing shall be braced laterally with angles connection to the webs of purlins or girts so that the flange compressive stress is within allowable limits for any combination of loading.
  - vii. Special bracing: When diagonal bracing is not constructible or permitted in the sidewall, a rigid frame type portal or fixed base columns shall be used. Wind bracing in the roof and/or walls need not be furnished where it can be shown that the diaphragm strength of the roof and/or wall covering is adequate to resist the applied wind forces.
- e. Wall and Roof Panels
- i. Roof and wall panels shall be manufactured using 26 gauge, 50,000 psi material. Roll-formed profile shall be "R" Panel configuration. Panels shall have 1 1/8" deep major ribs spaced at 12" on center, with minor ribs between major ribs. Each panel shall provide a net coverage width of 36". Roof panels shall match existing PEMB construction type.
  - ii. Provide wall panel assemblies with permanent resistance to air leakage through assembly of not more than 0.006 cfm/sf of fixed wall area when tested according to ASTM E283 at a static pressure differential of 6.24 psf.
  - iii. Provide wall panel assemblies with no water penetration as defined in the test method when tested according to ASTM E331 at a static pressure differential of 12.0 psf
  - iv. Substrate shall be Galvalume® AZ55 coating in accordance with ASTM A792.
  - v. Sheets shall be coated with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) over primer with total DFT of 0.8 – 1.0. The reverse side shall be coated with pigmented polyester. Exterior color to be selected from standard color selected by the County.
  - vi. Panels shall be one piece from base to eave. Endlaps, if required, shall be 6" and occur at a girt.
- f. Trim
- i. Trim shall be 26 gauge with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) typical to wall panels. Color shall match existing material.

- ii. Downspouts shall be 26 gauge galvanized steel, ASTM specification A924, with a fluoropolymer finish and shall have a minimum cross sectional area of 15.85 square inches. Downspouts shall terminate with an elbow at approximately 75° or transition to an underground drainage system. Color shall match existing material.

g. Light Transmitting Panels

Panels shall accommodate lock-tight, snap-tight, or mechanically seamed roof system construction as follows:

i. Lock Tight Roof Construction

High strength translucent panels are glass fiber reinforced polyester, high strength and may be either:

Type I, structural (general purpose) conforming to commercial standard CS-214-57 or

Type II, having a burning rate of 2" per minute or less when tested in accordance with UL R3870A.

High strength translucent panels shall be white, 1/16" thick, and have a nominal weight of 8 oz. per square foot with 55% light transmission as per ASTM D 1494.

Insulated translucent roof panels shall have a standard 8 oz. per square foot exterior panel with a translucent insulation foam core and a 4 oz. per square foot interior panel. The interior and exterior panels shall be positively sealed with silicone sealant against air leakage and de-lamination. Light transmission shall be approximately 45%.

ii. Snap Tight Construction (STC) or Mechanically Seamed Construction (MSC)

Provide translucent roof panels for STC or MSC roof system. Translucent panels shall be factory installed in a STC panel, 2'-0" x 10'-3" and shall be UL90 rated. Panels shall be white and have a nominal weight of 8 oz. per square foot with 55% light transmission as per ASTM D 1494.

Insulated translucent roof panels shall have a standard 8 oz. per square foot exterior panel with a translucent insulation foam core and a 4 oz. per square foot interior panel. The interior and exterior panels shall be positively sealed with silicone sealant against air leakage and de-lamination. Light transmission shall be approximately 45%.

h. Accessories

i. Louvers

Louver frames shall be 18 gauge galvanized steel frame, painted white with 20 gauge blades, and shall be self-framing and self-flashing. They shall be equipped with adjustable or fixed blades as specified. Nominal sizes shall be 3' x2', 3'x3', and 3'x4' self framing units.

ii. Ventilators and Wall Vents

Ventilators and wall vents shall be manufactured from galvanized steel and sized to match existing. The ventilator body shall be 26 gauge and the skirt shall match at the roof slope. Chain operated damper shall be furnished. The ventilators shall be spaced evenly on the ridge

**6.3.2 Connectors, Fasteners, Gasket and Sealant (Required Replacement)**

Due to forces exerted during the initial assembly of the PEMB and the potential for permanent deformation during the disassembly process, the Contractor shall replace all bolts, nuts, washers, screws, clips, rivets, sealant, gaskets, caulking, and closed foam closure strips and all other fastener/gasket hardware with new materials. Unless otherwise specified in the final structural analysis report, these materials shall meet the following requirements:

a. Fasteners

Fasteners to be manufacturer's standard long life fasteners. Exposed fastener heads to be factory painted to match the panel color. Self-drilling fasteners shall be used for panel to structural connections. Lapteks shall be used for panel to panel connections. Pop rivets shall be used at endlaps of eave and gable trims. The Contractor's design documents as approved by the County and Facilities, shall specify fasteners for: structural bolts, roof panels, roof panel sidelaps, standing seem roof panels and clips, wall panels, wall panel sidelaps, and blind fasteners. Bolts and nuts shall be high-strength in accordance with ASTM A325 or SAE J429 Grade 5.

b. Clips

All clips shall have factory applied mastic and be designed so that movement between the panel and the clip does not occur. The Contractor's engineer shall specify selected and required clip option in the project drawing for: utility clips, low fixed clips, high fixed clips, high or low floating clips.

c. Closed cell foam closure strips

Closed cell foam closure strips, die cut to match existing panel configuration. Metal closures shall be used with STC or MSC panel. The corrugations of the roof and wall panels shall be filled with solid or closed-cell, preformed rubber, neoprene or polyethylene closures along the eave, ridge and rake when required for weather tightness.

d. Sealant and Closures

Factory applied sealant used in panel sidelaps shall be a hot melt, foamable mastic-Q41A. Field applied sealant shall be used at the endlaps, ridge assembly, and gable flashings shall be 100% solids, butyl-based elastomeric tape sealer, furnished in roll form or pre-cut to length. Sealant used at the eave shall be a pre-compressed expanding foam sealant tape. Tape size to be minimum 3/32" x 3/4", supplied in rolls. Outside closures shall be manufactured from the same materials as the roof panels. Inside closures shall be 18 gauge metal. The mastic sealer shall have good adhesion to metal and be non-staining, non-corrosive, non-shrinking, non-oxidizing, non-toxic and non-volatile. The service temperature shall be from -60 degrees Fahrenheit to +300 degrees Fahrenheit.

e. Caulk

Caulk shall be manufacturer's standard product as appropriate for the application. All gutter and downspout joints, rake flashing laps, ridge flashing laps, doors, vents, and louvers shall be sealed with transparent or burnished slate pigmented caulk or butyl rubber base. Caulking color shall be to siding or trim color.

**6.3.3 6' x 7' Half-Glass, Double-Door Assembly and Hardware**

- a. Double door shall have a 6' wide x 7' high door opening with 1-3/4" thickness made of electro-galvanized steel sheets, 20 gauge, with smooth finish. All doors to be a patented two-panel design to insure structural integrity. Both leafs of the door assembly shall be active and be provided with a fire-rated removable center mullion.
- b. The doors shall have ADA compliant lever hardware.
- c. Doors shall be fabricated rigid, neat in appearance, with square edges, and free from defects, warping, and buckle. Exposed welds to be made smooth, flush and invisible. Core is a rigid-cell, foamed-in-place polyurethane with 1.8 lbs/ft density conforming to ASTM D-1622. Insulating core is chemically bonded to all interior surfaces, completely seals unit, and provides total support. Door core has an "R" factor of 14.97.
- d. The lock edge shall be non-beveled, flush, and have mechanical interlocking edge seam on both hinge and lock edges. An 18 gauge lock ring reinforcement shall be installed in the standard provision for Gov. Series 160/161 cylindrical lock sets, and in accordance with ANSI standard A 115.2.
- e. The hinge edge is non-beveled, non-handed, and reinforced with a 7 gauge hinge reinforcement attached at each hinge location. The doors are prepared for 4 1/2" full-mortise template hinges per ANSI/SDI 100.

- f. All doors shall have 16 gauge galvanized flush mounted top and bottom inverted channels, spot welded within the door, to prevent water penetration.
- g. All doors shall be factory prepared with a 6 5/16" x 16" 12 gauge galvanized steel reinforcement for closer installation. Doors shall be reinforced, stiffened, and sound deadened with impregnated graft honey comb core completely filling the inside faces of the door and laminated to the inside faces of the panels. Doors shall be reinforced for applicable hardware.
- h. Standard frames shall be made from electrogalvanized steel sheets of 16 gauge material. Frames shall be double rabbeted. Frame stops shall be a minimum of 5/8". Standard frames shall be 4 3/4" in width with a throat size of 3 3/4".
- i. The hinge jamb shall be reinforced with a 7 gauge plate, and prepared for a full mortise 4 1/2" template hinge. The strike jamb shall be prepared for a 4 7/8" ASA universal strike per ANSI standard A 115.2.
- j. All doors, frame headers and frame jambs shall be thoroughly cleaned, prime coated and then top coated with a smooth, durable finish capable of passing a 200 hour salt spray test in accordance with ASTM specifications B-117 and a 500 hour humidity test in accordance with ASTM specifications D2247. Weatherometer test results - 1000 hrs. Color selection is white. All glazing shall be done in the field.
- k. Subframing shall be factory installed to the door jambs and consist of two 16 gauge galvanized steel C-channels to match the specified girt depth.
- l. LOCK SET shall be a commercial Grade II cylindrical lock with US26D (Satin Chrome) finish having a 2 3/4" backset. Meets requirements ANSI #F81 and of Federal Specifications FF-H-106H Series 160 and ANSI 4000 Grade II or equal.
- m. PANIC LEVER devices shall be Type 1, Grade 1 rim type. Finished, with exterior key-in-knob function
- n. REMOVABLE MULLION shall be fire-rated and included keyed bottom and top anchorage and be manufactured by Detex, Inc. or approved equal.
- o. HALF GLASS windows shall provided for both doors, each having a dimension of 24" x 30". Glass shall be 1-inch insulated tempered glass.
- p. HEAVY DUTY CLOSERS shall be provided for both doors and be Grade 1 with backcheck and dual closing adjustment.
- q. HINGES shall be three 4-1/2" x 4-1/2", five knuckle, two ball bearings, with a non-rising removable pin template hinges with a US26D (Satin



Chrome) finish. Meets Federal Specifications FF-H-116C and ANSI A156.1.

- r. THRESHOLD shall be saddle type 5 3/4" wide (match frame depth), factory cut, with an aluminum mill finish. Meets ADA requirements.
- s. WEATHER STRIP shall be installed on jambs and header. It is adjustable and is composed of an extruded aluminum with extra large Qlon Kurf bulb.
- t. SWEEP shall be factory installed and composed of an extruded aluminum with heavy-duty vinyl insert. It is also adjustable and incorporates a drip cap that weeps water away from the threshold.
- u. JAMB CLIPS shall be of 12 gauge galvanized steel.
- v. FASTENERS shall consist of (4) 1/2" masonry anchor bolts; (25) #10 self-drilling screws; (2) masonry screws; (6) 1/4" bolts and locknuts.
- w. Preassembled door systems shall be packaged in heavy-duty wooden crates and skidded for forklift handling.

#### 6.4 EXECUTION

##### 6.4.1 Disassembly and Relocation

The site where the PEMB is currently located and any other areas within the surrounding vicinity shall be left in a condition that is equivalent to the existing condition prior to implementing the work.

In accordance with SCAQMD Rule 1403, an asbestos survey for the PEMB was conducted by the County. An asbestos-free certification (Refer to Appendix D) for the PEMB was received from the County of Riverside Department of Public Health on October 29, 2008.

Over years of not being used, pests (i.e. rodents and insects) have been discovered in the PEMB. Contractor shall be responsible for pest mitigation and addressing any public health concerns regarding the removal of pests and their feces in accordance with applicable Federal and State regulations. Prior to starting work, the Contractor shall inspect the PEMB to identify pests and submit a Pest Control Plan for County review. Plan shall include, but not limited to: methods and procedures for removing pests and feces, trapping devices, pesticides, bait boxes, rodenticides, staff personal protection equipment (PPE) for Hantavirus, and Material Safety Data Sheets (MSDS). This plan shall be incorporated under a separate appendix in the project-specific Health and Safety Plan as required in Section 1.8 of these Special Provisions.

Contractor shall properly terminate water and electrical utility lines outside of the existing PEMB foundation. The existing concrete foundation system (footings and floor slab) shall remain intact. Contractor shall cut, grind, cap, and properly

dispose of all remaining items that are protruding from slab such as anchor bolts and conduit stub-ups.

Contractor shall remove, transport and properly dispose of all fiberglass insulation and any debris generated during the disassembly process. Insulation and non-hazardous debris may be disposed of as a "no charge" account at the Lamb Canyon Landfill in the designated disposal area or as directed by the County. All metal waste materials generated from disassembling or reassembling the PEMB shall be separated from construction debris or general refuse generated from project construction and properly recycled by the Contractor by either using a "no charge" account at the Lamb Canyon Landfill or using an independent recycling vendor or facility. If the Contractor elects to utilize the later option (i.e. an independent recycling vendor or facility), the Contractor shall submit to the County documentation, such as receipt or manifest, as proof of proper recycling of this material.

Contractor shall remove, salvage, and relocate all existing electrical components including, but not limited to: lights, wiring, conduits, panel, junction boxes, fittings, switches and outlets. Contractor shall reassemble electrical components in the relocated PEMB at Lamb Canyon Landfill. Any damage to the electrical components during the disassembly, relocation and storage of materials, shall be the Contractor's responsibility and all costs associated with repairs of such damage or replacement of electrical components shall be borne by the Contractor. Replacement electrical components shall match existing or be an approved equal as determined by the County.

Prior to disassembly, the Contractor shall create an inventory list of all PEMB component materials to be relocated. This list shall include as a minimum, the following: assigned material number, material description, dimensions, and quantity. Each individual PEMB material shall be assigned a tracking number that is legibly marked on the component to correspond with the erection drawings. The list shall be approved by the County prior to transporting materials from the Murrieta site to Lamb Canyon. A ledger shall also be created and updated by the Contractor showing the current location of each building material.

The County's inspector shall always have an updated copy of the ledger provided by the Contractor. Any removal of material from the Murrieta site shall only be done with the County's written approval of each load.

The Contractor shall obtain and submit copies to the County of all required permits necessary to utilize public roads for PEMB material relocation and transport of any equipment or material on or off the site.

Extra payment for any additional materials or labor associated with disassembling and relocating the PEMB will not be made by the County.

## 6.4.2 Reassembly

The reassembly of the PEMB and the installation of accessories shall be performed in accordance with the PEMB Reassembly Drawings by a qualified contractor using proper tools and equipment. In addition, erection practices shall conform to Section 5, of the Metal Building Manufacturers Association (MBMA) "Code of Standard Practices." There shall be no field modification to the primary or secondary structural members except as authorized and specified by PEMB Reassembly Drawings and approved by the County.

### a. Building Anchorage

The building anchor bolts shall be designed to resist the maximum column reactions resulting from the specified combinations of loadings. These designs and sizes shall be specified by PEMB Reassembly Drawings. Anchor bolts shall be furnished and installed by the Contractor.

### b. Erection-Framing

Erect framing in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.

The erector shall furnish temporary guys and bracing where needed for squaring, plumbing, and securing the structural framing against loads, such as wind loads acting on the exposed framing and seismic forces, as well as loads due to erection equipment and erection operation, but not including loads resulting from the performance of work by others. The temporary guys, braces, falseworks and cribbing are the property of the erector, and the erector shall remove them immediately upon completion of erection.

Do not field cut or alter structural members without approval of the metal building manufacturer.

### c. Erection- Wall and Roofing System

Install in accordance with manufacturer's instructions and erection manual. The erection manual shall include procedures and designs to accommodate the out-of-square and out-of-plumb conditions that normally occur in construction.

Exercise care when cutting pre-finished material to ensure cuttings do not remain on finish surface.

Fasten cladding system to structural supports, aligned level and plumb.

### d. Erection- Gutters and Downdrains

Install seamless gutters and downspouts in accordance with manufacturer's instructions.

Furnish and install splash pans at the bottom of all downdrains as approved by the County.

### e. Installation- Accessories

Install accessories in accordance with manufacturer's instructions.

Seal wall and roof accessories weather tight.

## 6.5 MEASUREMENT AND PAYMENT

The disassembly, relocation, and reassembly of the PEMB shall be in accordance with this Special Provision section and the Contract Documents.

### 6.5.1 Prepare Structural Analysis Report for PEMB Reassembly at Lamb Canyon

Measurement and payment for the preparation and submittal of the Structural Analysis Report, including the reassembly drawings, shall be based upon the *lump sum* amount as stated in the Contractor's Proposal, *Bid Item No. 4 – "Prepare Structural Analysis Report for PEMB Reassembly at Lamb Canyon including Design of Reinforced Concrete Foundation and Floor Slab"*. Payments shall constitute full compensation (less retention) for all labor, material, design, and report preparation, by a licensed structural engineer, and submittal of design calculations, drawings, and applicable specifications for the reassembly of the PEMB and all other items necessary and incidental to completion of this item of work. For progress payments, 50% payment (less retention) shall be made upon initial submittal to the County for review and 50% payment (less retention) shall be made upon approval and issuance of a building permit by Facilities.

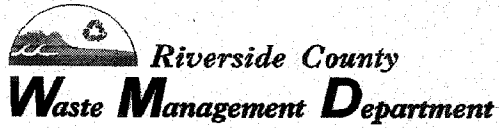
### 6.5.2 Disassemble and Relocate Existing PEMB to Lamb Canyon Landfill

Measurement and payment for the disassembly and relocation of the existing PEMB to Lamb Canyon Landfill shall be based upon the *lump sum* amount as stated in the Contractor's Proposal, *Bid Item No. 7 – "Disassemble and Relocate Existing PEMB to Lamb Canyon"*. Payments shall constitute full compensation (less retention) for all labor, material, tools, equipment, transportation, permits, and all other items necessary and incidental to completion of this item of work.

### 6.5.3 Reassemble Relocated PEMB at Lamb Canyon

Measurement and payment for the reassembly of the PEMB at the Lamb Canyon Landfill shall be based upon the *lump sum* amount as stated in the Contractor's Proposal, *Bid Item No. 8 – "Reassemble PEMB at Lamb Canyon"*. Payments shall constitute full compensation (less retention) for all labor, material, tools, equipment, reassembly of electrical and lighting components, and all other items necessary and incidental to completion of this item of work.

END OF SECTION 6



**SPECIAL PROVISIONS**

**FOR**

**RELOCATION OF PRE-ENGINEERED**

**METAL BUILDING (PEMB)**

**TO**

**LAMB CANYON SANITARY LANDFILL**

**APPENDIX "F"**

**PROJECT DRAWINGS  
(Reduced Size – 11x17)**

**RELOCATION OF PRE-ENGINEERED  
METAL BUILDING (PEMB)  
TO LAMB CANYON SANITARY LANDFILL  
OCTOBER 2010**

**APPENDIX A - F**



*Riverside County*  
**Waste Management Department**

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**ATTACHMENTS FILED**  
**WITH**  
**THE CLERK OF THE BOARD**