OPERATION AND MAINTENANCE PLAN FOR MATCON HMA COVER

ADDENDUM TO THE SITE OPERATIONS AND MAINTENANCE PLAN

TCEQ CONTRACT NO. 582-12-21803
WORK ORDER #287-0013

ROCKWOOL INDUSTRIES, INC.
FEDERAL SUPERFUND SITE
EPA ID# TXD06637964
SUP 033

August 2013

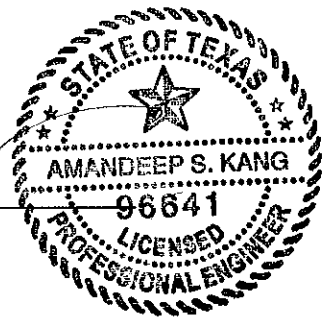
Prepared for the

Texas Commission on Environmental Quality (TCEQ)

by

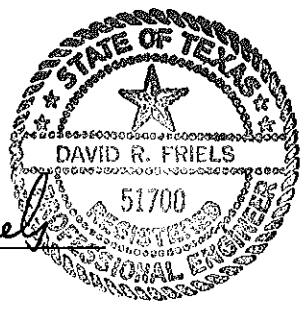
Shaw Environmental, Inc.
12005 Ford Road, Suite 600
Dallas, Texas 75234
972.773.8400
Texas Registered Engineering Firm F-5650

Shaw Project No.: 149373



Amandeep Kang, P.E
Project Manager

Firm # 5650



David Friels, P.E.
Project Engineer

TABLE OF CONTENTS

APPENDICES

Rockwool Industries, Inc.

MatCon HMA Cover Operation and Maintenance Plan

1.0 Introduction

1.1 Purpose

This MatCon Cover Operation and Maintenance (MatCon O&M) Plan has been prepared for the TCEQ and is applicable to the MatCon hot mixed asphaltic concrete (HMA) cap on the contaminated soil containment cell (CC). The purpose of this O&M Plan is to provide specific guidance regarding inspections, maintenance, and repair of the MatCon HMA cap which is part of the final cover that was constructed over the contaminated soil containment cell (CC). An ongoing inspection, maintenance, and repair program is necessary to protect and extend the service life of the cap. Additionally, maintaining the cap in good repair is necessary to prevent infiltration of surface water into the containment cell. If surface water is allowed to infiltrate into the waste, it is possible that leachate can migrate from the cell to groundwater, and the cell will not accomplish its intended remedial action objectives. It is intended that this O&M Plan will be an addendum to the current Site O&M Plan prepared by Daniel B. Stephens and Associates, Dated February 2011 (DBS O&M Plan). See a list of references in Section 6.

1.2 General Site Information

The Rockwool Industries, Inc. (RWI) EPA Federal Superfund Site (referred to as the "RWI Site" or 'site' hereon) is located in Belton, Bell County, Texas. The site is located approximately ¼ mile east of I 35 (exit 294B) at 1741 Taylor's Valley Road. RWI manufactured mineral wool insulation on the site from 1950 until February 1987. The RWI site includes approximately 100 acres, and approximately 47 acres of the facility were used in the production of "rock wool" insulation. Materials used in the process included copper and antimony smelter slag, coke, trap rock and basalt. It appears that most of the waste generated during the manufacturing process was stored or disposed on site. With the exception of bag house dust, which contained arsenic, the waste was not identified as being hazardous. Chemicals of concern (COCs) were identified in the 5-Year Report to be arsenic, antimony, and lead.

The RWI Site was added to the National Priorities List (NPL) in July 2000, and the final record of decision (ROD) was issued in September 2004. Remediation design was completed in July 2004, and remedial action was conducted between February and September 2005. The selected remedy to accomplish the remedial action objectives included excavating waste and contaminated soil that exceeded the preliminary remediation goals (PRGs) for arsenic, antimony, and lead, and consolidating the waste material in a containment cell (CC). Excavation for the CC commenced in April 2005 and filling of the CC was completed in August 2005. Construction of the MatCon HMA cap on the CC was completed in November 2005. The location of the CC is illustrated on the Boundary Survey, sheet 1 of 2, located in Appendix A.

1.3 Containment Cell (CC)

The CC is located approximately 165 feet south of Taylor's Valley Road. FM 93 is further west and approximately 200 to 300 feet south of the CC. The immediate property around the CC is generally grassed with only minor relief. Property usage around the site appears to be generally industrial or commercial. The CC cell is trapezoidal in shape and has a surface area of approximately 3.944 acres (including the approximately 7-foot wide perimeter apron). Refer to the Topographic Survey Drawing in Appendix B-1.

Construction of the containment cell is documented in the Remedial Action Report dated February 3, 2006 (RAR); and the Final First Five-Year Review Report dated September 2012 (5-YR). The final cover system for the containment cell consists of 4 inches of a hot mixed asphaltic concrete (HMA) cover or cap that was constructed over 6 inches of compacted flexible base (i.e., crushed limestone complying with Type A Grade 1 of the TxDOT Specification Item 247). The purpose of the cover is to contain the underlying waste, and the principal purpose of the HMA cap is to preclude surface water from infiltrating into the waste. The cover was designed with a 2 percent slope from the center crown towards the four sides. Drawings indicate that the bottom liner geosynthetics terminate in an anchor trench approximately 3 feet outside the grade break (limits of waste). The HMA cap extends 7 feet past the limits of waste or grade break (i.e., 3 feet past the anchor trench). The 7-foot width of asphalt around the perimeter is generally referred to as the apron and is outside the limits of waste. The cell is bounded by a perimeter drainage channel lined with a woven geotextile fabric and riprap. Record Drawings taken from the RAR, Sheets C1, C17, C18, and C19 illustrating the containment cell construction are provided in Appendix C for reference.

The HMA cap consists of a proprietary product furnished by MatCon®, Inc. and installed by Wilder Construction (Wilder) in August 2005. A copy of MatCon's webpage specific to the RWI Site is provided in Appendix D. The HMA consists of a dense graded mixture (similar in gradation to the TxDOT Type D, fine graded surface course material) with the MatCon® binder. The RAR indicates that there were problems with the HMA installation over the area between the anchor trench and grade break on the south side due to movements within the geosynthetics. Therefore, the geosynthetics were cut along the grade break and removed prior to HMA placement along the west, north, and east sides, and the HMA was laid directly on the soil berm. Between August 30 and November 23, 2005, cracked or failed HMA surface was repaired by milling, removing, sealing, or patching. Additional repairs to the MatCon® Cover were performed during 2006.

1.4 Current Site Operations and Maintenance Plan

The current O&M Plan for the RWI Site was prepared by Daniel B. Stephens and Associates for the TCEQ and is dated February 2011. This MatCon O&M Plan is an addendum to the DBS O&M Plan.

The CH2M Hill O&M Plan was prepared for EPA Region 6 in January 2006 has been replaced by the DBS O&M Plan, and therefore, is no longer applicable to this site. Additionally, the MatCon® O&M Plan was prepared by Wilder in January 2006 to provide the O&M protocol during the 5-year warrantee period and is no longer applicable to the HMA cap.

2.0 Inspection Plan

2.1 Visual Inspections

Semi-annual inspections should be conducted by a qualified professional with experience in landfill covers and asphalt materials and surfaces. A recommended site-specific check list for the inspections is included in Appendix E. Special note should be made of any type of distress that could cause the cap to not perform as designed or no longer accomplish its intended remedial action objectives (e.g., cracks that would allow surface water to infiltrate into the contained waste). If it is desired to mark defects for future consideration; i.e., subsequent inspections, immediate repair, survey measurements, etc., a water based spray paint is recommended. A CC Plan, as provided in Appendix B-1, is recommended to accompany the check list to facilitate documentation of cracks, ponding, and other defects.

A copy of the Restrictive Covenant which includes the CC (Tract No. 12) and requires semi-annual inspections in Exhibit C along with other monitoring requirements is provided in Appendix F. Corrective action should be implemented if any of the following conditions are observed during the visual inspection and are confirmed by survey:

- Approximately 600 lineal feet (LF) or more cumulative crack length with a mean width of 1/8" or greater or a depth of 1 inch or greater over waste (i.e., inside apron).
- Cracks greater than ¾" in width or cracks that extend full depth (i.e., greater than 4 inches deep) regardless of total lengths.
- Crack frequency is greater than 100 LF within an area of 320 square feet (SF).
- Settlement/ponding greater than approximately 2 inches deep (confirmed by survey).

Additionally, an inspection should be conducted after any extreme weather or environmental conditions; such as fire adjacent to cap, 100-year rain event, or a tornado on or near property.

2.2 Survey Documentation

The visual inspection should be supplemented by a field survey to quantitatively monitor settlement of the cap and document cracking if visual inspections indicate any of the following:

- Approximately 600 LF or more cumulative crack length with a mean width of 1/8" or greater or a depth of 1 inch or greater over waste (i.e., inside apron).
- Cracks greater than ¾" in width or cracks that extend full depth (i.e., greater than 4 inches deep) regardless of total lengths.
- Crack frequency is greater than 100 LF within an area of 320 SF.
- Settlement/ponding greater than approximately 2 inches deep.

The surveys should be conducted by a surveyor licensed to practice in Texas. The survey should measure surface elevations on a 50' by 50' grid and at the center of apparent ponding. The survey should also document the locations of open cracks with an average width of approximately 1/8" or greater. The survey should be presented on 11" by 17" drawings and also provided on a CD-ROM. One drawing is recommended for documenting existing surface elevations at the survey points and changes in surface elevation from the base line survey (dated August 2013). Subsequent surveys after the base line survey should utilize the same base grid. A second drawing is recommended to document open cracks with a mean width of approximately 1/8" or greater.

2.3 Boundary Survey

A boundary survey for the Rockwool Industries Superfund Site was performed by All County Surveying, Inc. in March 2012. A copy of this boundary survey is provided for reference in Appendix A.

2.4 Base Line Inspection and Survey

Shaw conducted a field visual inspection on June 24, 2013, Parties present during the inspection included A. Henderson and M. Long with TCEQ and D. Friels with Shaw. Observations from the visual inspection were documented in a report dated July 22, 2013. The report is provided in Appendix G for reference. In August 2013 Jaster-Quintanilla Dallas, LLP performed a topographic survey of the MatCon cap and a survey of the cracks within the cap. The visual observations during the June 2013 cap inspection and the August 2013 topographic survey define and document baseline

conditions for comparison with future inspections and surveys. Additionally, the survey reference points used for the August 2013 survey should be used for future surveys in order to facilitate comparing surface elevations between the surveys and identifying changes in surface elevation. The August 2013 topographic survey and the MatCon cover cracks survey are provided in Appendix B-1 and Appendix B-2, respectively. The current survey of existing cracks (from Appendix B-2) should be used to obtain crack repair costs from contractors.

2.5 Reporting

The observations and conclusions from the inspection should be submitted in a letter report to the TCEQ. The report should include narrative discussions of inspection activities, observations, and recommendations for corrective action. Apparent changes in the surface condition and maintenance and repair activities completed since the previous inspection should also be documented. The check list provided in Appendix E is recommended as part of the site observation documentation. The report should also be supplemented by photographs illustrating typical defects. If a current survey is conducted, the survey drawings shall be attached to the inspection report.

3.0 Corrective Measures

3.1 General

HMA surface courses require ongoing maintenance and repairs for continued satisfactory performance. The surfaces are subject to the following defects:

- Cracks commonly develop due contraction and expansion from normal temperature changes
- Isolated settlement/ponding or heaving may occur due to consolidation of the underlying materials or shrinkage/swelling of underlying clay soils.
- Natural oxidation results from drying of the asphalt cement; and extended sun and water exposure causes evaporation of the asphalt cement, leaving a surface with mostly aggregate and deficient of binder.
- Where the surface is subject to traffic, fatigue cracks and ruts can develop due to excessive stress from the wheel loads.

The MatCon CC HMA cap has experienced surface oxidation, cracking, and settlement/ponding; and there is no reason to expect that these defects will not continue to develop over time. This cap is not subject to traffic or material storage; thus fatigue or stress defects are not anticipated (unless the usage changes). Maintenance and repair activities that are anticipated to be required periodically over the life of the cap are addressed in the following subsections along with anticipated corrective measures, materials, and procedures. Guidelines for determining when to implement various actions are addressed in Section 4 below, and Section 5 addresses material guide specifications.

3.2 Crack Sealing

Sealing of cracks in the HMA surface using an appropriate material and sound procedures is necessary to extend the life of the surface and reduce infiltration of surface water. Recommended materials for sealing cracks are addressed below in Subsection 5.2. It is recommended that cracks ranging in average width of approximately 1/8" to ¾" be sealed in general conformance with Figure 1 of Appendix H. Refer to the Subsection 3.3 on Patching and Overlays for cracks with widths greater than approximately ¾". Crack sealing is necessary to prevent water infiltration, minimize crack growth by preventing dirt and gravel from entering the crack, and to protect the adjacent asphalt. Cracks inside the apron and over waste are most critical because they are most likely to allow surface water to infiltrate to waste; however, where practicable apron cracks should also be repaired.

To properly seal the cracks, remove vegetation and dirt from cracks, and apply an EPA-approved herbicide or burn roots. If an EPA-approved herbicide is applied, sealing should be delayed for 7 to 14 days. It is recommended that cracks with a mean width of approximately 1/8" or greater be routed using a vertical-spindle router or rotary-impact router to provide a clean and even crack edge and reservoir for the sealant. Routing should remove approximately 1/8" of material from each side of the crack and should extend approximately ½" to ¾" deep. After routing and removal of at least 1/8" of material from each side of the crack, the sealant reservoir should be at least ¼" wider than the original crack. Typically, the sealant reservoir should have a minimum width of approximately 3/8" and a maximum width of approximately ¾". See Figure 1, Appendix H for cross section of a crack sealant reservoir. After completion of routing and removal of uneven edges and loose aggregate, the crack must be cleaned out by blowing with filtered compressed air. Just before applying the sealer, it is beneficial to use a hot air blast or heat lance to remove moisture and improve bonding. After preparation has been completed, the joints should be sealed with a hot applied rubber-asphalt crack sealing compound. The crack sealing material shall be applied with a pressure feed nozzle so that it penetrates the joint and completely fills the crack so that the top of sealant is not more than 1/8" above the pavement surface. Unless otherwise approved by the product manufacturer and engineer, sealant should not be applied unless the ambient temperature is greater than 40 degrees Fahrenheit (F).

3.3 Patching and Overlays

Patching as illustrated on Figures 3 and 4 of Appendix H are applicable for severe cracks that are greater than 3/4" wide and cracks that extend full depth (i.e., 4 inches deep). Patching is also recommended for areas with excessive cracking, such as a crack frequency greater than 100 lineal feet within an area of 320 square feet or less or cracks less than approximately 5 feet apart. Patching is also used in areas where the surface has failed. Except for shallow defects (less than approximately 1 inch deep), the full depth patch (Figure 4) is recommended.

Patches may also be used to correct surface grade deformation problems, such as ponding or rutting. Isolated areas of surface deformation (i.e., settlement/ponding) that are greater than approximately 2.0 inches deep should be corrected by applying leveling patch consistent with Figure 2 of Appendix H. Shallow surface defects may be repaired with a shallow patch that is installed after the defective surface has been sawed or milled out (refer to Figure 3). For the patch over existing HMA to perform satisfactorily, the surface to receive the overlay must be clean, dry of moisture, and tack coated.

An overlay would generally be applicable to the entire cap or at least a large section of the cap or the apron to provide additional HMA thickness and correct surface defects. It may be practical to repair the apron with an overlay, but more likely the existing apron would need to be removed, the base or subgrade repaired and compacted, and new HMA placed to the design lines and grades.

Patching material can be an approved HMA mixture, such as Type D fine graded surface course or approved proprietary products. HMA material used for an overlay would typically consist of a Type D fine graded surface course mixture. In general, patches or overlays would need to have a minimum thickness of 1 inch except at feathered edges. Patching is accomplished by sawing out the affected areas or cracks, tack coating or priming the exposed surfaces, and placing a patch consisting of approved HMA patching material. Since a vertical joint is formed at the edge of the patch, consideration should be given to routing and sealing the joint (refer to Subsection 3.2) to reduce the potential for water infiltration around the patch.

3.4 Seal Coat

Seal coats are part of normal asphalt surface maintenance and are useful for rejuvenating and protecting the surface, sealing hairline cracks, and repairing surface abrasions. Seal coats consist of thin layer of asphalt or coal tar material that is applied in liquid form with a high pressure sprayer or power squeegee. Seal coat materials consist of a liquid formulation of either asphalt or coal tar base material that is frequently mixed with sand and other additives; such as, rubber, latex, or polymers. Rubber additive is typically used with coal tar to make the application more flexible. Latex or polymers are typically used with hot asphalt based sealers (including asphalt emulsions) to harden, thicken, strengthen, and help maintain the sand in suspension. Asphalt emulsion sealers are often blended with clay (as part of the manufactures proprietary formula) to add body and increase durability. Sand is an important additive to the asphalt based emulsion to improve traction, add body, and increase durability. A quality seal coat application should not be confused with a fog seal which generally consists of a slow drying oil cut back, diluted with as much as 50 percent water, and sprayed on the surface in a fine mist.

- *Asphalt Emulsion* – Asphalt emulsion is probably the most common asphalt based seal coat material. Typically, the liquid asphalt based emulsion is stabilized with clay and mixed with water, silica sand, and a polymer or latex. A surfactant is sometimes added to improve the coating of the sand particles. This type of sealer is generally most common and often the least expensive, but also has the shortest service life. The emulsions are typically heated for blending and some products require heating to approximately 150 to 160 degrees F for application. It is important that the ambient temperature be expected to remain above approximately 50 degrees F during and for at least 24 hours following seal coat application. Emulsion seal coats are typically applied with a minimum of 2 to 3 applications.

- *Coal Tar* - Coal tar is similar in appearance to asphalt, but is produced as a byproduct of bituminous coal during the production of metallurgical coke or coal gas. Coal tar can be made into an emulsion comparable to asphalt emulsion. Coal tar is the most resistant type of seal coat to damage from petroleum products or chemicals, but can also cause cancer in humans. A coal tar sealer is not recommended for this application since there should not be potential for damage from oil, gasoline, or diesel fuel, and because of the potential to be carcinogenic.

- *Hot Liquid Asphalt* – Asphalt cements, such as AC-10 or AC-15 may be used for seal coating. Typically, these materials are used if the applied seal coat will be covered with a thin layer of aggregate (e.g., fine crushed stone or sand). Hot liquid asphalt seal coat is heated to approximately 300 degrees F or more and must be applied when the ambient temperature is expected to remain above 70 degrees F for several days.

For this project an asphalt emulsion mixed with water, sand, and other additives (based on the manufactures formulary) is considered most appropriate. Prior to seal coat application, the asphalt surface must be clean and free of dirt and debris and dry of free moisture. The surface should be cleaned with a power broom or truck mounted vacuum. Loose surface material such as, flaking of previous seal coats, should be scrapped off. Additionally, any necessary repairs, such as crack sealing and patching should be completed prior to seal coat application. The seal coat application should be in accordance with the manufacturers recommendations and consistent with applicable TxDOT specifications. Unless otherwise approved, sealer should not be applied unless the ambient temperature is above 50 degrees F and expected to remain at 50 degrees F or greater for the following 24-hour period.

The seal coat application rate will vary somewhat depending on the material, admixtures, temperature, and other factors and should be applied consistent with the manufactures specifications. With most materials, a minimum of two applications are recommended using an application rate of approximately 0.1 to 0.15 gallons per square yard per application. As noted above, seal coats may be applied with a high pressure sprayer or squeegee. If the asphalt surface contains significant (i.e., greater than approximately 500 LF) hairline to 1/16" wide cracks that have not been sealed, consideration should be given to using the squeegee procedure for the first application since the squeegee application will generally fill open cracks and surface defects better than the spray application. A typical seal coat mixture based on 1 gallon of asphalt base material is:

- Asphalt base material – 1 gallon
- Sand – 3 to 5 pounds
- Water – 0.15 to 0.25 gallons (15% to 25%)
- Additive – polymer or latex at 0.01 to 0.02 gallons (1% to 2%)

4.0 Maintenance and Repair Guide Lines

It is important that maintenance and repair activities be performed timely in order to prolong the integrity and performance of the cap and assure continued preclusion of surface water from infiltrating into the underlying contaminated soils and waste. The following guide lines have been established to set practical minimum schedules for various activities including contracting for maintenance and repair services:

- Inspect HMA cap annually
- Perform a survey of the cap if the visual inspection reveals significant changes since the previous survey or cracking or ponding appear to be sufficient to justify repairs. Generally repairs would by justified as proposed in the following bullet or listed above in Subsection 2.2.
- Contract for asphalt repairs if inspections of the HMA surface over waste (excluding the apron) reveal:
  - Approximately 600 LF or more cumulative crack length with a mean width of 1/8" or greater or crack depths of 1 inch or greater over waste (i.e., inside apron).
  - cracks greater than ¾" in width or cracks that extend full depth (i.e., greater than 4 inches deep) regardless of total lengths.
  - Crack frequency is greater than 100 LF within an area of 320 SF.
  - Settlement/ponding greater than approximately 2 inches deep (confirmed by survey).
  - Apply a seal coat anytime repairs, such as sealing of cracks or patching are performed.
- Approximately every 5 to 7 years seal cracks and seal coat entire surface to combat weathering and oxidation and to generally extend service life of the cover even if conditions to trigger repairs as given above have not been met.

5.0 Material Specifications

5.1 Applicable Specifications

- Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, Texas Department of Transportation, June 1, 2004 (TxDOT Specification)

5.2 Crack Sealing Material

Rubber-asphalt (hot applied) crack sealing compound complying with TxDOT Specification 300.2 H Table 15. Typical materials include:

- Deery 102 Hot Applied Sealant
- Crafco Asphalt Rubber 541 (hot pour)
- SealMaster Crack Master PL or Crack Supreme
- Other comparable materials that have been approved by the engineer

5.3 HMA Patching and Overlay Material

- Asphalt paving mixture complying with TxDOT Specification Item 340, Dense-Graded Hot-Mix Asphalt, Type "D" fine graded surface mixture
- Proprietary products compatible with HMA may also be considered for small repairs where limited amounts of patch material are required if the material is approved by the engineer

5.4 Seal Coat Material

An approved clay stabilized asphalt based emulsion fortified with sand. Typical seal coat materials are:

- MasterSeal Concentrate Asphalt Based Pavement Sealer mixed with water, sand and additive manufactured by SealMaster. (requires minimum of 2 applications or coats per seal coat event)
- Jennite AE manufactured by Neyra Industries, Inc. mixed with sand and water (requires minimum of 3 applications or coats per seal coat event)
- Other approved asphalt based products
- Sand Additive - grade # 40 to #70 or as required by the manufacturer of the base seal coat material.

Copies of selected specifications (called Items) taken from the TxDOT Specifications and various specifications and manufactures materials information sheets are provided for reference in Appendix I.

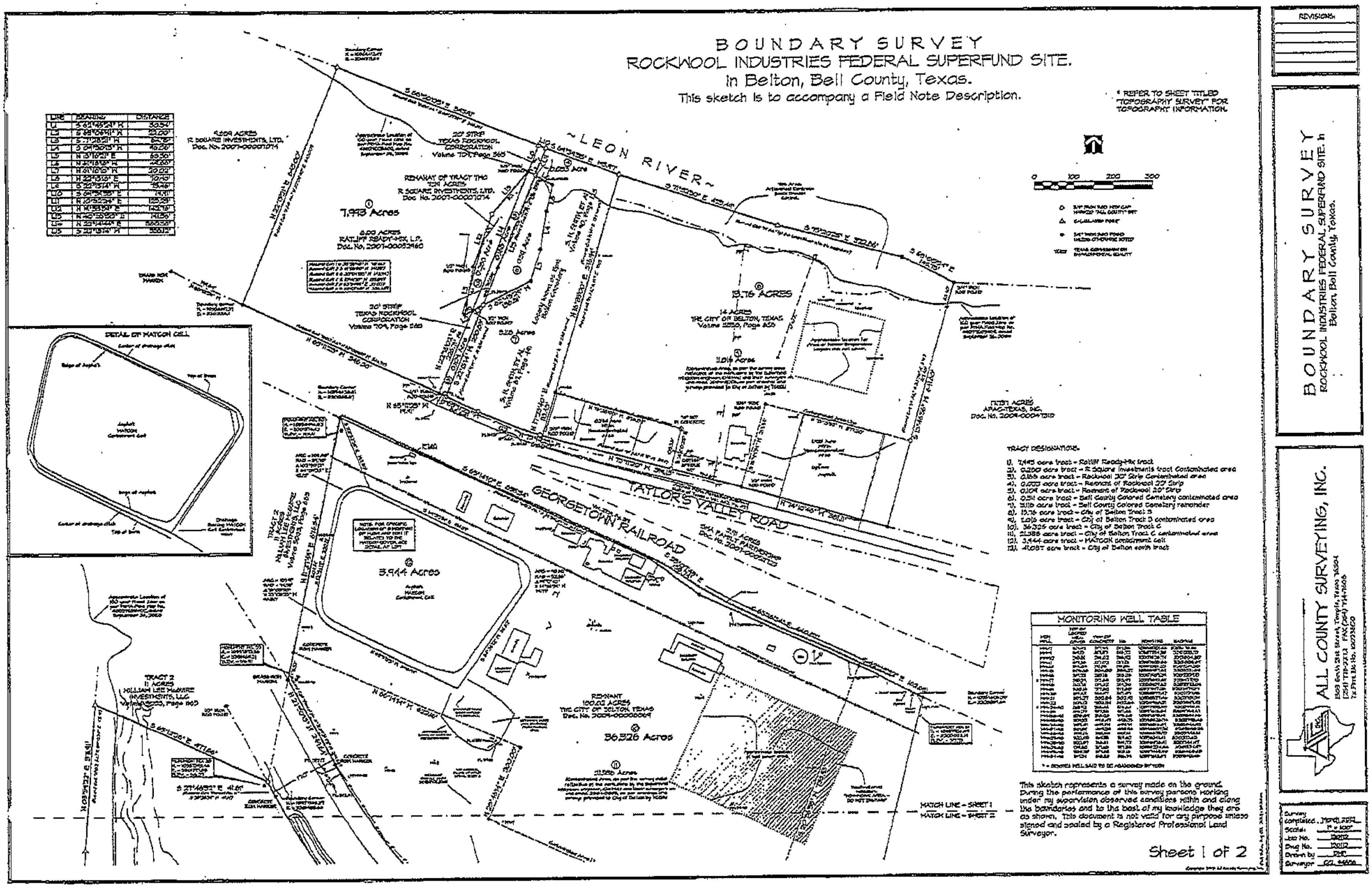
6.0 References

The following materials have been used or referenced during the preparation of this O&M Manual.

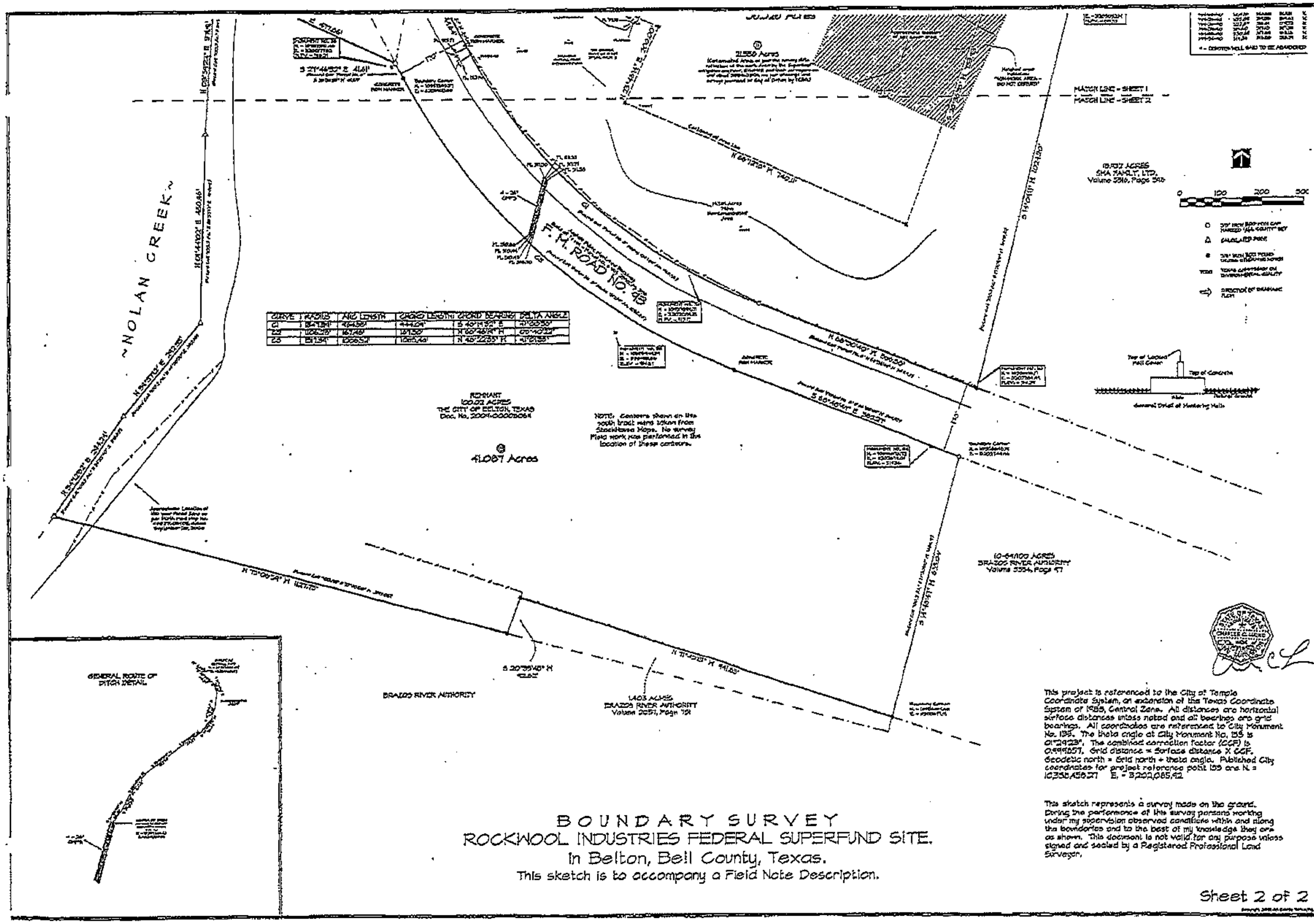
- Remedial Action Report, Rockwool Industries, Inc. Super Fund Site, prepared for U.S. Environmental Protection Agency by Tetra Tech EM, Inc., February 3, 2006 (RAR)
- Final First Five-Year Review Report, Rockwool Industries, Inc. Superfund Site, Prepared by Region 6 United States Environmental Protection Agency, Sept. 2012 (5-YR)
- As-Built Drawings, Soil/Waste Excavation and Site Restoration, Rockwool Industries, Inc. Superfund Site, Belton, Texas, Sheets 1 – 20, prepared for EPA by CH2MHill, January 2006, Attachment 11 to the RAR (Record Drawings)
- Operations and Maintenance Plan for Rockwool Industries, Inc., Belton, Texas, Prepared for EPA Region 6 by CH2M Hill, January 2006, Attachment 12 to the RAR (CH2M Hill O&M Plan)
- MatCon® Operation and Maintenance Plan for Rockwool Superfund Site, Prepared by Wilder Construction Company, January 13, 2006, Attachment D to the CH2M Hill O&M Plan (MatCon® O&M Plan).
- Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, Texas Department of Transportation, June 1, 2004 (TxDOT Specification)
- RWI Site O&M Plan dated February 2011, prepared by Daniel B. Stephens and Associates for the TCEQ (DBS O&M Plan)
- Boundary Survey, Rockwool Industries Federal Superfund Site. In Belton, Bell, County, Texas, Sheets 1 and 2, prepared by All County Surveying, Inc., dated March 2012
- Texas Risk Reduction Program Restrictive Covenant for Rockwool Industries, Inc. Tracts 10, 11, 12, and 13, executed January 8, 2013 (Restrictive Covenant)
- Topographic Survey of Asphalt Landfill Cap for Rockwool Industries, Inc. Superfund Site, Belton, Texas, 2 drawings, prepared by Jaster-Quintanilla Dallas, LP dated August 28, 2013
- Inspection Report, Rockwool Industries, Inc. Federal Superfund Site, Prepared to TCEQ by Shaw Environmental, Inc., July 2013 (Shaw Inspection Report)

Appendix A

Boundary Survey



BOUNDARY SURVEY
ROCKWOOL INDUSTRIES FEDERAL SUPERFUND SITE.
In Belton, Bell County, Texas.
This sketch is to accompany a Field Note Description.
* REFER TO SHEET TITLED "TOPOGRAPHY SURVEY" FOR TOPOGRAPHY INFORMATION.
~LEON RIVER~
7.993 Acres
13.76 Acres
14 ACRES THE CITY OF BELTON, TEXAS
TAYLORS VALLEY ROAD
GEORGETOWN RAILROAD
3.944 Acres
36.326 Acres
REMNANT 100.00 ACRES THE CITY OF BELTON, TEXAS
DETAIL OF MATCON CELL
TRACT DESIGNATIONS:
MONITORING WELL TABLE
This sketch represents a survey made on the ground. During the performance of this survey persons working under my supervision observed conditions within and along the boundaries and to the best of my knowledge they are as shown. This document is not valid for any purpose unless signed and sealed by a Registered Professional Land Surveyor.
MATCH LINE - SHEET 1
MATCH LINE - SHEET 2
Sheet 1 of 2
REVISIONS:
BOUNDARY SURVEY
ROCKWOOL INDUSTRIES FEDERAL SUPERFUND SITE. In Belton, Bell County, Texas.
ALL COUNTY SURVEYING, INC.



CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
C1	634.89'	454.50'	444.04'	S 40°11'57" E	41°00'55"
C2	1062.15'	167.48'	167.30'	N 60°48'47" W	[illegible]
C3	1411.34'	1006.54'	1065.40'	N 46°22'35" W	[illegible]

This project is referenced to the City of Temple Coordinate System, an extension of the Texas Coordinate System of 1983, Central Zone. All distances are horizontal surface distances unless noted and all bearings are grid bearings. All coordinates are referenced to City Monument No. 135. The theta angle at City Monument No. 135 is 01°29'23". The combined correction factor (CCF) is 0.999857. Grid distance = Surface distance X CCF. Geodetic north = Grid north + theta angle. Published City coordinates for project reference point 135 are N. = 10,358,458.27 E. = 3,202,085.42

This sketch represents a survey made on the ground. During the performance of this survey persons working under my supervision observed conditions within and along the boundaries and to the best of my knowledge they are as shown. This document is not valid for any purpose unless signed and sealed by a Registered Professional Land Surveyor.

BOUNDARY SURVEY

ROCKWOOL INDUSTRIES FEDERAL SUPERFUND SITE.
In Belton, Bell County, Texas.
This sketch is to accompany a Field Note Description.

Sheet 2 of 2

REVISIONS

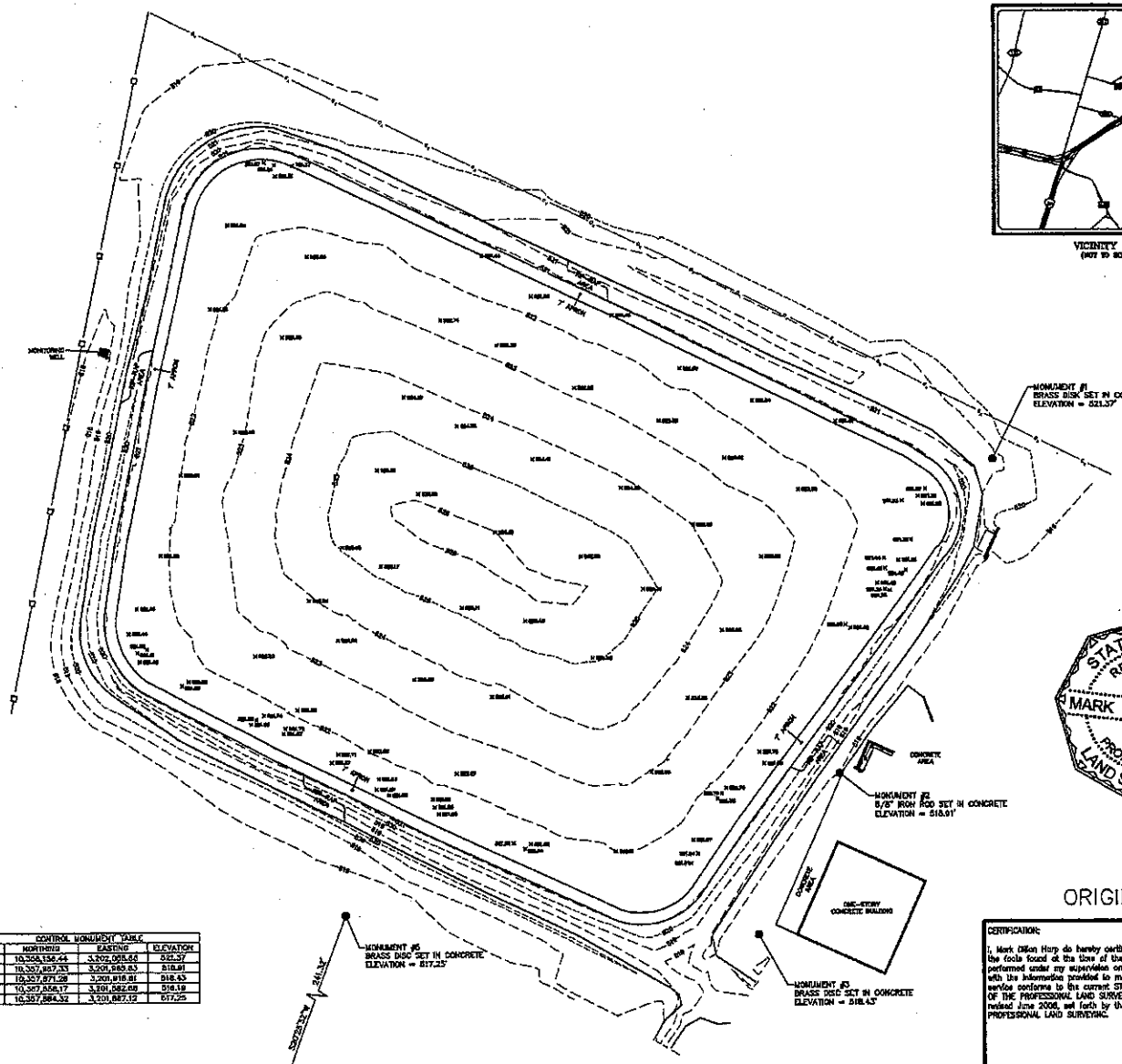
BOUNDARY SURVEY
ROCKWOOL INDUSTRIES FEDERAL SUPERFUND SITE, in Belton, Bell County, Texas.

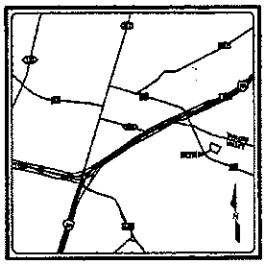
ALL COUNTY SURVEYING, INC.
1303 South 21st Street, Temple, Texas 76504
(254) 778-2272 FAX (254) 774-7608
TX Firm. Lic. No. 10023400

Survey completed: March 2017
Scale: 1" = 100'

Appendix B-1

Topographic Survey





VICINITY MAP
(NOT TO SCALE)

N

GRAPHIC SCALE

(IN FEET)
1 inch = 80 ft.

NOTES:

1) THE COORDINATION OF THIS DRAWING IS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NAD 83 CENTRAL ZONE 4203.

2) ELEVATIONS SHOWN HEREON ARE BASED ON CITY OF BELTON, TEXAS BENCHMARK NO. B-8. ELEVATION = 642.79'

LEGEND

CONTROL MONUMENT TABLE			
NO.	NORTHING	EASTING	ELEVATION
1	10,358,158.44	3,202,065.80	521.37
2	10,357,857.33	3,201,980.83	518.01
3	10,357,971.28	3,201,816.81	518.43
4	10,357,858.17	3,201,682.68	516.19
5	10,357,884.32	3,201,887.12	517.25

STATE OF TEXAS
REGISTERED
MARK DILLON HARP
6445
PROFESSIONAL
LAND SURVEYOR

9/20/2013

ORIGINAL

UTILITY NOTE:

UTILITY INFORMATION IS BASED UPON FIELD MEASUREMENTS. FIELD DATA IS LIMITED TO THAT WHICH IS VISIBLE AND CAN BE MEASURED. THIS DOES NOT PRECLUDE THE EXISTENCE OF OTHER UNDERGROUND ITEMS.

CERTIFICATION:

I, Mark Dillon Harp do hereby certify this survey drawing reflects the facts found at the time of the survey shown hereon as performed under my supervision on the ground in accordance with the information provided to me, and that this professional service conforms to the current STANDARDS AND SPECIFICATIONS OF THE PROFESSIONAL LAND SURVEYING PRACTICES ACT as revised June 2006, set forth by the TEXAS BOARD OF PROFESSIONAL LAND SURVEYING.

Name: MARK DILLON HARP
Registered Professional Land Surveyor
Texas No. 6445
Date of Survey:

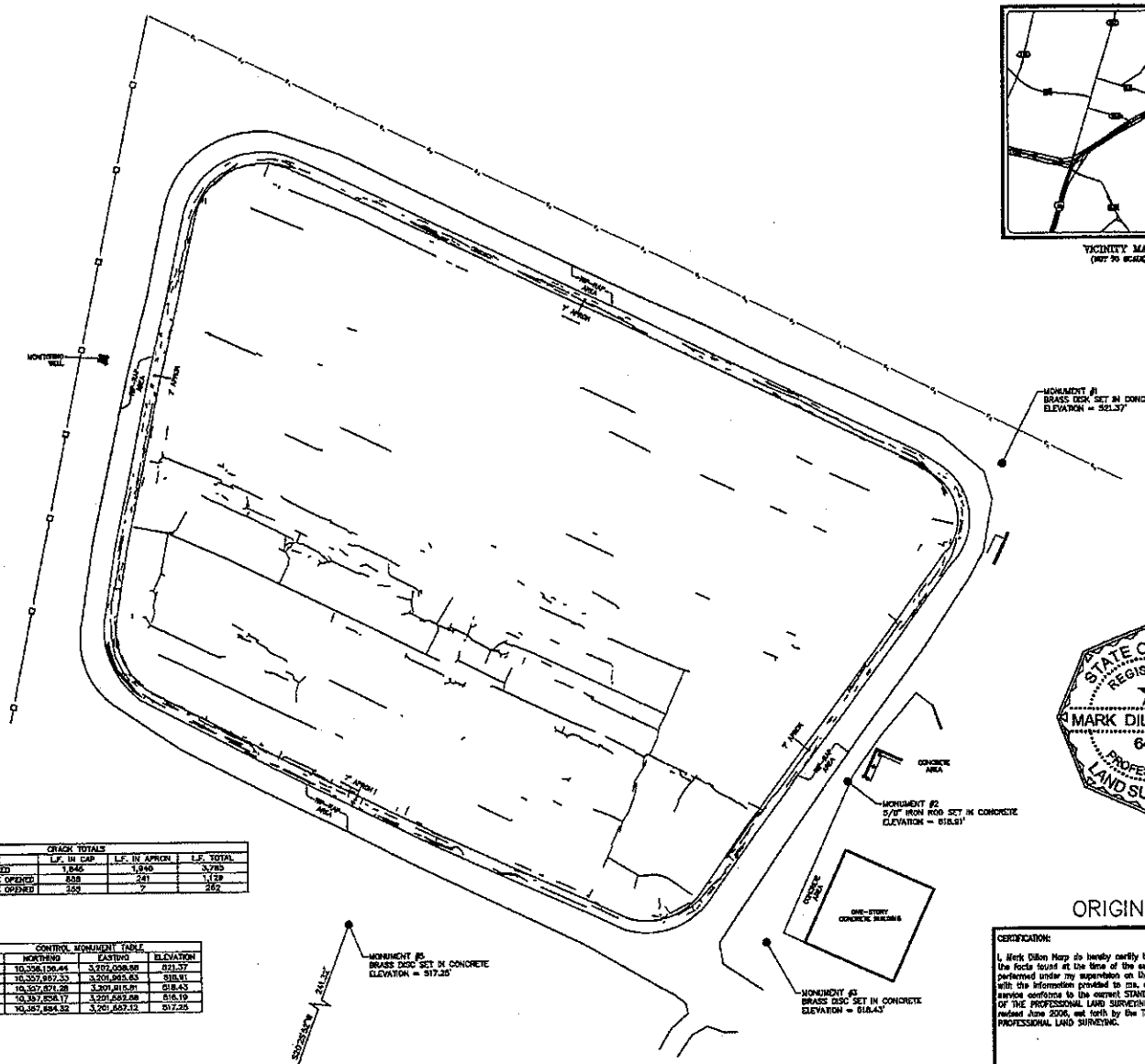
TOPOGRAPHIC SURVEY OF
ASPHALT LANDFILL CAP FOR
ROCKWOOL INDUSTRIES, INC.
SUPERFUND SITE
BELTON, TEXAS

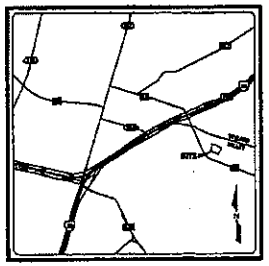
JACOBS-QUINCANDOLA DALLAS, LLP

DRAWN:	JAK
CHECKED:	MDH
DATE:	08/28/13
FIELD BOOK:	
PAGE:	
ORDR:	
SHEET:	1 of 1

Appendix B-2

MatCon Cover/Cracks Survey





VICINITY MAP
(NOT TO SCALE)

N

GRAPHIC SCALE

(IN FEET)
1 inch = 80 ft.

NOTES:

1) THE ORIENTATION OF THIS DRAWING IS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NAD 83 CENTRAL ZONE 4203.

2) ELEVATIONS SHOWN HEREON ARE BASED ON CITY OF BELTON, TEXAS BENCHMARK NO. B-6. ELEVATION = 846.76'

LEGEND

CRACK TOTALS				
COLOR	TYPE	L.F. IN CAP	L.F. IN APRON	L.F. TOTAL
	UNSEALED	1,846	1,946	3,793
	SEALED >100% OPENED	888	241	1,129
	SEALED <100% OPENED	350	7	357

CONTROL MONUMENT TABLE			
NO.	NORTHING	EASTING	ELEVATION
1	10,358,130.44	3,202,058.58	521.37
2	10,357,867.33	3,201,985.63	518.91
3	10,357,871.28	3,201,815.51	518.43
4	10,357,604.17	3,201,683.88	516.19
5	10,357,884.32	3,201,847.12	517.25

STATE OF TEXAS
REGISTERED
MARK DILLON HARP
6445
PROFESSIONAL
LAND SURVEYOR

9/20/2013

ORIGINAL

UTILITY NOTE:

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Name: MARK DILLON HARP
Registered Professional Land Surveyor
Texas No. 6445
Date of Survey:

MATCON COVER/CRACKS SURVEY FOR
ROCKWOOL INDUSTRIES, INC.
SUPERFUND SITE
BELTON, TEXAS

EASTER-QUINCANNON DALLAS, LLP

DRAWN:	JAK
CHECKED:	MDH
DATE:	09/20/13
FIELD BOOK:	
PAGE:	
JOB#:	
SHEET:	1 of 1

Appendix C

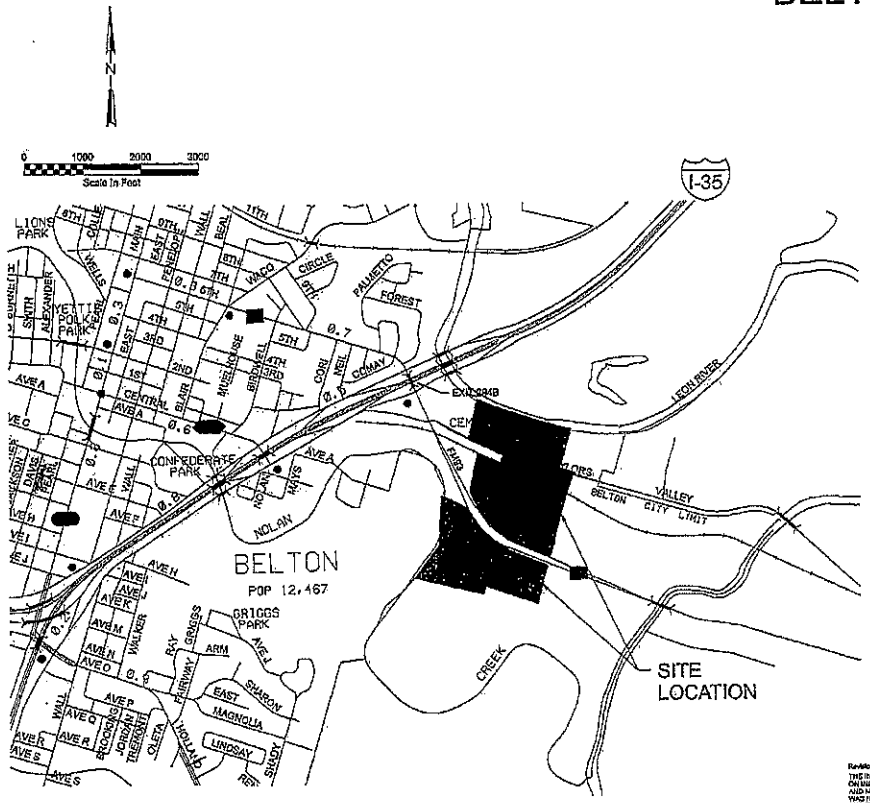
Record Drawings

AS-BUILT DRAWINGS

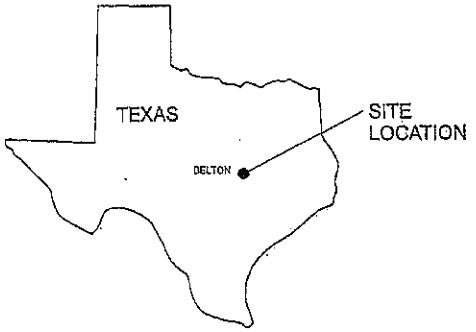
SOIL / WASTE EXCAVATION AND SITE RESTORATION

ROCKWOOL INDUSTRIES, INC SUPERFUND SITE

BELTON, TEXAS



LOCATION MAP



INDEX TO DRAWINGS			
SHT NO.	DWG NO.	SHEET TITLE / DESCRIPTION	
1	C-1	SITE LOCATION AND DRAWING INDEX	
2	C-2	SITE VICINITY MAP AND ACCESS PLAN	
3	C-3	SITE PREPARATION PLAN	GEER PROPERTY - CEMETERY AREA AND NORTH PROPERTY
4	C-4	SITE PREPARATION PLAN	OU2 AND CENTRAL PROPERTY
5	C-5	EXCAVATION / WASTE REMOVAL PLAN	GEER PROPERTY - CEMETERY AREA
6	C-6	EXCAVATION / WASTE REMOVAL PLAN	NORTH PROPERTY
7	C-7	EXCAVATION / WASTE REMOVAL PLAN	LEON RIVER EMBANKMENT
8	C-8	EXCAVATION / WASTE REMOVAL PLAN	OU2 AND CENTRAL PROPERTY
9	C-9	COVER AND FINISHED GRADE PLAN	GEER PROPERTY - CEMETERY AREA
10	C-10	COVER AND FINISHED GRADE PLAN	NORTH PROPERTY
11	C-11	FINISHED GRADE PLAN - CONTAINMENT CELL	OU2 AND CENTRAL PROPERTY
12	C-12	CULVERT PROFILES AND DETAILS	GEER PROPERTY - CEMETERY AREA
13	C-13	SECTIONS	GEER PROPERTY - CEMETERY AREA AND NORTH PROPERTY
14	C-14	SECTIONS	OU2 AND CENTRAL PROPERTY
15	C-15	DETAILS	COVER, CHAIN LINK FENCE, AND SEDIMENT FENCE
16	C-16	DETAILS	STORMWATER AND LEON RIVER EMBANKMENT
17	C-17	EXCAVATION PLAN	CONTAINMENT CELL
18	C-18	FINISHED GRADE PLAN	CONTAINMENT CELL
19	C-19	SECTIONS AND DETAILS	CONTAINMENT CELL
20	C-20	DETAILS	MONITORING WELL

RECORD DRAWINGS

Revisions Drawn By: JB Date: 1-2008

THE INFORMATION PROVIDED IN THE RECORD DRAWINGS IS BASED ON INFORMATION PROVIDED BY OTHERS FROM OBSERVATIONS AND MEASUREMENTS TAKEN DURING CONSTRUCTION. CH2M HILL WAS NOT PRESENT DURING CONSTRUCTION OF THE CONTRACT AND THEREFORE, WILL NOT BE RESPONSIBLE FOR ANY ERRORS, OMISSIONS, OR DESIGN CHANGES THAT MAY HAVE HAPPENED DURING CONSTRUCTION WITHOUT NOTIFICATION FOR APPROVAL OF CH2M HILL, WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS FROM THE INFORMATION PROVIDED.

DSGN	RE THOMPSON						VERIFY SCALE
DR	DCEVANS						BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
CHK	RE THOMPSON / MD WILSON						
APVD	DJ STIES	1	1/2008	RECORD DRAWINGS	JB	DS	
		NO.	DATE	REVISION	BY	APVD	

CH2MHILL

EPA

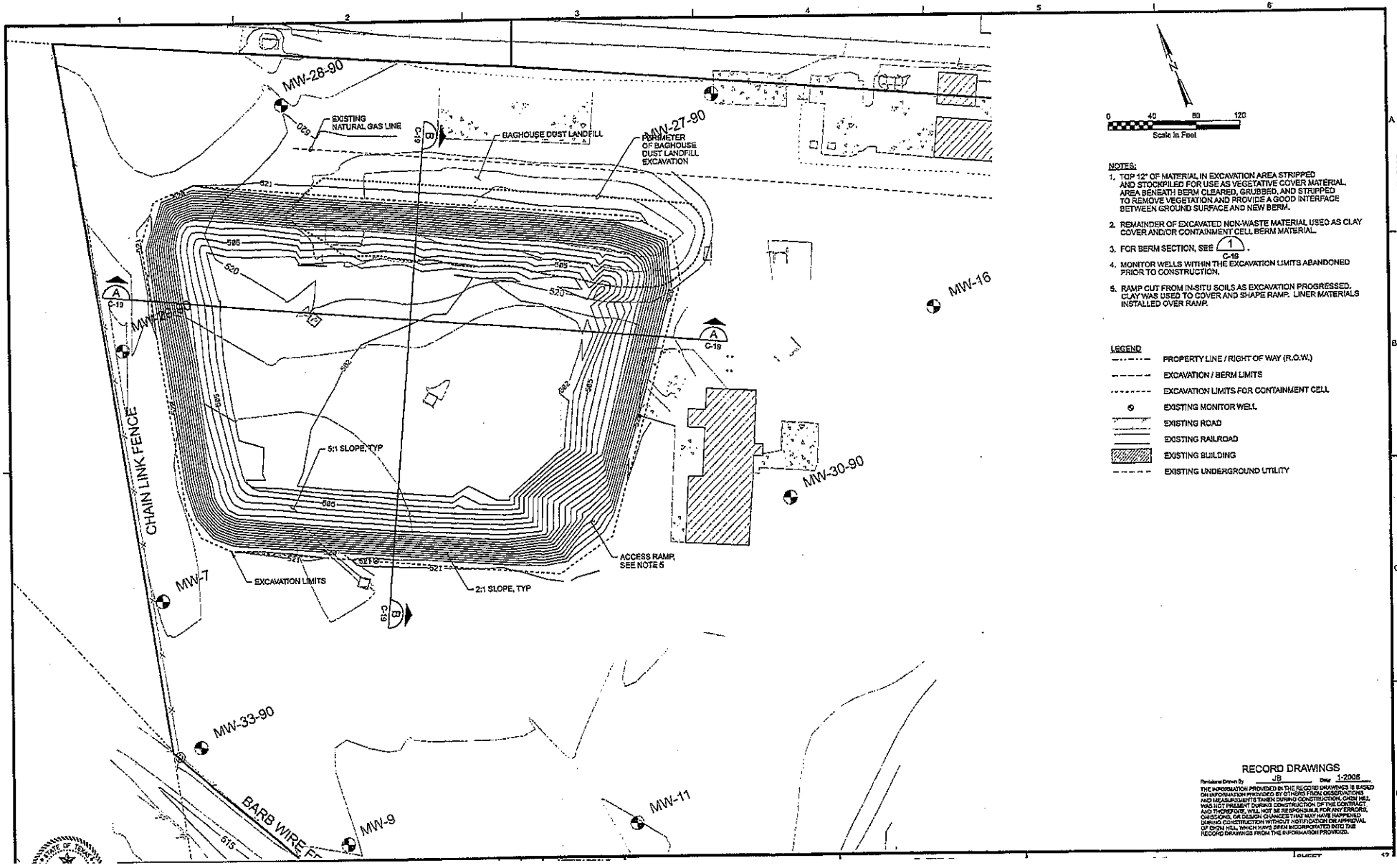
REGION 6 DALLAS, TEXAS - ROCKWOOL INDUSTRIES BELTON, TEXAS

CIVIL

SITE LOCATION AND DRAWING INDEX

SHEET	1
DWG	C-1
DATE	JAN 2008
PROJ	385014

FILENAME: C5rct000_385014.dgn PLOT DATE: 01/23/2008 PLOT TIME: 11:40:08 AM



NOTES:

1. TOP 12" OF MATERIAL IN EXCAVATION AREA STRIPPED AND STOCKPILED FOR USE AS VEGETATIVE COVER MATERIAL. AREA BENEATH BERM CLEARED, GRUBBED, AND STRIPPED TO REMOVE VEGETATION AND PROVIDE A GOOD INTERFACE BETWEEN GROUND SURFACE AND NEW BERM.
2. REMAINDER OF EXCAVATED NON-WASTE MATERIAL USED AS CLAY COVER AND/OR CONTAINMENT CELL BERM MATERIAL.
3. FOR BERM SECTION, SEE 1/C-19.
4. MONITOR WELLS WITHIN THE EXCAVATION LIMITS ABANDONED PRIOR TO CONSTRUCTION.
5. RAMP CUT FROM IN-SITU SOILS AS EXCAVATION PROGRESSED. CLAY WAS USED TO COVER AND SHAPE RAMP. LINER MATERIALS INSTALLED OVER RAMP.

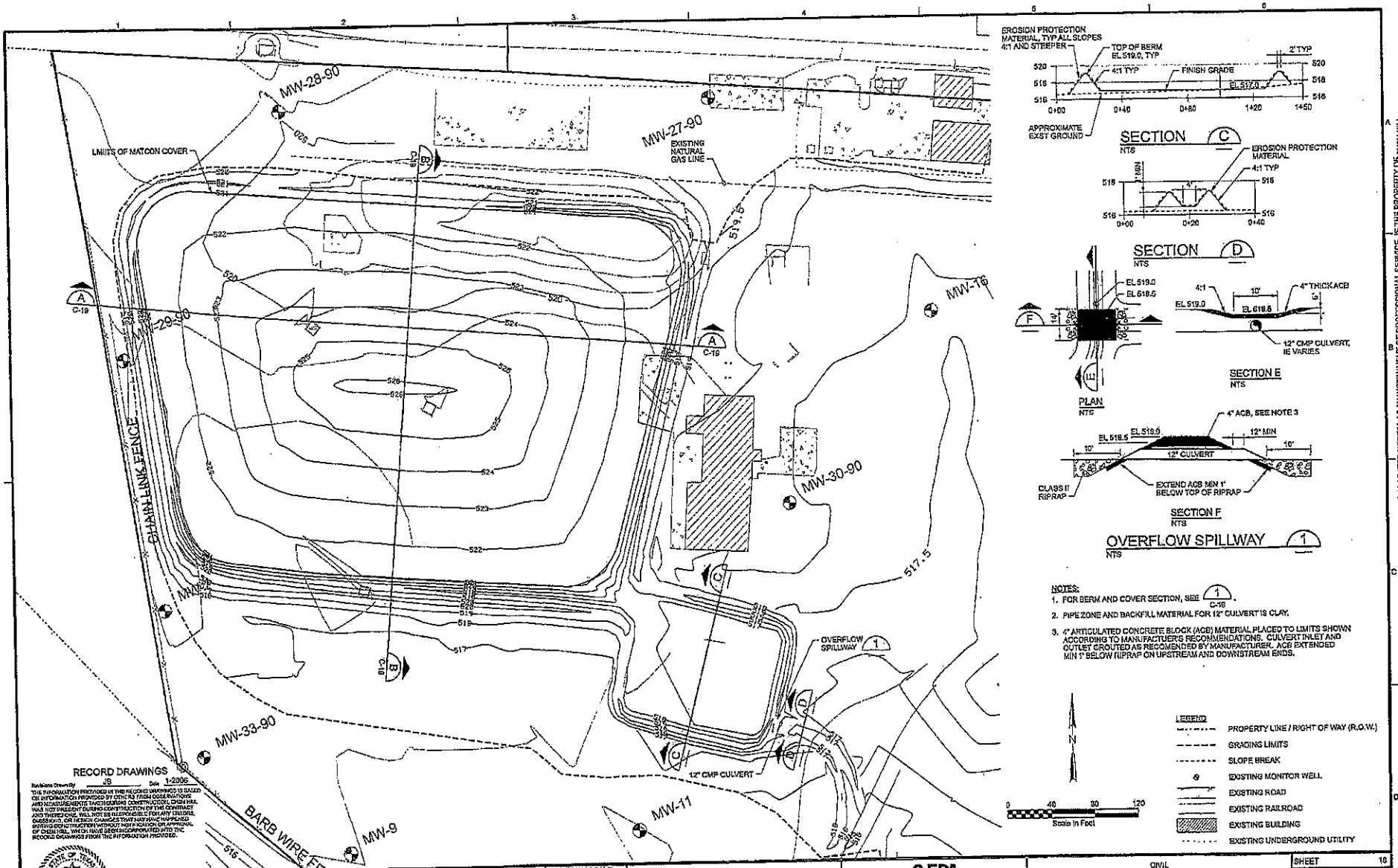
LEGEND

- PROPERTY LINE / RIGHT OF WAY (R.O.W.)
- EXCAVATION / BERM LIMITS
- EXCAVATION LIMITS FOR CONTAINMENT CELL
- EXISTING MONITOR WELL
- EXISTING ROAD
- EXISTING RAILROAD
- EXISTING BUILDING
- EXISTING UNDERGROUND UTILITY

RECORD DRAWINGS

Revisions Drawn By JB Date 1-2006

THE INFORMATION PROVIDED IN THE RECORD DRAWINGS IS BASED ON INFORMATION PROVIDED BY OTHERS FROM OBSERVATIONS AND MEASUREMENTS TAKEN DURING CONSTRUCTION. CHOM HILL WAS NOT PRESENT DURING CONSTRUCTION OF THE CONTRACT AND THEREFORE, WILL NOT BE RESPONSIBLE FOR ANY ERRORS, OMISSIONS, OR DESIGN CHANGES THAT MAY HAVE HAPPENED DURING CONSTRUCTION WITHOUT NOTIFICATION OR APPROVAL OF CHOM HILL WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS FROM THE INFORMATION PROVIDED.



RECORD DRAWINGS
Redline Drawn By JS Date 1-2006
THIS INFORMATION PROVIDED IN THIS RECORD DRAWINGS IS BASED ON INFORMATION PROVIDED BY OTHERS FROM OBSERVATIONS AND MEASUREMENTS TAKEN DURING CONSTRUCTION. CH2M HILL WAS NOT PRESENT DURING CONSTRUCTION OF THE CONTRACT AND THEREFORE, WILL NOT BE RESPONSIBLE FOR ANY ERRORS, GUESSWORK, OR IN SUCH CHANGES THAT MAY HAVE HAPPENED DURING CONSTRUCTION WITHOUT NOTIFICATION OR APPROVAL OF CH2M HILL, WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS FROM THIS INFORMATION PROVIDED.

STATE OF TEXAS — DAVID J. STIEB — 79795 — REGISTERED PROFESSIONAL ENGINEER
David J. Stieb 1-31-06

DSGN	RE THOMPSON / JA BOOTH
DR	DC EVANS
CHK	RE THOMPSON / MD WILSON
APVD	DJ STIEB

NO.	DATE	REVISION	BY	APVD
3	1/2006	RECORD DRAWINGS	JB	DS
2	7/2005	DESIGN REVISION 1	JB	RT
1	1/2005	ADDENDUM 1	JB	RT

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

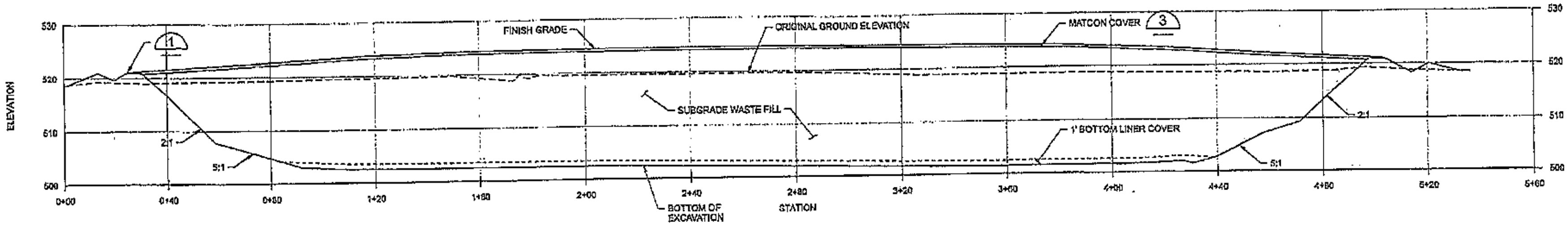
CH2MHILL

EPA
REGION 6 DALLAS, TEXAS
ROCKWOOL INDUSTRIES
BELTON, TEXAS

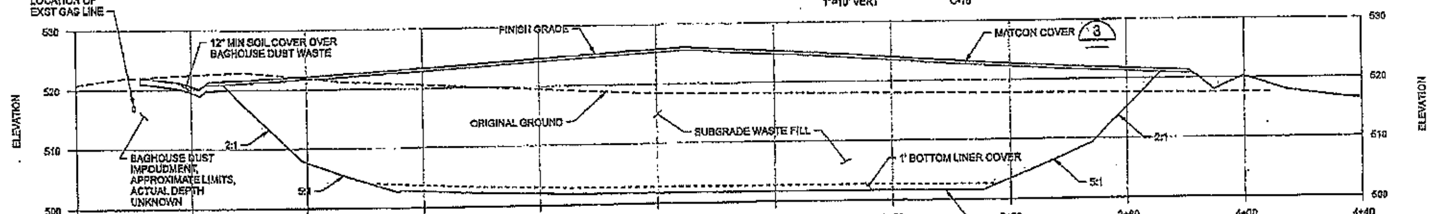
OU#1
FINISHED GRADE PLAN
CONTAINMENT CELL

SHEET	18
DWG	C-18
DATE	JAN 2006
PROJ	185014

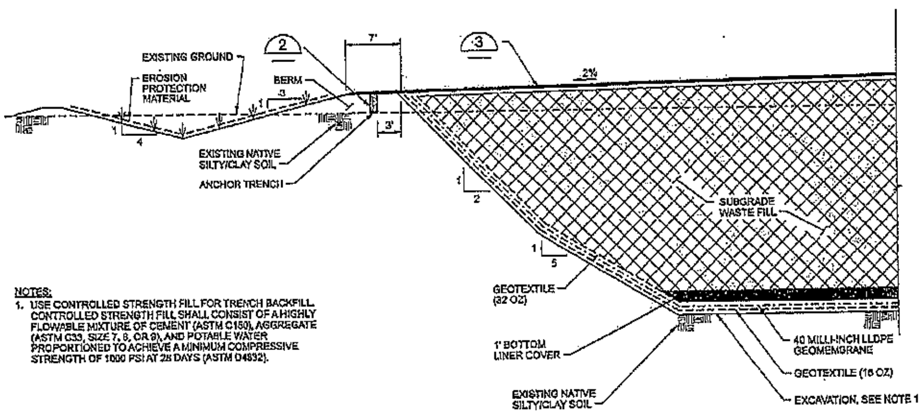
FILENAME: 06ncg117d_185014.dgn PLOT DATE: 01/23/2006 PLOT TIME: 12:04:47 PM



SECTION A
1"=20' HORIZ
1"=10' VERT
C-17
C-18

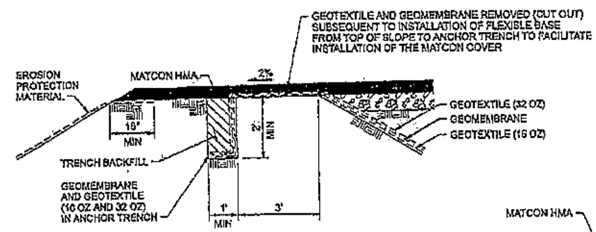


SECTION B
1"=20' HORIZ
1"=10' VERT
C-17
C-18

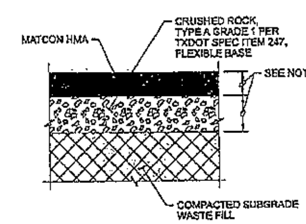


NOTES:
1. USE CONTROLLED STRENGTH FILL FOR TRENCH BACKFILL. CONTROLLED STRENGTH FILL SHALL CONSIST OF A HIGHLY FLOWABLE MIXTURE OF CEMENT (ASTM C150), AGGREGATE (ASTM C33, SIZE 7, 8, OR 9), AND POTABLE WATER PROPORTIONED TO ACHIEVE A MINIMUM COMPRESSIVE STRENGTH OF 1000 PSI AT 28 DAYS (ASTM D4832).

CONTAINMENT CELL DETAIL 1
NTS
C-17, C-18



ANCHOR TRENCH DETAIL 2
NTS



NOTE: MINIMUM THICKNESS AS DETERMINED BY WILDER CONSTRUCTION.

COVER DETAIL 3
NTS

RECORD DRAWINGS
Drawn By JB Date 1-2006
THE INFORMATION PROVIDED IN THE RECORD DRAWINGS IS BASED ON INFORMATION PROVIDED BY OTHERS FROM OBSERVATIONS AND MEASUREMENTS TAKEN DURING CONSTRUCTION. CH2M HILL WAS NOT PRESENT DURING CONSTRUCTION OF THIS CONTRACT AND THEREFORE, WILL NOT BE RESPONSIBLE FOR ANY ERRORS, OMISSIONS, OR DESIGN CHANGES THAT MAY HAVE HAPPENED DURING CONSTRUCTION WITHOUT NOTIFICATION OR APPROVAL OF CH2M HILL WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS FROM THE INFORMATION PROVIDED.

DSGN	RE THOMPSON / JA BOOTH	3	1/2006	RECORD DRAWINGS	JB	OS	
DR	DC EVANS	2	7/2005	DESIGN REVISION 1	JB	RT	
CHK	RE THOMPSON / MD WILSON	1	1/2005	ADDENDUM 1	JB	RT	
APVD	DJ STIER	NO.	DATE	REVISION	BY	APVD	

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

CH2MHILL

EPA
REGION 6 DALLAS, TEXAS
ROCKWOOL INDUSTRIES
BELTON, TEXAS

CIVIL
SECTIONS AND DETAILS
CONTAINMENT CELL

SHEET	19
DWG	C-19
DATE	JAN 2006
PROJ	165014

FILENAME: 08nc212d_165014.dgn PLOT DATE: 01/23/2006 PLOT TIME: 12:03:50 PM

Appendix D

MatCon Web Page

MatCon, Inc.

... materials for the construction industry

CERCLA and Superfund ...

Hanford, RTY Interim Barrier Asphalt Cap
Location: Hanford Nuclear Reservation, WA
Client: Washington River Protection Solutions
Year: 2010
Area: 2.0 AC
Requirement: <1 x 10^{-8} cm/s
History: Underground nuclear waste storage tanks
New Use: Temporary cap until waste is vitrified.

Download video file from local newscast.

Download PDF factsheet

Rockwool Superfund Site
Location: Belton, TX
Client: EPA Region 6
Year: 2005
Area: 3.7 AC
Requirement: <1 x 10^{-7} cm/s
History: Rock Wool Manufacturing
New Use: For Sale

Download PDF factsheet

Industrial Solvents SF Site
Location: York County, PA
Client: PA DEQ
Year: 2004 Area: 4.0 AC
Requirement: <1 x 10^{-7} cm/s
History: Temporary Treatment and Disposal Facility
New Use: For Sale

Selma SF Site
Location: Selma, CA
Owner: Confidential
Year: 2004
Area: 5.4 AC
Requirement: <1 x 10^{-7} cm/s
History: Wood Treating Facility
New Use: For Sale

Tri County Landfill SF Site
Location: Elgin, IL
Owner: Waste Management
Year: 1999
Area: 3.7 AC
Requirement: <1 x 10^{-7} cm/s
History: Municipal Solid Waste Landfill
New Use: Parking Lot

Dover AFB Lindane Source Area
Location: Dover Air Force Base, Dover, DL
Owner: US Air Force
Year: 1998 Area: .5 AC
Requirement: <1 x 10-7 cm/s
History: Spill New
Use: Parking Lot

Download PDF factsheet

MatCon® Project Summary

Rockwool Superfund Site

Location: Belton, TX
Owner: US EPA
Contact: Region 6

Year: 2005
Area: 3.7 AC
Permeability: <1 x 10^{-7} cm/s
History: Rockwool Manufacturing Facility
New Use: Planned parking area
Contractor: Lindsey Construction

Project Description

The Rockwool Superfund Site in Belton, Texas was closed under the Superfund program over a period of years. Site soils contaminated with metals from the Rockwool operation were consolidated in a containment cell and capped with a MatCon layer in 2005. A MatCon cap was selected to provide the opportunity for reuse of the cell area once the site is sold. The initial design called for a conventional clay cover with an HDPE geomembrane. The construction of the cell was delayed due to a higher than anticipated quantity of contaminated soils as well as weather delays due to higher than normal rain events.

The EPA wanted to finish the cell in time for their annual report to Congress and was concerned that the delays might jeopardize its inclusion in the report. Fortunately, they selected MatCon for capping the cell. The paving contractor, Lindsey Construction, paved the entire 3.7 acre cap in one continuous operation lasting nearly 28 hours and finished just ahead of another rain event. The next day, the EPA project manager was delighted with the quick placement of the cap noting that they would have only just begun placement of the traditional multi-layered cap that would have required weeks of work to complete.

During the initial two passes along the east side of the site, the MatCon QA supervisor noticed that the MatCon surface showed cracks even after considerable rolling. The problem was soon determined to be the exposed liner and geotextile fabric that crossed over the berm and into an anchor trench. The 80 mil liner and geotextile layers were not flat against the surface, but had large air gaps. This resulted in a "bunched" and bulged irregular surface that would not conform to the berm for compaction. The paving operation was moved away from the berm areas so that site personnel could cut the remaining liner out. It was noted prior to paving that the entire berm was not graded smoothly and compacted to subgrade specifications, but the EPA contractor authorized paving due to an imminent storm and the very tight schedule. An attempted correction was made by paving a "skim coat" over portions of the berm, but this did not fully correct the subgrade problem. Since construction, cracks have appeared in numerous places along the berm. Wilder routed and sealed these cracks even though they are not technically covered by the MatCon warranty.

The site was inspected in 2006 and site repairs were made in 2008 under the warranty.

Appendix E

Site-Specific MatCon Cover Inspection Check List

Rockwool Industries Superfund Site
Belton, Bell County, TX
MatCon Containment Cell Cap Inspection Check List

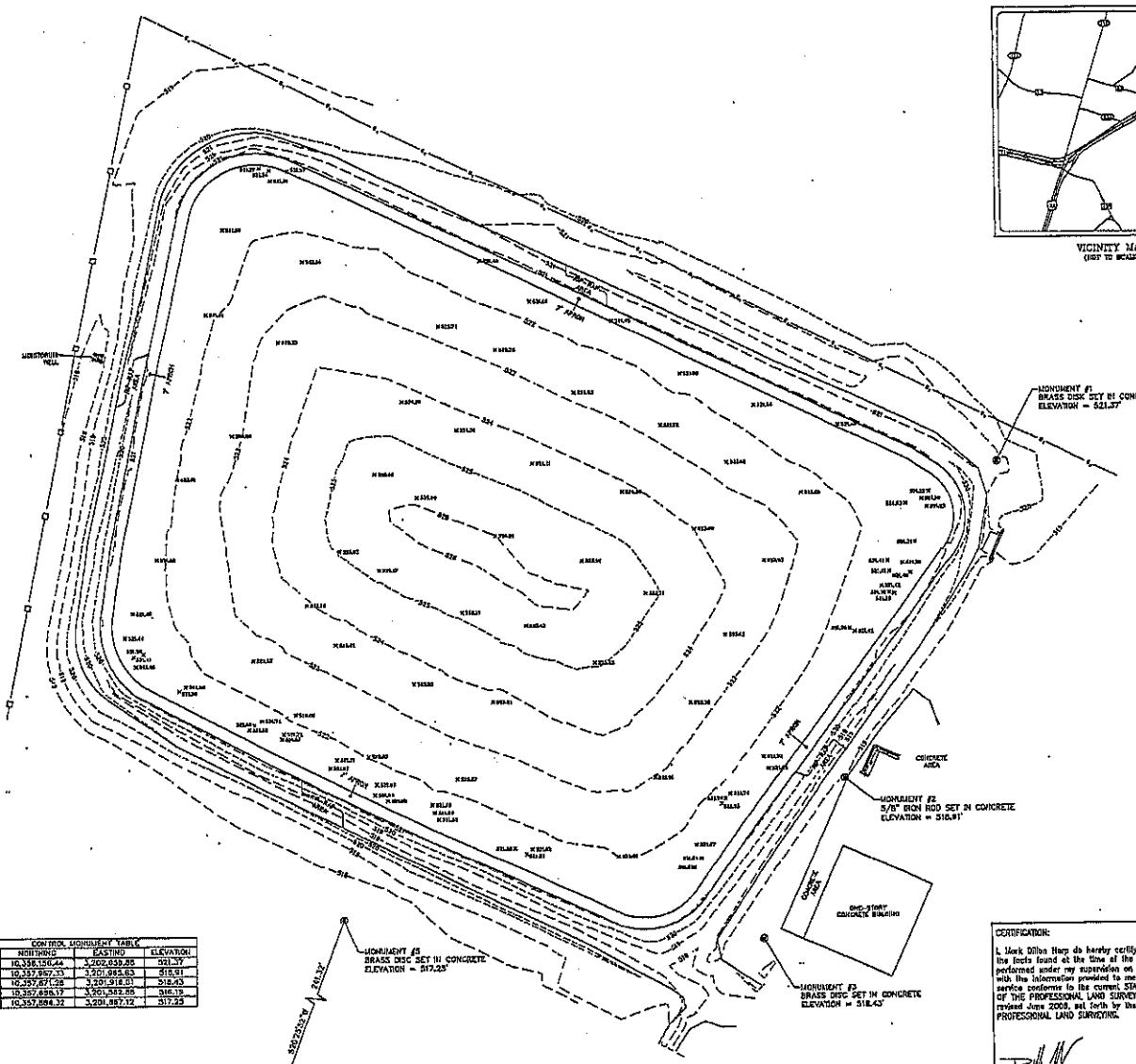
General Information						
Inspection Date/Time	Date:		Time:			
Inspectors Name						
Company/Affiliation						
Weather Conditions						
Most Recient Inspection	Date:		Company:			
Purpose of Inspection						
Item	**Defect Yes/No**	**Lineal Feet**	**Survey Needed**	**Repairs Needed**	**Reference Drawing**	**Photo**
Apparent Disturbance						
Surface Conditions Over Waste (excluding Apron)						
Disturbance of Cap						
Settlement						
Evidence of Ponding Water						
Upheaval						
Evidence of Seeps						
Surface Damage						
Evidence of traffic on CC Cap						
Usage of Cap - Storage, etc.						
Other Condition Changes						
Distress Over Waste						
Surface Deterioration						
Weathering/ Oxidation						
Abrasion/scuffing						
Cracking - Over Waste						
Less than 1/8" wide						
1/8" to 3/4" wide						
1" deep or greater						
Cracks greater than 3/4" wide						
Full Depth Cracks (4 inches)						
Concentrated Cracking						
100 LF in 320 SF						
Cracks less than 5' apart						
Grass and Weeds in Cracks						

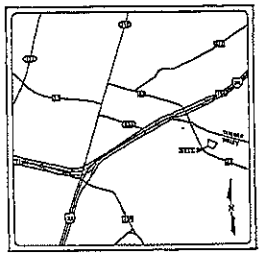
Rockwool Industries Superfund Site
Belton, Bell County, TX
MatCon Containment Cell Cap Inspection Check List

Item	Defect Yes/No	Lineal Feet	Survey Needed	Repairs Needed	Reference Drawing	Photo
Apron (Outer 7')						
Cracks 1/8" to 3/4" wide						
Cracks greater than 3/4" wide						
Cracks 1" deep or greater						
Full Depth Cracks (4 inches)						
Ponding/Settlement						
Grass and Weeds in Cracks						
Outer Side of Berm						
Grass Coverage and Height						
Erosion of Outer Side						
Inner Side of Berm and Perimeter Channel						
RipRap in Place						
Erosion of Chanel Bank						
Weeds growing through RipRap						
Other Observations						
Inspector Signature:						

Notes to Check List:

1. Apron is the outer most 7 feet of asphalt surface, also is approximately surface not over waste
2. Unless otherwise noted, the term "crack" refers to opening in surface which may be a new crack, or a crack that has been repaired (sealed) but has subsequently opened.
3. Inspection Purpose will normally be: Semiannual Inspection, Change is Usage, Fire, or Extreem Weather Event
4. Use attached plan to locate defects, reference photographs, etc.





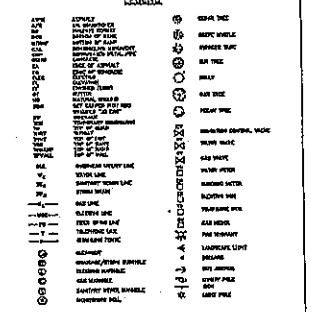
VICINITY MAP
(NOT TO SCALE)

NOTES:

1) THE ORIENTATION OF THIS DRAWING IS BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NAD 83 CENTRAL ZONE 4203.

2) ELEVATIONS SHOWN HEREON ARE BASED ON CITY OF BELTON, TEXAS BENCHMARK NO. B-E. ELEVATION = 542.76'

LEGEND



CONTROL MONUMENT TABLE			
NO.	NORTHING	EASTING	ELEVATION
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2	10,357,957.13	3,201,993.83	516.91
3	10,357,871.28	3,201,916.01	518.43
4	10,357,686.17	3,201,582.86	516.19
5	10,357,884.32	3,201,887.12	517.23

UTILITY NOTE:

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CERTIFICATION:

I, Mark Dillon Harp do hereby certify this survey drawing reflects the facts found at the time of the survey shown hereon as performed under my supervision on the ground in accordance with the information provided to me, and that this professional service conforms to the current STANDARDS AND SPECIFICATIONS OF THE PROFESSIONAL LAND SURVEYING PRACTICES ACT as revised June 2008, set forth by the TEXAS BOARD OF PROFESSIONAL LAND SURVEYING.

Name: MARK DILLON HARP
Registered Professional Land Surveyor
Texas No. 6445
Date of Survey: 8/28/2013

STATE OF TEXAS
REGISTERED
MARK DILLON HARP
6445
PROFESSIONAL
LAND SURVEYOR

TOPOGRAPHIC SURVEY OF ASPHALT LANDFILL CAP FOR ROCKWOOL INDUSTRIES, INC. SUPERFUND SITE BELTON, TEXAS

DRAWN:	JAK
CHECKED:	MDH
DATE:	8/28/13
FIELD BOOK:	
PAGE:	
CREW:	
SHEET:	1 of 1

AUSTIN • QUINTANILLA • BALLARD, PLLC

Appendix F

Restrictive Covenant

Texas Risk Reduction Program

Restrictive Covenant

COPY

STATE OF TEXAS §
§
COUNTY OF BELL §

This Restrictive Covenant is filed to provide information concerning certain environmental conditions and use limitations pursuant to the Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program Rule (TRRP) found at 30 Texas Administrative Code (TAC), Chapter 350, and affects the real property (Property) described as follows:

80.804 Acres, more or less, out of Abstract Number 20, O.T. Tyler Survey, being Lot 2B, Block 230 of the Hubbard-Tyler Industrial Park Addition to the City of Belton, Bell County, Texas being that property more particularly described in Volume 5600, Page 897 of the Deed Records, Bell County, Texas.

The Property includes the following designated tracts, further described in the Field Notes Prepared by All County Surveying, Inc., which comprise Exhibit A, attached hereto and incorporated herein by reference:

Tract No. 10, a 36.326 acre tract – City of Belton Tract C
Tract No. 11, a 21.538 acre tract – City of Belton Tract C contaminated area
Tract No. 12, a 3.944 acre tract – MATCON containment cell
Tract No. 13, a 41.087 acre tract – City of Belton south tract

Tract Nos. 11 and 12 are contained within Tract No. 10.

Portions of the soils and groundwater of the Property contain certain identified chemicals of concern causing those portions of the Property to be considered an Affected Property as that term is defined in the TRRP. The portion considered to be Affected Property includes the following designated tracts, depicted on the map adapted from the Boundary Survey, March 2012, and further described in the Field Notes Prepared by All County Surveying, Inc. Together the map and the field notes comprise Exhibit B, attached hereto and incorporated herein by reference:

Tract No. 10, a 36.326 acre tract – City of Belton Tract C
Tract No. 11, a 21.538 acre tract – City of Belton Tract C contaminated area
Tract No. 12, a 3.944 acre tract – MATCON containment cell

The Affected Property does not include Tract No. 13.

The chemicals of concern that exceed critical Protective Concentration Levels are:

Soil	*Groundwater*
Arsenic	Arsenic
Antimony	Antimony
Lead	Lead

After recording return to:
City of Belton
Attn: City Clerk
P.O. Box 120
Belton, TX 76513

COPY

A Notice of Environmental Conditions previously was filed for the Property, Instrument No. 2009-00002504 filed for record on January 22, 2009. The conditions that necessitated the filing of the Notice of Environmental Conditions were commercial/industrial land use, use of physical control on soil, and use of waste control unit. These conditions remain unchanged. The Notice of Environmental Conditions included a provision stating that a more detailed description of the cap and waste control unit would be filed at a later date. Accordingly, this Restrictive Covenant includes more detailed descriptions of the cap and waste control unit. This Restrictive Covenant supersedes the Notice of Environmental Conditions. The TRRP rule requires the TCEQ to consent to the filing of a superseding restrictive covenant.

On September 27, 2005, in recognition of the United States Environmental Protection Agency's (EPA) selected remedy for the Rockwool Superfund Site, the City of Belton passed Ordinance No. 2005-46. This Restrictive Covenant has no effect on and does not supersede Ordinance No. 2005-46.

This Restrictive Covenant is required for the following reasons:

1. The Affected Property currently meets TRRP standards for commercial/industrial use. Based on the reports, the chemicals of concern pose no significant present or future risk to humans or the environment based on commercial/industrial land use. No further remediation of the Affected Property is required by the TCEQ as long as the Affected Property is not to be used for residential purposes. If any person desires in the future to use the Affected Property for residential purposes, the TCEQ must be notified at least 60 days in advance of such use and additional response actions may be necessary before the property may be used for residential purposes. Persons contemplating a change in land use for the Affected Property are encouraged to review the definitions for commercial/industrial and residential land use contained in TRRP as the definition of residential land use is broad.
2. The Affected Property is subject to the TRRP requirements for properties containing concentrations of chemicals of concern in soil and is subject to the requirements in 30 TAC § 350.33(e)(2) to prevent exposure to soils that contain a chemical of concern in excess of the protective concentration level. The attached Exhibit C describes and provides the location of the physical control and extent of the soil that exceeds the TCEQ-approved protective concentration levels for certain chemicals of concern. The attached Exhibit C also provides the reason the physical control must remain in place and describes the maintenance and monitoring required for the physical control. This program must be implemented unless and until TCEQ approves any modification.
3. The Affected Property is subject to the TRRP requirements for properties containing concentrations of chemicals of concern in groundwater underlying a waste control unit and is subject to the requirements in 30 TAC § 350.33(f)(2) to prevent exposure to underlying groundwater that contains a chemical of concern in excess of the protective concentration level. A waste control unit includes municipal or industrial solid waste landfills, including Resource Conservation and Recovery Act-regulated units closed as landfills, with a liner system and engineered cap. The attached Exhibit D provides the location of the waste control unit and extent of the groundwater underlying the waste control unit that exceeds the TCEQ-approved protective concentration levels for certain chemicals of concern. The attached Exhibit D also describes the maintenance and monitoring required for the waste control unit. This program must be implemented unless and until TCEQ approves any modification.

As of the date of this Restrictive Covenant, the record owner of fee title to the Property is City of Belton Trustee (Owner) with an address of P.O. Box 120, Belton, Texas 76513-0120.

In consideration of response action oversight by the TCEQ and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Owner has agreed to place the following restrictions on the Property in favor of the TCEQ and the State of Texas, to wit:

1. The Property shall not be used for any purposes other than commercial/industrial uses, as defined in 30 TAC § 350.4(a)(13).
2. The removal or modification of the physical control on the Affected Property is prohibited without prior approval from the TCEQ and the physical control must be maintained and monitored as described in Exhibit C. Removal or modification of this restrictive covenant is prohibited without prior approval of the TCEQ.
3. The removal or modification of the waste control unit on the Affected Property is prohibited without prior approval from the TCEQ and the waste control unit must be maintained and monitored as described in Exhibit D. Use of and exposure to the groundwater underlying the waste control unit for any purpose is prohibited until such time when all the chemicals of concern no longer exceed their respective protective concentration levels. Removal or modification of this restrictive covenant is prohibited without prior approval of the TCEQ.
4. These restrictions shall be a covenant running with the land.

For additional information, contact:

TCEQ
Central Records
Building E
12100 Park 35 Circle
Austin, Texas 78753

Mail:
TCEQ
MC-199
P O Box 13087
Austin, TX 78711-3087

COPY

TCEQ Program and Identifier No.: Superfund; EPA ID TXD066379645, TCEQ ID SUP033

This Restrictive Covenant may be rendered of no further force or effect only by a release executed by the TCEQ or its successor agencies and filed in the same Real Property Records as those in which this Restrictive Covenant is filed.

THIS AREA INTENTIONALLY LEFT BLANK.

COPY

Executed this 8th day of January, 2013.

City of Belton, Trustee

By: _____

Name: Jim Covington

Title: Mayor, City of Belton

Accepted as Third Party Beneficiary this 6th day of February, 2013.

Texas Commission on Environmental Quality

By: Beth Seaton

Name: Beth Seaton

Title: Division Director, Remediation Division

STATE OF TEXAS

Bell COUNTY

BEFORE ME, on this the 8th day of January 2013, personally appeared Jim Covington, Mayor, City of Belton for City of Belton, Trustee, known to me to be the person whose name is subscribed to the foregoing instrument, and he acknowledged to me that he executed the same for the purposes and consideration therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 8th day of January, 2013.

CONNIE S. TORRES
Notary Public, State of Texas
My Commission Expires
November 21, 2014

Notary Public in and for the State of Texas,

County of Bell

My Commission Expires: 11/21/14

STATE OF TEXAS

TRAVIS COUNTY

BEFORE ME, on this the 6th day of FEBRUARY, personally appeared Beth Seaton, Division Director, Remediation Division, of the Texas Commission on Environmental Quality, known to me to be the person whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity herein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 6th day of FEBRUARY, 2013.

JAMES D. McGHEE
Notary Public, State of Texas
My Commission Expires
JULY 7, 2014
Notary without Bond

Notary Public in and for the State of Texas

County of Travis

My Commission Expires: 7/7/14

Exhibit A – Property Description

Field Notes

COPY

Exhibit A

COPY

Property Description

Field Notes

City of Belton Tract C, Field Notes Prepared by All County Surveying, Inc., March 28, 2012, designated as Tract No. 10, 36.326 acre tract – City of Belton Tract C on Boundary Survey, Rockwool Industries Federal Superfund Site, in Belton, Bell County, Texas, completed March 2012 by All County Surveying, Inc.

City of Belton Tract C contaminated area, Field Notes Prepared by All County Surveying, Inc., March 28, 2012, designated as Tract No. 11, 21.538 acre tract – City of Belton Tract C contaminated area on Boundary Survey, Rockwool Industries Federal Superfund Site, in Belton, Bell County, Texas, completed March 2012 by All County Surveying, Inc.

MATCON Containment Cell, Field Notes Prepared by All County Surveying, Inc., April 17, 2012, designated as Tract No. 12, 3.944 acre tract – MATCON containment cell on Boundary Survey, Rockwool Industries Federal Superfund Site, in Belton, Bell County, Texas, completed March 2012 by All County Surveying, Inc.

City of Belton south tract, Field Notes Prepared by All County Surveying, Inc., March 28, 2012, designated as Tract No. 13, 41.087 acre tract – City of Belton south tract on Boundary Survey, Rockwool Industries Federal Superfund Site, in Belton, Bell County, Texas, completed March 2012 by All County Surveying, Inc.

FIELD NOTES PREPARED BY ALL COUNTY SURVEYING, INC.

March 28, 2012

Surveyor's Field Notes for the CITY OF BELTON, for:

36.326 ACRES, being part of the **O. T. TYLER SURVEY, ABSTRACT NO. 20,** in Bell County, Texas and being a portion of that certain called 100.02 acre tract described in a deed to THE CITY OF BELTON, of record in Doc. No. 2009-00008069 of the Official Public Records of Real Property of Bell County, Texas, said 36.326 acre tract was surveyed by All County Surveying, Inc. and is more particularly described by these metes and bounds as follows:

BEGINNING at a 5/8" iron rod found in the south right-of-way line of the GEORGETOWN RAILROAD, and being in the east line of said 100.02 acre tract, being the northwest corner of that certain called 18.952 acre tract described in a deed to SMA FAMILY, LTD., of record in Volume 5316, Page 598 of the Official Public Records of Real Property of Bell County, Texas and being the northeast of this tract.

THENCE in a southerly direction, with the west line of said 18.952 acre tract, same being the east line of said 100.02 acre tract *(record call of S 17 deg 30 min 00 sec W, 1888.91 feet)* **SOUTH 14 deg 09 min 11 sec WEST, a distance of 1024.20 feet** to a 5/8" iron rod found in the north right-of-way line of a public roadway known as F. M. ROAD NO. 93, said right-of-way is of record in a deed to the STATE OF TEXAS, in Volume 2590, Page 336 of the Official Public Records of Real Property of Bell County, Texas, being the southwest corner of said 18.952 acre tract and being the southeast corner of this tract.

THENCE in a generally northwesterly direction, with the north right-of-way line of said F. M. ROAD NO. 93 and crossing said 100.02 acre tract, for the following THREE (3), courses and distances:

1). **NORTH 68 deg 50 min 40 sec WEST, a distance of 566.38 feet** to a 5/8" iron rod with plastic cap marked "All County" set;

2). With a curve to the right, having a radius of **1347.39 feet,** an arc length of **964.55 feet,** a central angle of **41 deg 00 min 58 sec** and a chord that bears **NORTH 48 deg 19 min 32 sec WEST, a distance of 944.09 feet** to a concrete right-of-way marker found; and

3). **NORTH 27 deg 50 min 13 sec WEST, a distance of 249.64 feet** to a brass right-of-way marker found, being the southeast corner of that certain called 11 acre tract described as TRACT 2, in a deed to WILLIAM LEE McGUIRE INVESTMENTS, LLC, of record in Volume 5033, Page 663 of the Official Public Records of Real Property of Bell County, Texas and being the southwest corner of this tract.

THENCE in a northerly direction, with the east line of said 11 acre tract and crossing said 100.02 acre tract **NORTH 11 deg 27 min 49 sec EAST, a distance of 676.34 feet** to a 5/8" iron rod found in the south right-of-way line of said GEORGETOWN

Surveyor's Field Notes for the CITY OF BELTON, for:

RAILROAD, same being the north line of said 100.02 acre tract and being the northwest corner of this tract.

THENCE In an easterly direction, with the south right-of-way line of said GEORGETOWN RAILROAD, same being the north line of said 100.02 acre tract, *(record call of S 59 deg 59 min 20 sec E, 2177.84 feet)* for the following FOUR (4), courses and distances:

1). **SOUTH 66 deg 14 min 10 sec EAST, a distance of 855.34 feet** to a 5/8" iron rod with plastic cap marked "All County" set;

2). **SOUTH 63 deg 07 min 43 sec EAST, a distance of 158.74 feet** to a 5/8" iron rod found;

3). **SOUTH 65 deg 16 min 34 sec EAST, a distance of 440.87 feet** to a 5/8" iron rod found; and

4). **SOUTH 62 deg 22 min 32 sec EAST, a distance of 182.65 feet** to the Point of Beginning, Containing **36.326 ACRES.**

This project is referenced to the City of Temple Coordinate System, an extension of the Texas Coordinate System of 1983, Central Zone. All distances are horizontal surface distances unless noted and all bearings are grid bearings. All coordinates are referenced to City Monument No. 133. The theta angle at City Monument No. 133 is 01°29'23". The combined correction factor (CCF) is 0.999857. Grid distance = Surface distance X CCF. Geodetic north = Grid north + theta angle. Reference tie from City monument No. 133 to the northwest corner of this 36.326 acre tract is N 82°09'23" W, 516.88 feet. Published City coordinates for project reference point 133 are N. = 10,358,458.27 E. = 3,202,085.92. This description is to accompany a Surveyor's Sketch showing the herein described 36.326 acre tract. This document is not valid for any purpose unless signed and sealed by a Registered Professional Land Surveyor.

Surveyed March 2012

ALL COUNTY SURVEYING, INC.
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STATE OF TEXAS
REGISTERED
CHARLES C. LUCKO
4636
PROFESSIONAL
LAND SURVEYOR

Charles C. Lucko
Registered Professional Land Surveyor
Registration No. 4636

FIELD NOTES PREPARED BY ALL COUNTY SURVEYING, INC.

March 28, 2012

COPY

Surveyor's Field Notes for the CITY OF BELTON, for:

21.538 ACRES, being part of the **O. T. TYLER SURVEY, ABSTRACT NO. 20,** in Bell County, Texas and being a portion of that certain called 100.02 acre tract described in a deed to THE CITY OF BELTON, of record in Doc. No. 2009-00008069 of the Official Public Records of Real Property of Bell County, Texas, said 21.538 acre tract was surveyed by All County Surveying, Inc. and is more particularly described by these metes and bounds as follows:

BEGINNING at a 5/8" iron rod found in the south right-of-way line of the GEORGETOWN RAILROAD, and being in the north line of said 100.02 acre tract, being the northeast corner of that certain called 11 acre tract described as TRACT 2, in a deed to WILLIAM LEE McGUIRE INVESTMENTS, LLC., of record in Volume 5033, Page 663 of the Official Public Records of Real Property of Bell County, Texas and being the northwest of this tract.

THENCE In an easterly direction, with the south right-of-way line of said GEORGETOWN RAILROAD, same being the north line of said 100.02 acre tract, *(record call of S 59 deg 59 min 20 sec E, 2177.84 feet)* for the following THREE (3), courses and distances:

1). **SOUTH 65 deg 14 min 10 sec EAST, a distance of 855.34 feet** to a 5/8" iron rod with plastic cap marked "All County" set;

2). **SOUTH 53 deg 07 min 43 sec EAST, a distance of 158.74 feet** to a 5/8" iron rod found; and

3). **SOUTH 65 deg 16 min 34 sec EAST, a distance of 440.87 feet** to a 5/8" iron rod found, being the northeast corner of this tract,

THENCE In a southerly direction, crossing said 100.02 acre tract **SOUTH 20 deg 36 min 55 sec WEST, a distance of 733.93 feet** to a 5/8" iron rod found, being the southwest corner of this tract.

THENCE In a westerly direction, continuing across said 100.02 acre tract **NORTH 66 deg 12 min 18 sec WEST, a distance of 740.11 feet** to a 5/8" iron rod found, being a corner of this tract.

THENCE In a northerly direction, continuing across said 100.02 acre tract **NORTH 23 deg 48 min 14 sec EAST, a distance of 200.00 feet** to a 5/8" iron rod found, being a corner of this tract.

Surveyor's Field Notes for the CITY OF BELTON, continued:

THENCE in a westerly direction, continuing across said 100.02 acre tract **NORTH 66 deg 14 min 14 sec WEST, a distance of 622.16 feet** to a concrete marker found in the east line of said 11 acre tract and being the southwest corner of this tract, from which a concrete right-of-way marker found, bears: SOUTH 11 deg 27 min 49 sec WEST, a distance of 71.13 feet.

THENCE in a northerly direction, crossing said 100.02 acre tract, with the east line of said 11 acre tract **NORTH 11 deg 27 min 49 sec EAST, a distance of 604.61 feet** to the Point of Beginning, Containing **21.538 ACRES.**

This project is referenced to the City of Temple Coordinate System, an extension of the Texas Coordinate System of 1983, Central Zone. All distances are horizontal surface distances unless noted and all bearings are grid bearings. All coordinates are referenced to City Monument No. 133. The theta angle at City Monument No. 133 is 01°29'23". The combined correction factor (CCF) is 0.999857. Grid distance = Surface distance X CCF. Geodetic north = Grid north + theta angle. Reference tie from City monument No. 133 to the northwest corner of this 21.538 acre tract is N 82°09'23" W, 516.88 feet. Published City coordinates for project reference point 133 are N. = 10,358,458.27 E. = 3,202,085.92. This description is to accompany a Surveyor's Sketch showing the herein described 21.538 acre tract. This document is not valid for any purpose unless signed and sealed by a Registered Professional Land Surveyor.

Surveyed March 2012

COPY

ALL COUNTY SURVEYING, INC.
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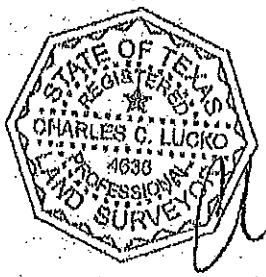

Charles C. Lucko
Registered Professional Land Surveyor
Registration No. 4636

FIELD NOTES PREPARED BY ALL COUNTY SURVEYING, INC.

April 17, 2012

COPY

Surveyor's Field Notes for the CITY OF BELTON, for:

3.944 ACRES, being part of the **O. T. TYLER SURVEY, ABSTRACT NO. 20,** in Bell County, Texas and being a portion of that certain called 100.02 acre tract described in a deed to THE CITY OF BELTON, of record in Doc. No. 2009-00008069 of the Official Public Records of Real Property of Bell County, Texas, said 3.944 acre tract was surveyed by All County Surveying, Inc. and is more particularly described by these metes and bounds as follows:

BEGINNING at a point being the northwest corner of this tract, from which a 5/8" iron rod found in the west line of said 100.02 acre tract, being a corner of a 36.326 acre tract surveyed by All County Surveying, Inc., bears: NORTH 22 deg 32 min 55 sec WEST, a distance of 192.90 feet.

THENCE in an easterly direction, crossing said 100.02 acre tract **SOUTH 64 deg 35 min 31 sec EAST, a distance of 414.57 feet** to a point, being the northeast corner of this tract.

THENCE in a southerly direction, continuing across said 100.02 acre tract, with a curve to the right, having a radius of **52.36 feet,** a central angle of **99 deg 13 min 43 sec,** an arc length of **90.68 feet** and a chord that bears **SOUTH 14 deg 58 min 39 sec EAST, a distance of 79.77 feet** to a point, being a corner of this tract.

THENCE in a continuing in a southerly direction and continuing across said 100.02 acre tract **SOUTH 34 deg 38 min 12 sec WEST, a distance of 311.62 feet** to a point, being the southeast corner of this tract.

THENCE in a westerly direction, continuing across said 100.02 acre tract **NORTH 63 deg 11 min 03 sec WEST, a distance of 348.94 feet** to a point, being the southwest corner of this tract.

THENCE in a northerly direction, continuing across said 100.02 acre tract, with a curve to the right having a radius of **79.75 feet,** a central angle of **76 deg 05 min 20 sec,** an arc length of **105.91 feet** and a chord that bears **NORTH 25 deg 08 min 23 sec WEST, a distance of 98.30 feet** to a point, being a corner of this tract.

THENCE continuing in a northerly direction and continuing across said 100.02 acre tract **NORTH 12 deg 54 min 17 sec EAST, a distance of 230.15 feet** to a point, being a corner of this tract.

Surveyor's Field Notes for the CITY OF BELTON, continued:

THENCE In an easterly direction, continuing across said 100.02 acre tract, with a curve to the right, having a radius of **59.70 feet**, a central angle of **102 deg 30 min 12 sec**, an arc length of **106.80 feet** and a chord that bears **NORTH 64 deg 09 min 23 sec EAST, a distance of 93.12 feet** to the point of Beginning, Containing **3.944 ACRES.**

This project is referenced to the City of Temple Coordinate System, an extension of the Texas Coordinate System of 1983, Central Zone. All distances are horizontal surface distances unless noted and all bearings are grid bearings. All coordinates are referenced to City Monument No. 133. The theta angle at City Monument No. 133 is 01°29'23". The combined correction factor (CCF) is 0.999857. Grid distance = Surface distance X CCF. Geodetic north = Grid north + theta angle. Reference tie from City monument No. 133 to the northwest corner of this 3.944 acre tract is N 76°11'54" E, 451.10 feet. Published City coordinates for project reference point 133 are N. = 10,358,458.27 E. = 3,202,085.92. This description is to accompany a Surveyor's Sketch showing the herein described 36.328 acre tract. This document is not valid for any purpose unless signed and sealed by a Registered Professional Land Surveyor.

Surveyed March 2012

ALL COUNTY SURVEYING, INC.
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Charles C. Lucko
Registered Professional Land Surveyor
Registration No. 4636

FIELD NOTES PREPARED BY ALL COUNTY SURVEYING, INC.

March 28, 2012

Surveyor's Field Notes for the CITY OF BELTON, for:

41.087 ACRES, being part of the **O. T. TYLER SURVEY, ABSTRACT NO. 20,** in Bell County, Texas and being a portion of that certain called 100.02 acre tract described in a deed to THE CITY OF BELTON, of record in Doc. No. 2009-00008069 of the Official Public Records of Real Property of Bell County, Texas, said 41.087 acre tract was surveyed by All County Surveying, Inc. and is more particularly described by these metes and bounds as follows:

BEGINNING at a 5/8" iron rod with plastic cap marked "All County" set in the south right-of-way line of a public maintained roadway known as F. M. ROAD NO. 93, said right-of-way is of record in a deed to the STATE OF TEXAS, in Volume 2590, Page 336 of the Official Public Records of Real Property of Bell County, Texas, same being the east line of said 100.02 acre tract, and being the northwest corner of that certain called 10-64/100 acre tract described in a deed to BRAZOS RIVER AUTHORITY, of record in Volume 3554, Page 97 of the Official Public Records of Real Property of Bell County, Texas and being the northeast corner of this tract.

THENCE in a southerly direction, with the west line of said 10-64/100 acre tract, same being the east line of said 100.02 acre tract *(record call of S 17 deg 30 min 00 sec W, 1888.91 feet)* **SOUTH 14 deg 43 min 47 sec WEST, a distance of 655.04 feet** to a 3/8" iron rod found, being the northeast corner of that certain called 1.403 acre tract described in a deed to BRAZOS RIVER AUTHORITY, of record in Volume 2057, Page 751 of the Deed Records of Bell County, Texas, same being the southwest corner of said 10-64/100 acre tract and being the southeast corner of this tract.

THENCE in a westerly direction, crossing said 100.02 acre tract, with the north line of said 1.403 acre tract **NORTH 71 deg 45 min 15 sec WEST, a distance of 941.63 feet** to a 1" metal pipe found, being the northwest corner of said 1.403 acre tract and being a corner of this tract.

THENCE in a southerly direction, continuing across said 100.02 acre tract, with the west line of said 1.403 acre tract **SOUTH 20 deg 35 min 43 sec WEST, a distance of 92.82 feet** to a 1/2" iron rod found in the north line of a tract of land shown to be in the name of BRAZOS RIVER AUTHORITY, on maps on file with the Bell County Tax Appraisal District, same being the south line of said 100.02 acre tract, being the southwest corner of said 1.403 acre tract and being a corner of this tract.

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Surveyor's Field Notes for the CITY OF BELTON, continued:

THENCE In a westerly direction, with the north line of said BRAZOS RIVER AUTHORITY tract, same being the south line of said 100.02 acre tract *(record call of N 72 deg 30 min 00 sec W, 2193.05 feet)* **NORTH 76 deg 06 min 59 sec WEST, a distance of 1127.73 feet** to a calculated point in NOLAN CREEK, being the southwest corner of said 100.02 acre tract and being the southwest corner of this tract.

THENCE In a generally northerly direction, with the west line of said 100.02 acre tract and with the said NOLAN CREEK, for the following FOUR (4), courses and distances:

1). *(record call of N 39 deg 25 min 40 sec E, 376.65 feet)* **NORTH 34 deg 12 min 32 sec EAST, a distance of 294.24 feet** to a calculated point;

2). *(record call of N 44 deg 50 min 20 sec E, 292.35 feet)* **NORTH 39 deg 37 min 12 sec EAST, a distance of 292.35 feet** to a calculated point;

3). *(record call of N 06 deg 57 min 10 sec E, 450.96 feet)* **NORTH 01 deg 44 min 02 sec EAST, a distance of 450.96 feet** to a calculated point; and

4). *(record call of N 09 deg 12 min 30 sec E, 471.91 feet)* **NORTH 03 deg 59 min 22 sec EAST, a distance of 371.91 feet** to a calculated point, being the southwest corner of that certain called 11 acre tract described as TRACT 2, in a deed to WILLIAM LEE McGUIRE INVESTMENTS, LLC., of record in Volume 5033, Page 663 of the Official Public Records of Real Property of Bell County, Texas and being the northwest corner of this tract.

THENCE In an easterly direction, with the south line of said 11 acre tract, and crossing said 100.02 acre tract **SOUTH 65 deg 12 min 28 sec EAST, a distance of 477.86 feet** to a 5/8" iron rod with plastic cap marked "All County" set in the south right-of-way line of said F. M. ROAD NO. 93, being the southeast corner of said 11 acre tract and being a corner of this tract.

THENCE In a southeasterly direction, with the south right-of-way line of said F. M. ROAD NO. 93, and crossing said 100.02 acre tract, for the following TWO (2), courses and distances:

1). **SOUTH 27 deg 46 min 32 sec EAST, a distance of 41.61 feet** to a concrete right-of-way marker found;

Surveyor's Field Notes for the CITY OF BELTON, continued:

2). With a curve to the left, having a radius of **1517.39 feet**, an arc length of **1086.52 feet**, a central angle of **41 deg 01 min 35 sec** and a chord that bears **SOUTH 48 deg 22 min 35 sec EAST, a distance of 1063.46 feet** to a concrete right-of-way marker found; and

3). **SOUTH 68 deg 48 min 49 sec EAST, a distance of 583.27 feet** to the Point of Beginning, Containing **41.087 ACRES.**

This project is referenced to the City of Temple Coordinate System, an extension of the Texas Coordinate System of 1983, Central Zone. All distances are horizontal surface distances unless noted and all bearings are grid bearings. All coordinates are referenced to City Monument No. 133. The theta angle at City Monument No. 133 is 01°29'23". The combined correction factor (CCF) is 0.999867. Grid distance = Surface distance X CCF. Geodetic north = Grid north + theta angle. Reference tie from City monument No. 133 to the south corner of this 41.087 acre tract is S 19°59'32" E, 1926.15 feet. Published City coordinates for project reference point 133 are N. = 10,358,458.27 E. = 3,202,085.92. This description is to accompany a Surveyor's Sketch showing the herein described 41.087 acre tract. This document is not valid for any purpose unless signed and sealed by a Registered Professional Land Surveyor.

COPY

Surveyed March 2012

ALL COUNTY SURVEYING, INC.
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Charles C. Lucko
Registered Professional Land Surveyor
Registration No. 4636

Exhibit B – Affected Property Description

Field Notes

COPY

Map

Exhibit B

Affected Property Description

COPY

Field Notes

City of Belton Tract C, Field Notes Prepared by All County Surveying, Inc., March 28, 2012, designated as Tract No. 10, 36.326 acre tract – City of Belton Tract C on Boundary Survey, Rockwool Industries Federal Superfund Site, in Belton, Bell County, Texas, completed March 2012 by All County Surveying, Inc.

City of Belton Tract C, Field Notes Prepared by All County Surveying, Inc., March 28, 2012, designated as Tract No. 11, 21.538 acre tract – City of Belton Tract C contaminated area on Boundary Survey, Rockwool Industries Federal Superfund Site, in Belton, Bell County, Texas, completed March 2012 by All County Surveying, Inc.

MATCON Containment Cell, Field Notes Prepared by All County Surveying, Inc., April 17, 2012, designated as Tract No. 12, 3.944 acre tract – MATCON containment cell on Boundary Survey, Rockwool Industries Federal Superfund Site, in Belton, Bell County, Texas, completed March 2012 by All County Surveying, Inc.

FIELD NOTES PREPARED BY ALL COUNTY SURVEYING, INC.

March 28, 2012

COPY

Surveyor's Field Notes for the CITY OF BELTON, for:

36.326 ACRES, being part of the **O. T. TYLER SURVEY, ABSTRACT NO. 20,** in Bell County, Texas and being a portion of that certain called 100.02 acre tract described in a deed to THE CITY OF BELTON, of record in Doc. No. 2009-00008069 of the Official Public Records of Real Property of Bell County, Texas, said 36.326 acre tract was surveyed by All County Surveying, Inc. and is more particularly described by these metes and bounds as follows:

BEGINNING at a 5/8" iron rod found in the south right-of-way line of the GEORGETOWN RAILROAD, and being in the east line of said 100.02 acre tract, being the northwest corner of that certain called 18.952 acre tract described in a deed to SMA FAMILY, LTD., of record in Volume 5316, Page 598 of the Official Public Records of Real Property of Bell County, Texas and being the northeast of this tract.

THENCE in a southerly direction, with the west line of said 18.952 acre tract, same being the east line of said 100.02 acre tract *(record call of S 17 deg 30 min 00 sec W, 1888.91 feet)* **SOUTH 14 deg 09 min 11 sec WEST, a distance of 1024.20 feet** to a 5/8" iron rod found in the north right-of-way line of a public roadway known as F. M. ROAD NO. 93, said right-of-way is of record in a deed to the STATE OF TEXAS, in Volume 2590, Page 336 of the Official Public Records of Real Property of Bell County, Texas, being the southwest corner of said 18.952 acre tract and being the southeast corner of this tract.

THENCE in a generally northwesterly direction, with the north right-of-way line of said F. M. ROAD NO. 93 and crossing said 100.02 acre tract, for the following THREE (3), courses and distances:

1). **NORTH 68 deg 50 min 40 sec WEST, a distance of 566.38 feet** to a 5/8" iron rod with plastic cap marked "All County" set;

2). With a curve to the right, having a radius of **1347.39 feet,** an arc length of **964.55 feet,** a central angle of **41 deg 00 min 58 sec** and a chord that bears **NORTH 48 deg 19 min 32 sec WEST, a distance of 944.09 feet** to a concrete right-of-way marker found; and

3). **NORTH 27 deg 50 min 13 sec WEST, a distance of 249.64 feet** to a brass right-of-way marker found, being the southeast corner of that certain called 11 acre tract described as TRACT 2, in a deed to WILLIAM LEE McGUIRE INVESTMENTS, LLC, of record in Volume 5033, Page 663 of the Official Public Records of Real Property of Bell County, Texas and being the southwest corner of this tract.

THENCE in a northerly direction, with the east line of said 11 acre tract and crossing said 100.02 acre tract **NORTH 11 deg 27 min 49 sec EAST, a distance of 676.34 feet** to a 5/8" iron rod found in the south right-of-way line of said GEORGETOWN

Surveyor's Field Notes for the CITY OF BELTON, for:

RAILROAD, same being the north line of said 100.02 acre tract and being the northwest corner of this tract.

THENCE In an easterly direction, with the south right-of-way line of said GEORGETOWN RAILROAD, same being the north line of said 100.02 acre tract, *(record call of S 59 deg 59 min 20 sec E, 2177.84 feet)* for the following FOUR (4), courses and distances:

1). **SOUTH 65 deg 14 min 10 sec EAST, a distance of 855.34 feet** to a 5/8" iron rod with plastic cap marked "All County" set;

2). **SOUTH 63 deg 07 min 43 sec EAST, a distance of 158.74 feet** to a 5/8" iron rod found;

3). **SOUTH 65 deg 16 min 34 sec EAST, a distance of 440.87 feet** to a 5/8" iron rod found; and

4). **SOUTH 62 deg 22 min 32 sec EAST, a distance of 182.65 feet** to the Point of Beginning, Containing **36.326 ACRES.**

This project is referenced to the City of Temple Coordinate System, an extension of the Texas Coordinate System of 1983, Central Zone. All distances are horizontal surface distances unless noted and all bearings are grid bearings. All coordinates are referenced to City Monument No. 133. The theta angle at City Monument No. 133 is 01°29'23". The combined correction factor (CCF) is 0.999857. Grid distance = Surface distance X CCF. Geodetic north = Grid north + theta angle. Reference tie from City monument No. 133 to the northwest corner of this 36.326 acre tract is N 82°09'23" W, 516.88 feet. Published City coordinates for project reference point 133 are N. = 10,358,458.27 E. = 3,202,085.92.. This description is to accompany a Surveyor's Sketch showing the herein described 36.326 acre tract. This document is not valid for any purpose unless signed and sealed by a Registered Professional Land Surveyor.

Surveyed March 2012

ALL COUNTY SURVEYING, INC.
1-800-749-PLAT
Server/projects/pro120000/120000/120100/120112/120112J.doc

Charles C. Lucko
Registered Professional Land Surveyor
Registration No. 4636

FIELD NOTES PREPARED BY ALL COUNTY SURVEYING, INC.

March 28, 2012

Surveyor's Field Notes for the CITY OF BELTON, for:

21.538 ACRES, being part of the **O. T. TYLER SURVEY, ABSTRACT NO. 20,** in Bell County, Texas and being a portion of that certain called 100.02 acre tract described in a deed to THE CITY OF BELTON, of record in Doc. No. 2009-00008069 of the Official Public Records of Real Property of Bell County, Texas, said 21.538 acre tract was surveyed by All County Surveying, Inc. and is more particularly described by these metes and bounds as follows:

BEGINNING at a 5/8" iron rod found in the south right-of-way line of the GEORGETOWN RAILROAD, and being in the north line of said 100.02 acre tract, being the northeast corner of that certain called 11 acre tract described as TRACT 2, in a deed to WILLIAM LEE McGUIRE INVESTMENTS, LLC., of record in Volume 5033, Page 663 of the Official Public Records of Real Property of Bell County, Texas and being the northwest of this tract.

THENCE In an easterly direction, with the south right-of-way line of said GEORGETOWN RAILROAD, same being the north line of said 100.02 acre tract, *(record call of S 59 deg 59 min 20 sec E, 2177.84 feet)* for the following THREE (3), courses and distances:

1). **SOUTH 65 deg 14 min 10 sec EAST, a distance of 855.34 feet** to a 5/8" iron rod with plastic cap marked "All County" set;

2). **SOUTH 53 deg 07 min 43 sec EAST, a distance of 158.74 feet** to a 5/8" iron rod found; and

3). **SOUTH 65 deg 16 min 34 sec EAST, a distance of 440.87 feet** to a 5/8" iron rod found, being the northeast corner of this tract,

THENCE In a southerly direction, crossing said 100.02 acre tract **SOUTH 20 deg 36 min 55 sec WEST, a distance of 733.93 feet** to a 5/8" iron rod found, being the southwest corner of this tract.

THENCE In a westerly direction, continuing across said 100.02 acre tract **NORTH 66 deg 12 min 18 sec WEST, a distance of 740.11 feet** to a 5/8" iron rod found, being a corner of this tract.

THENCE In a northerly direction, continuing across said 100.02 acre tract **NORTH 23 deg 48 min 14 sec EAST, a distance of 200.00 feet** to a 5/8" iron rod found, being a corner of this tract.

Surveyor's Field Notes for the CITY OF BELTON, continued:

THENCE in a westerly direction, continuing across said 100.02 acre tract **NORTH 66 deg 14 min 14 sec WEST, a distance of 622.16 feet** to a concrete marker found in the east line of said 11 acre tract and being the southwest corner of this tract, from which a concrete right-of-way marker found, bears: SOUTH 11 deg 27 min 49 sec WEST, a distance of 71.13 feet.

THENCE in a northerly direction, crossing said 100.02 acre tract, with the east line of said 11 acre tract **NORTH 11 deg 27 min 49 sec EAST, a distance of 604.61 feet** to the Point of Beginning, Containing **21.538 ACRES.**

This project is referenced to the City of Temple Coordinate System, an extension of the Texas Coordinate System of 1983, Central Zone. All distances are horizontal surface distances unless noted and all bearings are grid bearings. All coordinates are referenced to City Monument No. 133. The theta angle at City Monument No. 133 is 01°29'23". The combined correction factor (CCF) is 0.999857. Grid distance = Surface distance X CCF. Geodetic north = Grid north + theta angle. Reference tie from City monument No. 133 to the northwest corner of this 21.538 acre tract is N 82°09'23" W, 516.88 feet. Published City coordinates for project reference point 133 are N. = 10,358,458.27 E. = 3,202,085.92. This description is to accompany a Surveyor's Sketch showing the herein described 21.538 acre tract. This document is not valid for any purpose unless signed and sealed by a Registered Professional Land Surveyor.

Surveyed March 2012

ALL COUNTY SURVEYING, INC.
1-800-749-PLAT
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Charles C. Lucko
Registered Professional Land Surveyor
Registration No. 4636

FIELD NOTES PREPARED BY ALL COUNTY SURVEYING, INC.

COPY

April 17, 2012

Surveyor's Field Notes for the CITY OF BELTON, for:

3.944 ACRES, being part of the **O. T. TYLER SURVEY, ABSTRACT NO. 20,** in Bell County, Texas and being a portion of that certain called 100.02 acre tract described in a deed to THE CITY OF BELTON, of record in Doc. No. 2009-00008069 of the Official Public Records of Real Property of Bell County, Texas, said 3.944 acre tract was surveyed by All County Surveying, Inc. and is more particularly described by these metes and bounds as follows:

BEGINNING at a point being the northwest corner of this tract, from which a 5/8" iron rod found in the west line of said 100.02 acre tract, being a corner of a 36.326 acre tract surveyed by All County Surveying, Inc., bears: NORTH 22 deg 32 min 56 sec WEST, a distance of 192.90 feet.

THENCE in an easterly direction, crossing said 100.02 acre tract **SOUTH 64 deg 35 min 31 sec EAST, a distance of 414.57 feet** to a point, being the northeast corner of this tract.

THENCE in a southerly direction, continuing across said 100.02 acre tract, with a curve to the right, having a radius of **52.36 feet**, a central angle of **99 deg 13 min 43 sec**, an arc length of **90.68 feet** and a chord that bears **SOUTH 14 deg 58 min 39 sec EAST, a distance of 79.77 feet** to a point, being a corner of this tract.

THENCE in a continuing in a southerly direction and continuing across said 100.02 acre tract **SOUTH 34 deg 38 min 12 sec WEST, a distance of 311.62 feet** to a point, being the southeast corner of this tract.

THENCE in a westerly direction, continuing across said 100.02 acre tract **NORTH 63 deg 11 min 03 sec WEST, a distance of 348.94 feet** to a point, being the southwest corner of this tract.

THENCE in a northerly direction, continuing across said 100.02 acre tract, with a curve to the right having a radius of **79.75 feet**, a central angle of **76 deg 05 min 20 sec**, an arc length of **105.91 feet** and a chord that bears **NORTH 25 deg 08 min 23 sec WEST, a distance of 98.30 feet** to a point, being a corner of this tract.

THENCE continuing in a northerly direction and continuing across said 100.02 acre tract **NORTH 12 deg 54 min 17 sec EAST, a distance of 230.15 feet** to a point, being a corner of this tract.

Surveyor's Field Notes for the CITY OF BELTON, continued:

THENCE In an easterly direction, continuing across said 100.02 acre tract, with a curve to the right, having a radius of **59.70 feet**, a central angle of **102 deg 30 min 12 sec**, an arc length of **106.80 feet** and a chord that bears **NORTH 64 deg 09 min 23 sec EAST, a distance of 93.12 feet** to the point of Beginning, Containing **3.944 ACRES.**

This project is referenced to the City of Temple Coordinate System, an extension of the Texas Coordinate System of 1983, Central Zone. All distances are horizontal surface distances unless noted and all bearings are grid bearings. All coordinates are referenced to City Monument No. 133. The theta angle at City Monument No. 133 is 01°29'23". The combined correction factor (CCF) is 0.999857. Grid distance = Surface distance X CCF. Geodetic north = Grid north + theta angle. Reference tie from City monument No. 133 to the northwest corner of this 3.944 acre tract is N 76°11'54" E, 451.10 feet. Published City coordinates for project reference point 133 are N. = 10,358,458.27 E. = 3,202,085.92. This description is to accompany a Surveyor's Sketch showing the herein described 36.326 acre tract. This document is not valid for any purpose unless signed and sealed by a Registered Professional Land Surveyor.

Surveyed March 2012

ALL COUNTY SURVEYING, INC.
1-800-749-PLAT
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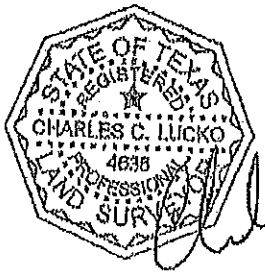


Charles C. Lucko
Registered Professional Land Surveyor
Registration No. 4636

Exhibit B

Affected Property Description

COPY

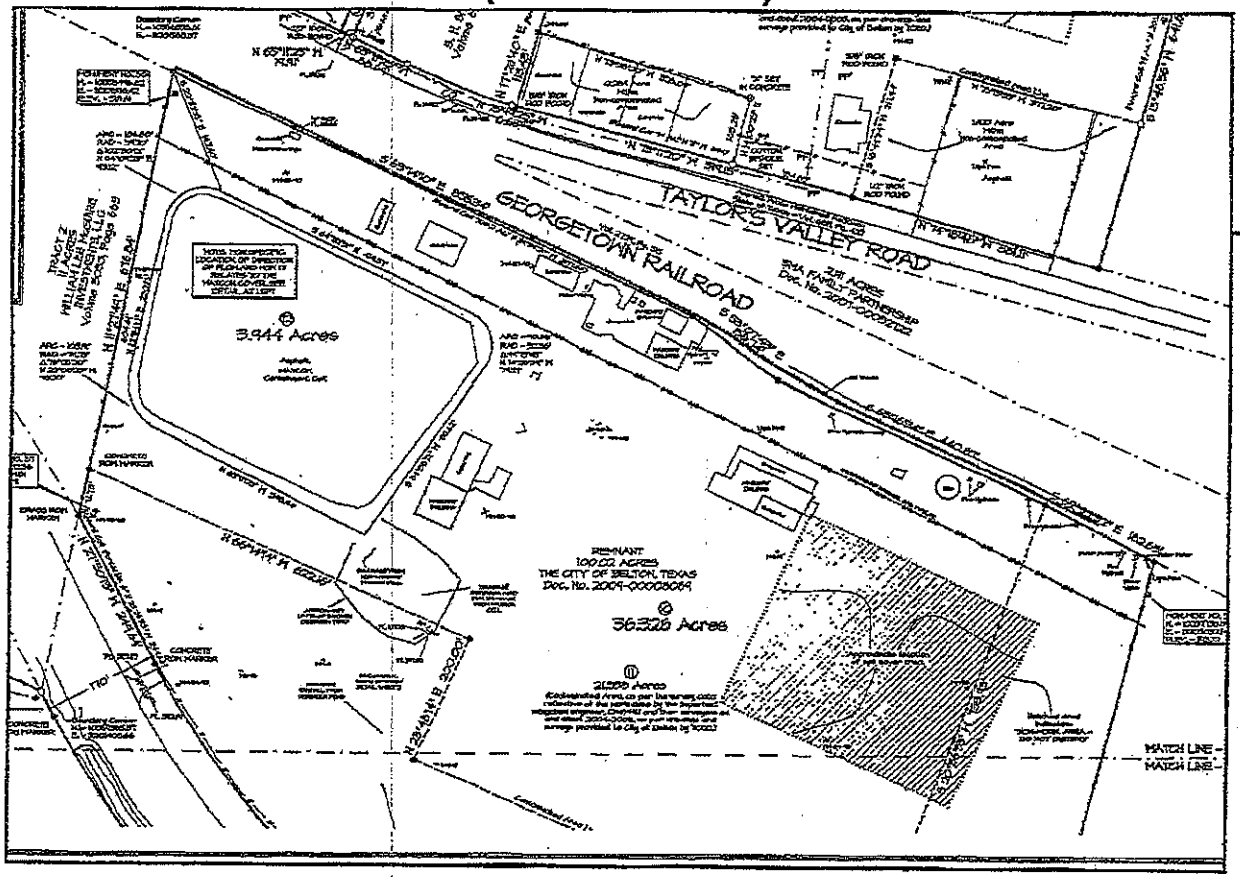
Map

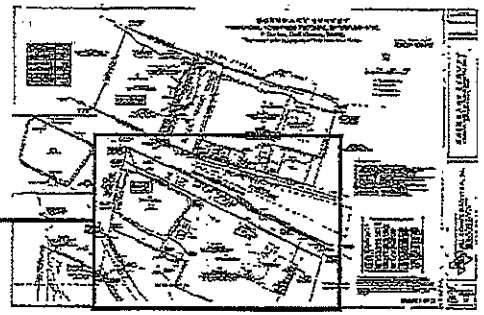
Exhibit B – Map, Tracts 10 (36.326 ac.), 11 (21.538 ac.), and 12 (3.944 ac.), Sheet 1 of 2

Exhibit B – Map, Tracts 10 (36.326 ac.), 11 (21.538 ac.), and 12 (3.944 ac.), Sheet 2 of 2

COPY

Exhibit B - Map
Tracts 10 (36.326 ac.), 11 (21.538 ac.), and 12 (3.944 ac.)
(Sheet 1 of 2)

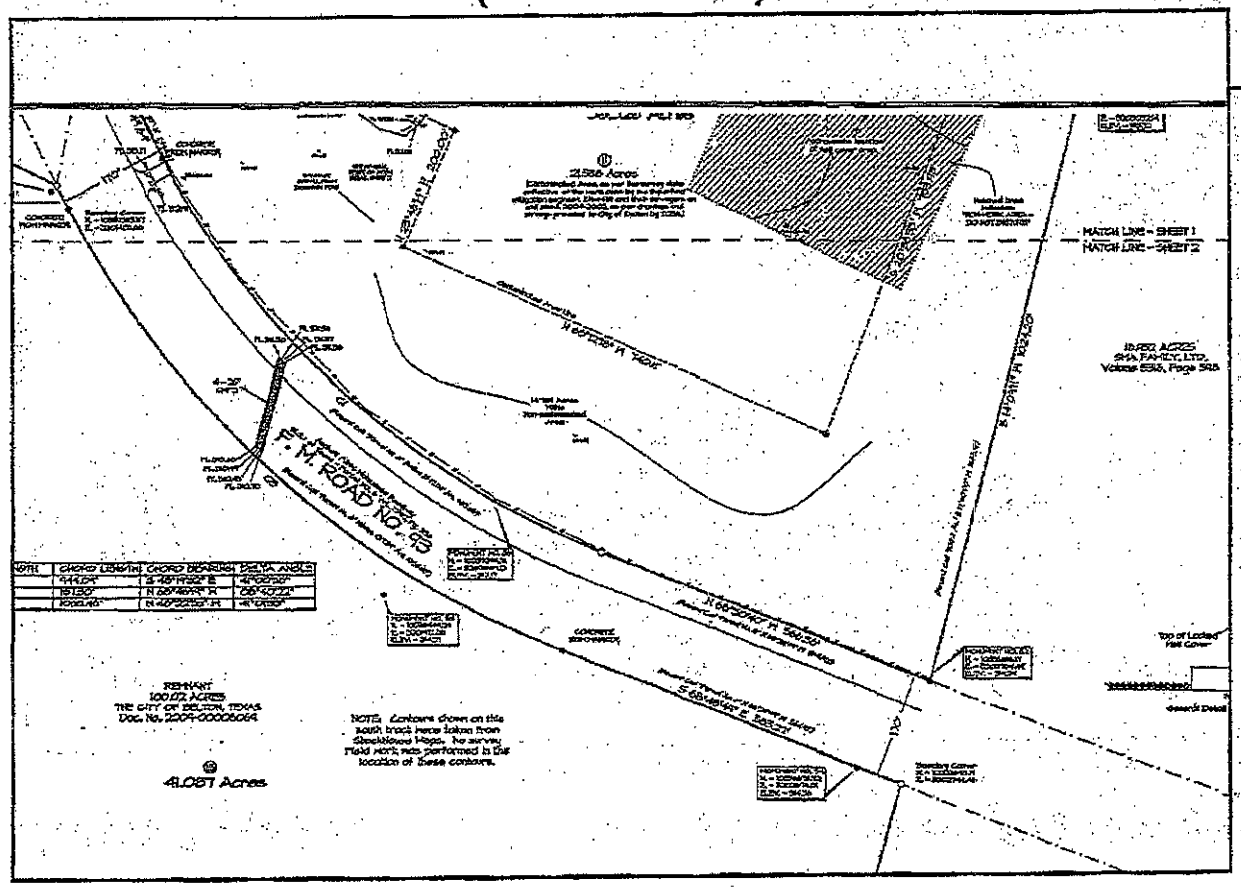




This map has been adapted by the Remediation Division of the Texas Commission on Environmental Quality. This map is for informational purposes and was not prepared for and may not be suitable for legal, engineering, or surveying purposes. This map is based on a drawing prepared by All County Surveying, Inc. in March 2012. To obtain a copy of the original drawing, contact the Remediation Division at 800-633-9363.

COPY

Exhibit B - Map
Tracts 10 (36.326 ac.), 11 (21.538 ac.), and 12 (3.944 ac.)
(Sheet 2 of 2)



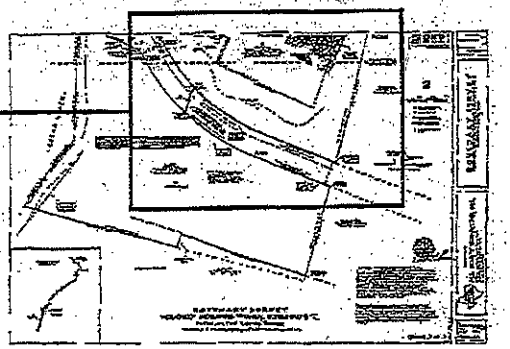


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Exhibit C – Physical Control on Soil

Map

COPY

Maintenance and Monitoring

Exhibit C

Physical Control on Soil

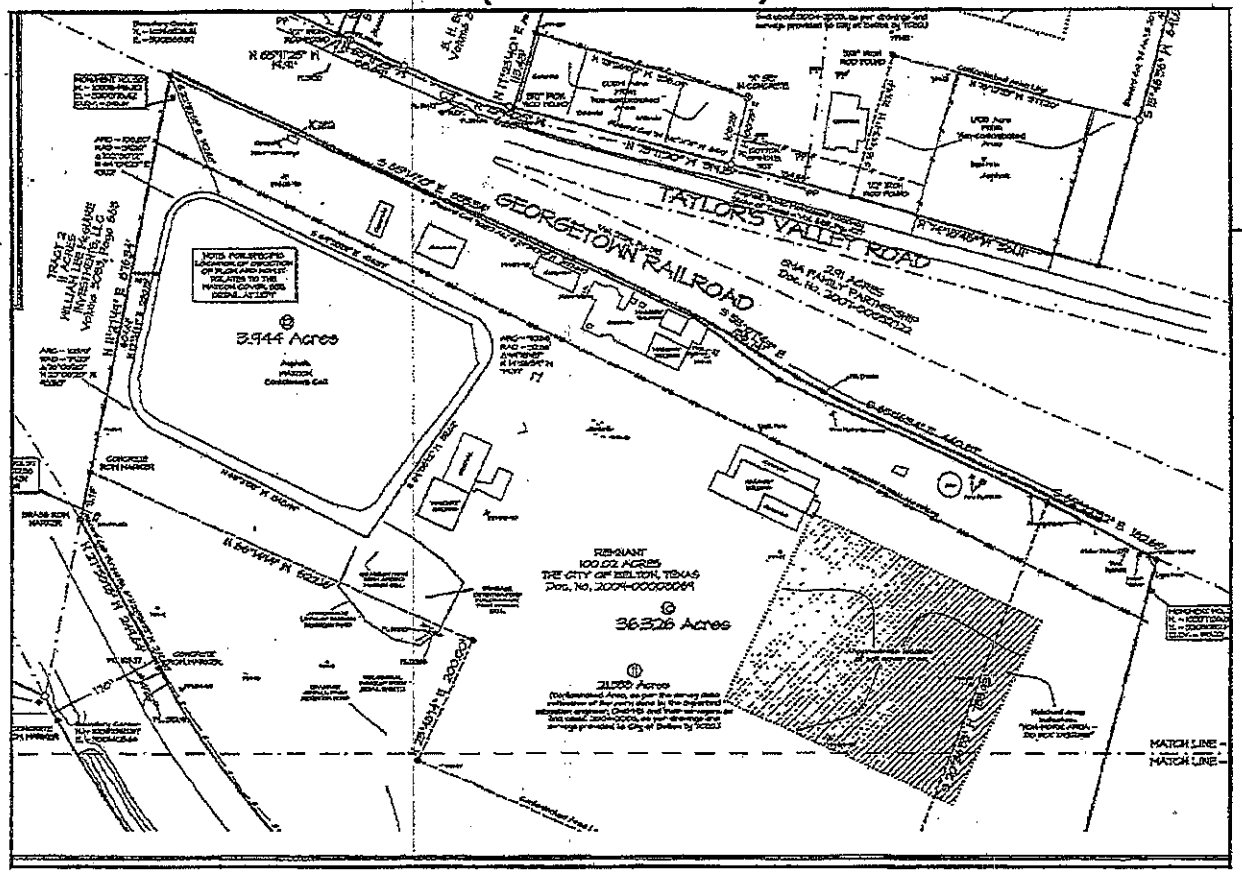
COPY

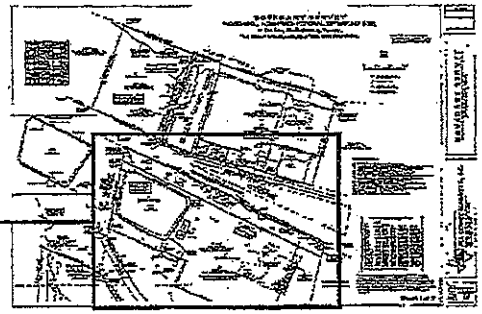
Map

Exhibit C – Map, Tracts 10 (36.326 ac.), 11 (21.538 ac.), and 12 (3.944 ac.), Sheet 1 of 2
Exhibit C – Map, Tracts 10 (36.326 ac.), 11 (21.538 ac.), and 12 (3.944 ac.), Sheet 2 of 2

COPY

Exhibit C
Tracts 10 (36.326 ac.), 11 (21.538 ac.), and 12 (3.944 ac.)
(Sheet 1 of 2)





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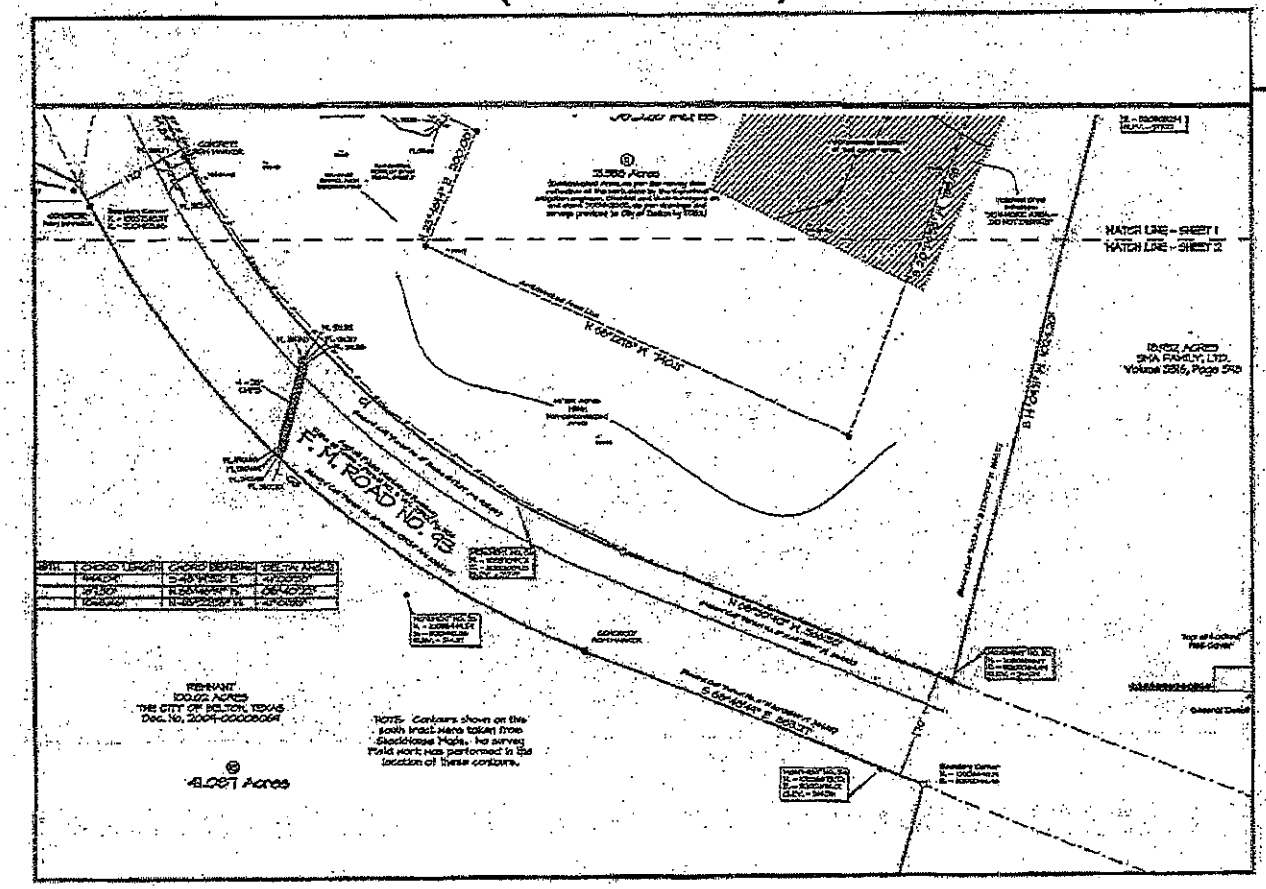
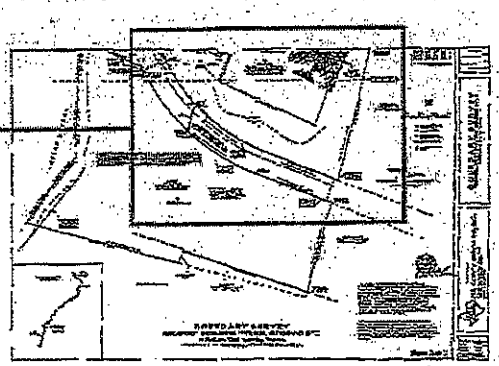
COPY

Exhibit C - Map
Tracts 10 (36.326 ac.), 11 (21.538 ac.), and 12 (3.944 ac.)
(Sheet 2 of 2)





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COPY

Exhibit C

Physical Control on Soil

Maintenance and Monitoring

The physical control on soil consists of a soil cover that is one (1) foot of clay and one-half (0.5) foot of topsoil. In addition, there is an asphaltic cover, which is the MatCon cap, overlying a containment cell. The physical control on soil must remain in place in order to ensure that the remedy remains protective of human health and the environment. Future use of shallow groundwater is prohibited. The clay cap and vegetative cover may not be disturbed. The MatCon cap and underlying containment cell as well as the associated drainage system may not be modified without prior written approval from the Texas Commission on Environmental Quality, and the integrity of the MatCon cap and containment cell must be preserved. The integrity of the monitor wells must be preserved, and access to the monitor wells must be provided. These restrictions are necessary to protect the industrial worker and to prohibit access to groundwater.

The maintenance and monitoring required for the physical control include:

1. Inspect fence, including gates, and signage semiannually. If damaged and/or missing, repair existing or install new fence, gates and signs.
2. Inspect site vegetation semiannually in order to protect the soil cover. If there are holes from burrowing animals, fill holes with clean soil material and compact. If there is settlement, fill settled area with clean soil material and reseed surface. If there are wet areas or water damage, repair so the surface is properly graded and drained. If there is erosion, fill eroded area with clean soil material. If there are cracks, fill cracked area with clean soil material and reseed surface. If there are areas with no vegetation, reseed.
3. At least three times a year, mow the Property. Mow the outer side of the berm surrounding the MatCon capped containment cell (MatCon) up to the top of the berm, but do not mow the inner side of the berm or the MatCon perimeter drainage. Mow vegetation surrounding monitor wells. Do not use a chemical method to control vegetation, as that might affect groundwater sampling data.
4. Inspect the drainage controls semiannually. Drainage controls include the drainage detention pond and drainage outfall from the detention pond south-southwest toward F.M. Road No. 93 but do not include the MatCon perimeter drainage ditch and berm. If berms, except for the berm surrounding the MatCon, are observed to be eroded or unstable, evaluate the damage and repair. If there is debris present, remove debris. If there is restricted flow because of sediment or vegetation, remove vegetation and sediment.
5. Inspect the culverts semiannually. If culverts, culvert inlets, manholes, and/or outfall boxes are blocked or damaged, remove blockage and repair or replace if needed.
6. Visually inspect the surface of the MatCon cap semiannually and report any disturbances or changes to the Texas Commission on Environmental Quality. No other maintenance activities are required with regard to the MatCon cap itself or the underlying containment cell.
7. Using Exhibit C, Physical Control on Soil, as a reference and guide, draft and submit an annual report to the Texas Commission on Environmental Quality. Include documentation of onsite and adjacent offsite land uses. Provide a summary of maintenance and monitoring activities performed, including general observations and findings pertaining to each enumerated maintenance and monitoring requirement, a general description of inspection

and maintenance tasks enumerated in Exhibit C, and the date(s) on which the tasks were performed. No specific format is prescribed. For example, a checklist may be developed and utilized. Photographic documentation may be helpful but is optional. By March 31, submit the annual report for the previous year to:

Texas Commission on Environmental Quality
Remediation Division
Superfund Section
Attention: Project Manager
Rockwool Industries Inc. Federal Superfund Site
MC-136
P.O. Box 13087
Austin, TX 78711-3087

COPY

Exhibit D – Waste Control Unit

Map

COPY

Maintenance and Monitoring

Exhibit D

Waste Control Unit

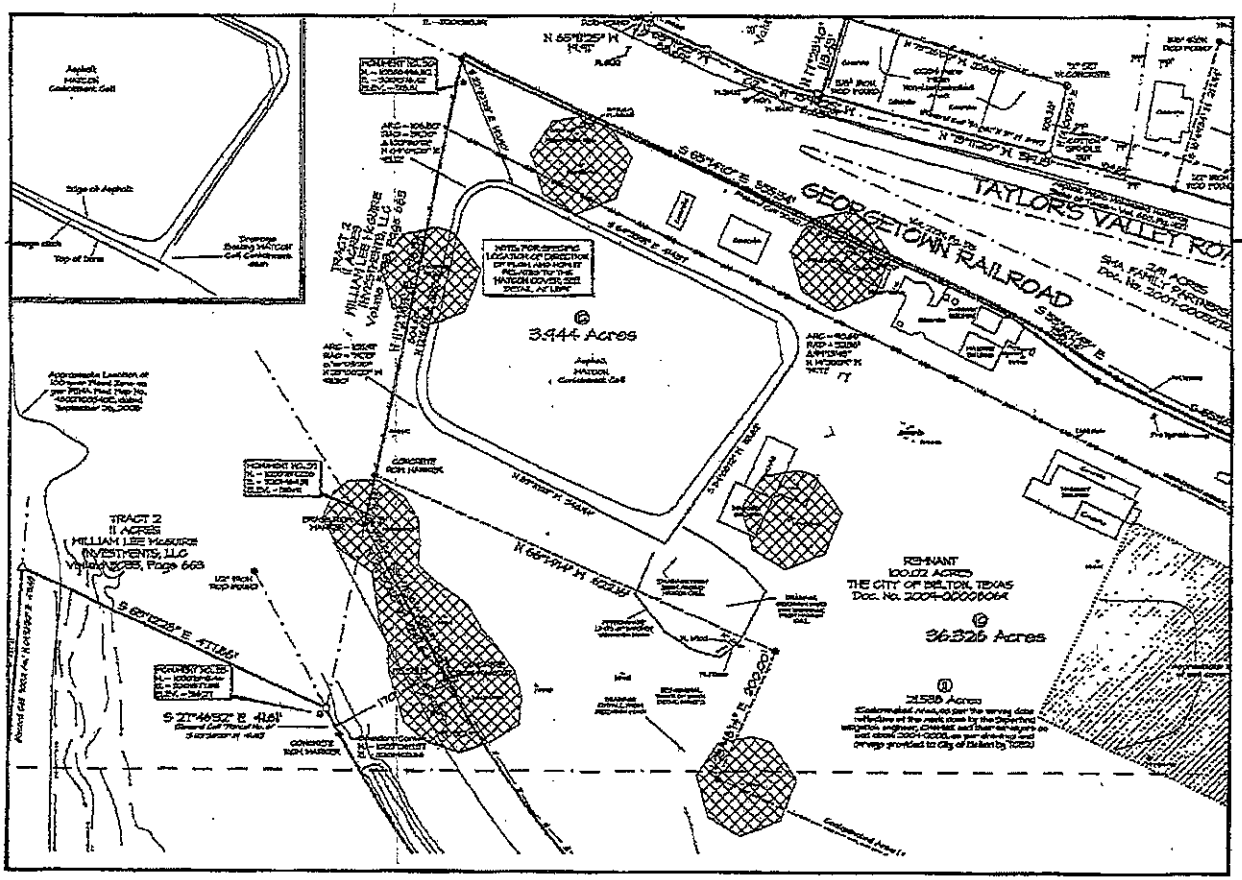
Map

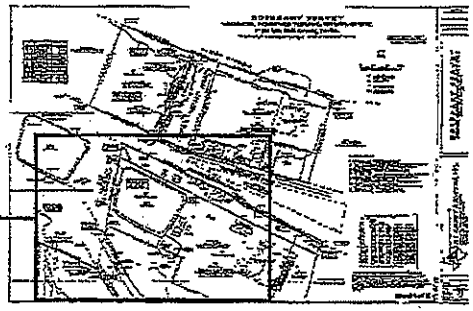
Exhibit D – Map, Tract 12 (3.944 ac.)

COPY

COPY

Exhibit D - Map
Tract 12 (3.944 ac.)





Groundwater Above Protective Concentration Levels (based on available data)

This map has been adapted by the Remediation Division of the Texas Commission on Environmental Quality. This map is for informational purposes and was not prepared for and may not be suitable for legal, engineering, or surveying purposes. This map is based on a drawing prepared by All County Surveying, Inc. in March 2012. To obtain a copy of the original drawing, contact the Remediation Division at 800-633-9363.

Exhibit D

COPY

Waste Control Unit

Maintenance and Monitoring

The waste control unit is identified as the MatCon-capped containment cell (Tract No. 12).

The waste control unit must remain in place in order to ensure that the remedy remains protective of human health and the environment.

The maintenance and monitoring required for the waste control unit include:

1. Fulfill the maintenance and monitoring requirements listed in Exhibit C in order to protect the integrity of the waste control unit.
2. The asphaltic cover of the MatCon-capped containment cell must not be disturbed. No holes are to be made in or through the asphaltic cover.

Bell County
Shelley Coston
County Clerk
Belton, Texas 76513

Instrument Number: 2013-00006480
As
Recordings

Recorded On: February 19, 2013

Parties: CITY OF BELTON TRUSTEE
To EX PARTE

Billable Pages: 36
Number of Pages: 37

Comment:

(Parties listed above are for Clerks reference only)

**** Examined and Charged as Follows: ****

Recordings	151.00
Total Recording:	**151.00**

COPY

************ DO NOT REMOVE. THIS PAGE IS PART OF THE INSTRUMENT ************

Any provision herein which restricts the Sale, Rental or use of the described REAL PROPERTY because of color or race is invalid and unenforceable under federal law.

File Information:

Document Number: 2013-00006480
Receipt Number: 161926
Recorded Date/Time: February 19, 2013 10:37:05A

User / Station: G Gomez - Cash Station 1

Record and Return To:

CITY OF BELTON
PO BOX 120
BELTON TX 76513

I hereby certify that this instrument was filed on the date and time stamped hereon and was duly recorded in the Real Property Records in Bell County, Texas

Shelley Coston
Bell County Clerk

Appendix G

Shaw Inspection Report

Inspection Report

TCEQ CONTRACT NO. 582-12-21803
WORK ORDER #287-0013

ROCKWOOL INDUSTRIES, INC.
FEDERAL SUPERFUND SITE
EPA ID# TXD06637964
SUP 033

Prepared for the

Texas Commission on Environmental Quality

by

Shaw Environmental, Inc.
12005 Ford Road, Suite 600
Dallas, Texas 75234
972.773.8400
Texas Registered Engineering Firm F-5650

Shaw Project No.: 149865

Amandeep Kang, P.E.
Project Manager

David R. Friels, P.E.
Project Engineer

July 2013

12005 Ford Road, Ste 600
Dallas, TX 75234
Tel: 972 773 8400
Fax: 972 773 8401
www.CBI.com

July 22, 2013
Shaw Project No.: 149865

Ms. Marilyn Czimer Long, P.G., Project Manager
Superfund Section, Remediation Division, MC-136
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, Texas 78711-3087

Re: Inspection Report
MatCon® Containment Cell Cover Evaluation
Rockwool Industries, Inc. Superfund Site
Belton, Bell County, Texas
TCEQ Contract No. 582-12-21803, TCEQ Work Order #287-0013

Dear Ms. Long:

Shaw Environmental, Inc. (Shaw), a CB&I company, is pleased to submit this letter report to the Texas Commission on Environmental Quality (TCEQ) to document the inspection of the MatCon® Containment Cell Cover at the Rockwool Industries, Inc. Superfund Site (RWI). The site inspection was conducted on June 24, 2013, by David R. Friels, P.E. The inspection was authorized by the TCEQ via Work Order #287-0013 under Contract 582-12-21803. The inspection and scope of our evaluation were limited to the containment cell cover (cap). Prior to the inspection, Shaw was provided copies of:

- Remedial Action Report, prepared by Tetra Tech EM, Inc., dated February 3, 2006 (RAR)
- Final First Five-year Review Report prepared by CH2M HILL, dated Sept. 2012 (5-YR Report)

These documents were reviewed prior to the site inspection, and statements regarding the site history, contamination, containment cell design and construction, and other remedial actions have been based on information provided in these two documents.

PROJECT BACKGROUND

The RWI site occupies approximately 100 acres and is located approximately ¼ mile east of I 35 at 1741 Taylor's Valley Road in Belton, Texas. Approximately 47 acres of the property were used in the production of mineral wool insulation, while the remainder of the site was predominantly ponds and farm land. It appears that the majority of waste generated during the manufacturing process was stored or disposed on site. With the exception of the bag house dust, which contained arsenic, the waste was not identified as being hazardous. Chemicals of concern (COCs) were identified in the 5-Year Report to be arsenic, antimony, and lead.

SITE CHRONOLOGY

A detailed chronology is provided in the RAR, and selected events are summarized below:

- RWI manufactured mineral wool insulation on the site from the 1950 until February 1987
- Superfund site inspection conducted by TNRCC (presently TCEQ) in 1996
- Interim Record of Decision issued August 2003
- Remedial Investigation/Feasibility study completed April 2003
- Remedial design completed July 2004
- Final Record of Decision signed September 30, 2004
- Remedial Action Construction February 2005 through September 2005
- Repairs to the MatCon® Cover performed during 2006

REMEDIAL ACTION OBJECTIVES (RAOs)

The subsurface/surface soils and groundwater RAOs are presented in the 5-Year Report and summarized below:

1. Preventing direct human contact with surface soil/waste containing arsenic, antimony, and lead at concentrations above the preliminary remediation goals (PRGs) of 200 milligrams/kilogram (mg/kg), 310 mg/kg, and 1754 mg/kg, respectively.
2. Preventing leaching and migration of arsenic, antimony, and lead from surface/subsurface soils/waste into groundwater and surface water resulting in concentrations exceeding specified concentration limits (i.e., 50, 6, and 5 micrograms/liter (µg/L) respectively).
3. Prevent the migration of contaminated soil/waste into the Leon River through surface runoff and erosion.

REMEDIAL ACTION

To accomplish the stated RAOs, the selected remedy for the site included:

1. Excavating waste and contaminated soil exceeding the PRGs and consolidating the waste material in a containment cell.
2. Covering in place waste materials and contaminated soils exceeding the remedial goals.
3. Implementing institutional controls at the site in order to protect the integrity of the containment cell, clay caps and other facilities.

CONTAINMENT CELL

The containment cell is trapezoidal in shape, has a surface area of approximately 3.5 acres, and was constructed in 2005 (RAR). The cell is located approximately 165 feet south of Taylor's Valley Road.

The area between Taylor's Valley Road and the cell is utilized by industrial facilities. An industrial facility is also located on the west side of the cell, and FM 93 is further west and approximately 200 to 300 feet south of the cell. The immediate property around the cell is generally grassed with only minor relief.

Based on the RAR, the containment cell is approximately 18 feet deep with a bottom elevation of 501/502 feet. The bottom liner consists of (from the bottom up) six inches of clay, 16-ounce/square yard (16-oz) geotextile, 40-mil linear low density polyethylene (LLDPE) liner, 1 foot of sandy loam protective cover (bottom liner) and 32-oz geotextile fabric on the sidewalls (Record Drawings Sheet 19). The geosynthetics were terminated in an anchor trench approximately 3 feet from the top of slope. The final cover system (landfill cap) consists of (from the bottom up) 6 inches of compacted flexible base and 4 inches of hot mixed asphaltic concrete (HMA). The cover has a 2 percent slope from the center crown towards the four sides and extends approximately 3 feet past the anchor trench and 7 feet past the limits of waste or grade break. The 7-foot width of asphalt around the perimeter is generally referred to as the apron and is outside the limits of waste. It appears the apron area was not included in the above-mentioned cell area of 3.5 acres. The cell is bounded by a perimeter drainage channel lined with a woven geotextile fabric and riprap. The drainage channels generally flow to the southeast corner and then south to the FM 93.

According to the 5-Year Report, the HMA surface and flexible base were constructed over 1 foot of select fill, and the crown is approximately 8 feet above ground surface at the perimeter. The HMA cap consists of a proprietary product furnished by MatCon®, Inc. and installed by Wilder Construction (Wilder) in August 2005. The HMA consists of a dense graded mixture (similar in gradation to the TxDOT Type D, fine graded surface course material) with the MatCon® binder. The Guide Specifications prepared by Wilder indicate that the compacted HMA will develop a coefficient of permeability, k less than 1×10^{-8} cm/sec (which is a factor of 10 lower than the requirement for a Sub-Title D compacted clay liner for municipal solid waste landfills).

The RAR indicates that there were problems with the HMA installation over the area between the anchor trench and grade break on the south side due to movements within the geosynthetics. Therefore, the geosynthetics were cut along the grade break and removed prior to HMA placement along the west, north, and east sides, and the HMA was placed directly on the soil berm. Between August 30 and November 23, 2005, cracked or failed HMA surface was repaired by milling, removing, sealing, or patching.

SITE VISIT DOCUMENTATION

The observations during the site visit performed on June 24, 2013, are documented on the checklists attached to this letter as Appendix A. The check lists include:

1. Containment Cell MatCon® Cap
2. MatCon® Asphalt Crack Summary
3. Surface Ponding Summary

Select photographs that were taken during the site visit are included as Appendix B. Record drawings prepared by CH2M HILL and provided in the RAR are attached in Appendix C along with Boundary Survey Drawings.

SUMMARY OF OBSERVATIONS

The 5-Year Report indicates that "the MatCon® cap had multiple small cracks in the asphalt, both

sealed and unsealed", and recommended that the unsealed cracks be repaired as specified in the O&M Plan. As noted above, the RAR indicates that significant repairs were made to the asphalt cap in 2005 (predominately in the apron area outside limits of waste). Additionally, it is understood that cracks were sealed in 2006.

Cracking

At the time of the site visit, the asphalt cap contained a significant number of cracks (both sealed and unsealed) which appeared to be predominantly thermal cracking due to temperature-related movements. A significant amount of the previously sealed cracks have reopened. There is a greater concentration of cracks in the apron area, but there is also significant cracking either along or generally parallel to the paving joints and a lesser number of cracks transverse to the joint seams. Approximately 75 percent of the paving joints exhibit cracking. The observed cracking is documented on the inspection forms in Appendix A. The open crack widths generally varied from hairline (less than 0.02") to approximately 5/8", with a large percentage of the cracks within 1/16" to 1/2". It did not appear that the previously sealed cracks were routed prior to sealing, although the MatCon® O&M Plan indicates that cracks at least 1 inch deep should be routed out and sealed.

The total lineal footage of cracks was estimated using a measuring wheel. The percentages of cracks that were sealed and unsealed or open were visually estimated. Therefore, the lineal feet of cracks should be considered an estimate, and the actual lineal feet of cracks should be determined by survey procedures. Our estimates indicate the following:

- Approximately 3,740 lineal feet of cracks total (includes previously sealed and unsealed)
- Approximately 1,860 lineal feet of open or unsealed cracks in aprons
- Approximately 1,880 lineal feet of open or unsealed cracks over waste

To protect and prolong the life of the cap, all cracks should be repaired. However, the cracks inside the apron and over waste are most critical because they are most likely to allow surface water to infiltrate to the waste.

Ponding

A summary of apparent ponding is included in Appendix A. The apparent ponding was based on the presence of darker color and silt on the asphalt surface. Approximately 17 areas of ponding with dimensions in the long direction ranging from approximately 2 feet to 24 feet were observed. The ponding areas appeared to be low to moderate in severity with estimated depths less than approximately 1" and mostly less than 1/2".

Asphalt Surface Oxidation

The asphalt surface is exhibiting some weathering and oxidation, which is normal due to long-term exposure to weather elements. Also, oxidation is generally greater on asphalt surfaces not subject to traffic.

ACCOMPLISHMENT OF REMEDIAL ACTION OBJECTIVES

The soil containment cell as designed will accomplish all three of the RAOs for soil/waste/contaminated water within the cell. Waste containment cell design is based on a relatively impermeable bottom and sidewall liner that will prevent the leaching or migration of water within the waste from seeping into the groundwater. Likewise the cover is designed with a sloping, relatively impermeable cap to prevent surface water from infiltrating into the waste within the cell.

A review of the RAR indicates that the containment cell has been constructed with a 40-mil polyethylene bottom liner and the 4-inch thick, HMA MatCon® Cap. If the containment cell construction complied with the design and good quality construction standards and is adequately maintained, the containment cell should generally accomplish the stated objectives. However, if cracking of the MatCon® cap is allowed to continue, surface water may infiltrate into the waste and seepage of contaminated water (leachate) into the groundwater could occur, and the cell would no longer accomplish its intended objectives.

CONCLUSIONS AND RECOMENDATIONS

Unless the MatCon® cap is adequately repaired and an ongoing inspection and maintenance program is implemented, the cap will not prevent infiltration of surface water into the containment cell. If surface water is allowed to infiltrate into the waste within the containment cell, it is possible that leachate can migrate from the cell and the cell will not accomplish its intended objectives.

Periodic seal coating is generally recommended for asphalt surfaces to combat weathering and oxidation. Generally, seal coats are recommended every 3 to 6 years. A seal coat application is recommended along with the crack repair as soon as practicable.

Surface repairs recommended to be completed as soon as practicable include:

1. Remove all grass and weeds that are growing through the cracks
2. Remove vegetation and dirt from cracks, and apply an EPA-approved herbicide or burn roots
3. Cracks with widths of approximately 1/16" to 3/4" should be routed and sealed (Fig. 1)
4. Severe cracks that are greater than 3/4" or full depth should be cut out and patched (Fig. 4)
5. Clean the surface and apply a seal coat over the entire surface

Recommended ongoing maintenance includes:

1. Inspect cap annually
2. Seal cracks that have a mean width greater than 1/16"
3. Apply a seal coat to the entire surface as needed (estimated to be approximately every five years)

Apron repairs:

Due to the relative frequency of cracks in the apron and given that the apron is not over waste, it would be acceptable to remove vegetation, clean open cracks, seal cracks > 1/16" wide, and then apply the seal coat. It is anticipated that if movements continue within the apron surface, it will be necessary to remove all or large parts of the apron, repair or apply new base, and patch with new HMA.

REPAIR PROCEDURES AND MATERIALS

Applicable Specifications

- Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, Texas Department of Transportation, June 1, 2004 (TxDOT Specification)

- MatCon® Operation and Maintenance Plan for Rockwool Superfund Site, January 13, 2006 (MatCon® O&M Plan) – Note Figures 1 through 4 are attached as Appendix D.

Crack Sealing

Cracks should be routed out to provide a clean and even crack edge and reservoir for the sealant. The sealant reservoir should be approximately 1/2" to 3/4" wide and deep (after routing and removal of at least 1/8" material from each side). See Figure 1, Appendix D. After completion of routing and removal of uneven edges and loose aggregate, the joint must be cleaned out by blowing with compressed air. Any vegetation growing in the joints must be removed, and the joint area should be treated to prevent the vegetation from growing back (i.e., herbicide application or burning). If an EPA-approved herbicide is applied, sealing should be delayed for 7 to 14 days. After preparation has been completed, the joints should be sealed with a rubber-asphalt crack sealing compound complying with TxDOT Specification 300.2 H Table 15.

Patching

Patching of the surface should be employed if the cracks are greater than ¾" in width or extend full depth. Additionally, patching may be practicable if the crack frequency is greater than 100 lineal feet within an area of 320 square feet. Patching is accomplished by sawing out the affected areas or cracks, tack coating the exposed surfaces, and placing a patch consisting of approved HMA patching material. (Refer to Figures 3 and 4, Appendix D)

Seal Coat

After routing and cleaning of cracks (or patching), the surface shall be cleaned and sprayed with an approved hot liquid asphalt pavement sealer with sand additive. The seal coat application should be in accordance with the manufacturers recommendations and consistent with applicable TxDOT or FAA specifications. Typically the sealer should be applied at a rate of approximately 0.12 to 0.3 gallons per square yard per application with a minimum of two applications (coats). The actual seal coat application rate may vary depending on manufacturer, temperature, and other factors.

We appreciate the opportunity of working with you on this project. Should you have any questions, please contact Amandeep Kang at (972) 773-8428.

Sincerely,

Shaw Environmental, Inc., a CB&I company
Texas Registered Engineering Firm F-5650

David R. Friels, PE
Project Engineer

STATE OF TEXAS
DAVID R. FRIELS
51700
REGISTERED
PROFESSIONAL ENGINEER
7/22/13

Amandeep Kang, PE
Project Manager

Attachments:
A – Site Inspection Checklist Forms
B – Photographs from the Site Inspection
C – Drawings
D – Figures 1 – 4, MatCon® O&M Plan

APPENDIX A

SITE INSPECTION CHECKLIST FORMS

Containment Cell MatCon® Cap

Item	Yes/No	Remarks	Photo
General Surface Conditions			
Settlement	Yes		
Evidence of Ponding Water	Yes	Approx. 17 locations, see Summary	X
Upheaval	No		
Evidence of Seeps	No		
Surface Damage	No		
Distress			
Surface Deterioration			
Weathering	No		
Abrasion/scuffing	No		
Cracking	Approx. 3,740 ft of cracks, see following Summary		
Fatigue/Alligator	No		
Thermal Cracking	Yes		X
Transverse	Yes		
Longitudinal	Yes		
Block Shaped	No	Blocks just beginning to form	
Cracks Along Paving Joints	Yes	Approx. 75% of joints cracked	X
Previously Filled, Ok	Yes		X
Sealed but needing Repairs	Yes		X
New (not filled)	Yes		X
Grass and Weeds in Cracks	Yes		X
Cracks in Apron	Yes		X
Rutting	No		
Raveling	No		
Pot Holes	No		
Perimeter Drainage Channel			
RipRap in Place	Yes		X
Erosion of Chanel Bank	Yes		X
Weeds growing through RipRap	Yes		X

Inspector: David R. Friels, P.E. Inspection Date: 6/24/13

MatCon® Asphalt Crack Summary

Location / Type	Lineal Ft.	Unsealed	Sealed	Unsealed or Open	
Apron (0 to 7' from Edge)					Assumes cracks > 7' from edge over waste
		30%	70%	50%	
East	690	207	483	345	
		20%	80%	40%	
South	1042	208	834	417	
		20%	80%	60%	
West	780	156	624	468	
		40%	60%	60%	
North	1050	420	630	630	
Subtotal	**3562**	**991**	**2571**	**1860**	
Interior Over Waste					
Along Paving Joints (not sealed)	830	830	NA	830	Mostly 0.02" to 1/4" & <2" deep
Longitudinal and Transverse	1050	525	525	1050	Includes sealed but open along joints
Subtotal	**1880**	**1355**	**525**	**1880**	
Total Lineal Feet of Cracks	**5442**	**2346**	**3095.6**	**3740**	Includes cracks in Apron not over waste
Inspector:	David R. Friels, P.E.			Date:	June 24, 2013

Notes:
Lineal footage measured with a wheel supplemented by estimating
Above percentages were estimated from visual inspection and apply to total Lineal Ft.
Assumes apron extends 7 feet past edge of waste
Sealed includes all previously sealed cracks including those that have reopened & need repair
Unsealed or open includes previously sealed cracks that have reopened and unsealed cracks

Containment Cell Ponding Summary

	Location	Length, Ft	Width, Ft	Area, SF	
Areas of Ponding	South	9	3	27	
		8	3	24	
		24	3	72	
		10	3	30	
		4	2	8	
		2	1	2	
		6	2	12	
		4	2	8	
		5	33	165	
		22	3	66	
	West	4	2	8	
		5	3	15	
		22	3	66	
	NW	23	18	414	
	North	3	2	6	
		3	2	6	
	NE	6	4	24	
Total Area				953	

Inspector: David R. Friels Date: 6/24/2013

Notes: Ponding area based on change in color and presence of silt

APPENDIX B

PHOTOGRAPHS FROM THE SITE INSPECTION

Photographic Documentation
Containment Cell

Client: TCEQ
Location: Rockwool Industries, Inc. Superfund Site
Belton, Bell County, Texas

Prepared by: CB&I
Photographer: David R. Friels
Project Number: 149865

Photograph No. 1

Date: June 24, 2013

Direction: Southwest

Description:
View across MatCon® Cap from NE corner. Note evidence of ponding as shown in foreground.

Photograph No. 2

Date: June 24, 2013

Direction: West

Description:
View across north side of cap from NE corner. Note grass growing in cracks in apron and through riprap in perimeter ditch.

Photographic Documentation
Containment Cell

Client: TCEQ
Location: Rockwool Industries, Inc. Superfund Site
Belton, Bell County, Texas

Prepared by: CB&I
Photographer: David R. Friels
Project Number: 149865

Photograph No. 3

Date: June 24, 2013

Direction: West

Description:
View of typical construction joint cracking.

Photograph No. 4

Date: June 24, 2013

Direction: West

Description:
View of longitudinal cracking previously sealed.

Photographic Documentation
Containment Cell

Client: TCEQ
Location: Rockwool Industries, Inc. Superfund Site
Belton, Bell County, Texas

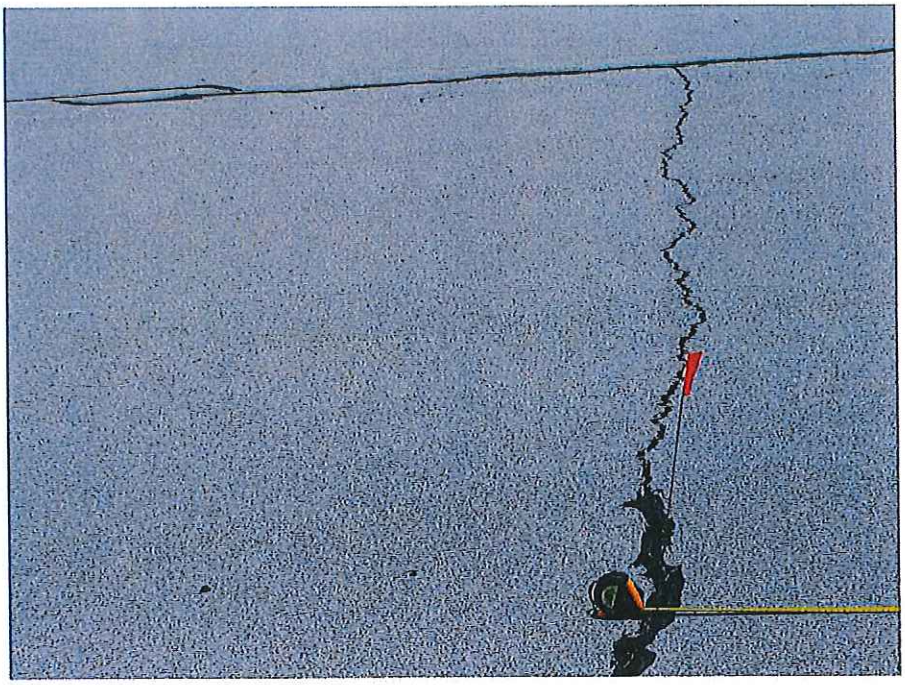
Prepared by: CB&I
Photographer: David R. Friels
Project Number: 149865

Photograph No. 5

Date: June 24, 2013

Direction: N/A

Description:
View of cracking in cap. Note previously sealed cracks and newer cracking.



Photograph No. 6

Date: June 24, 2013

Direction: NA

Description:
View of cracks in cap.

Photographic Documentation
Containment Cell

Client: TCEQ
Location: Rockwool Industries, Inc. Superfund Site
Belton, Bell County, Texas

Prepared by: CB&I
Photographer: David R. Friels
Project Number: 149865

Photograph No.7

Date: June 24, 2013

Direction: South

Description:
View of apron on south end of east side. Note extensive cracking in apron – previously sealed and newer. Also note grass growth in cracks and also through riprap in ditch. Tape measure indicates 7' from edge of apron and according to plans, cracks inside the 7' are over waste.

Photograph No. 8

Date: June 24, 2013

Direction: NA

Description:
View of differential settlement of edge of apron on north side.

Photographic Documentation
Containment Cell

Client: TCEQ
Location: Rockwool Industries, Inc. Superfund Site
Belton, Bell County, Texas

Prepared by: CB&I
Photographer: David R. Friels
Project Number: 149865

Photograph No. 9

Date: June 24, 2013

Direction: West

Description:
View of south perimeter ditch and apron from southeast corner. Note tape measure indicating 7' (i.e., edge of apron). Also note existing patches and grass and weeds growing in cracks.

Photograph No. 10

Date: June 24, 2013

Direction: East

Description:
View of south side of cap. Note apparent ponding over waste.

Photographic Documentation
Containment Cell

Client: TCEQ
Location: Rockwool Industries, Inc. Superfund Site
Belton, Bell County, Texas

Prepared by: CB&I
Photographer: David R. Friels
Project Number: 149865

Photograph No. 11

Date: June 24, 2013

Direction: South

Description:
View of east perimeter ditch. Note grass and weeds growing through riprap and in cracks along apron.

Photograph No. 12

Date: June 24, 2013

Direction: NA

Description:
View of isolated erosion of south perimeter ditch at edge of south apron.

APPENDIX C

DRAWINGS

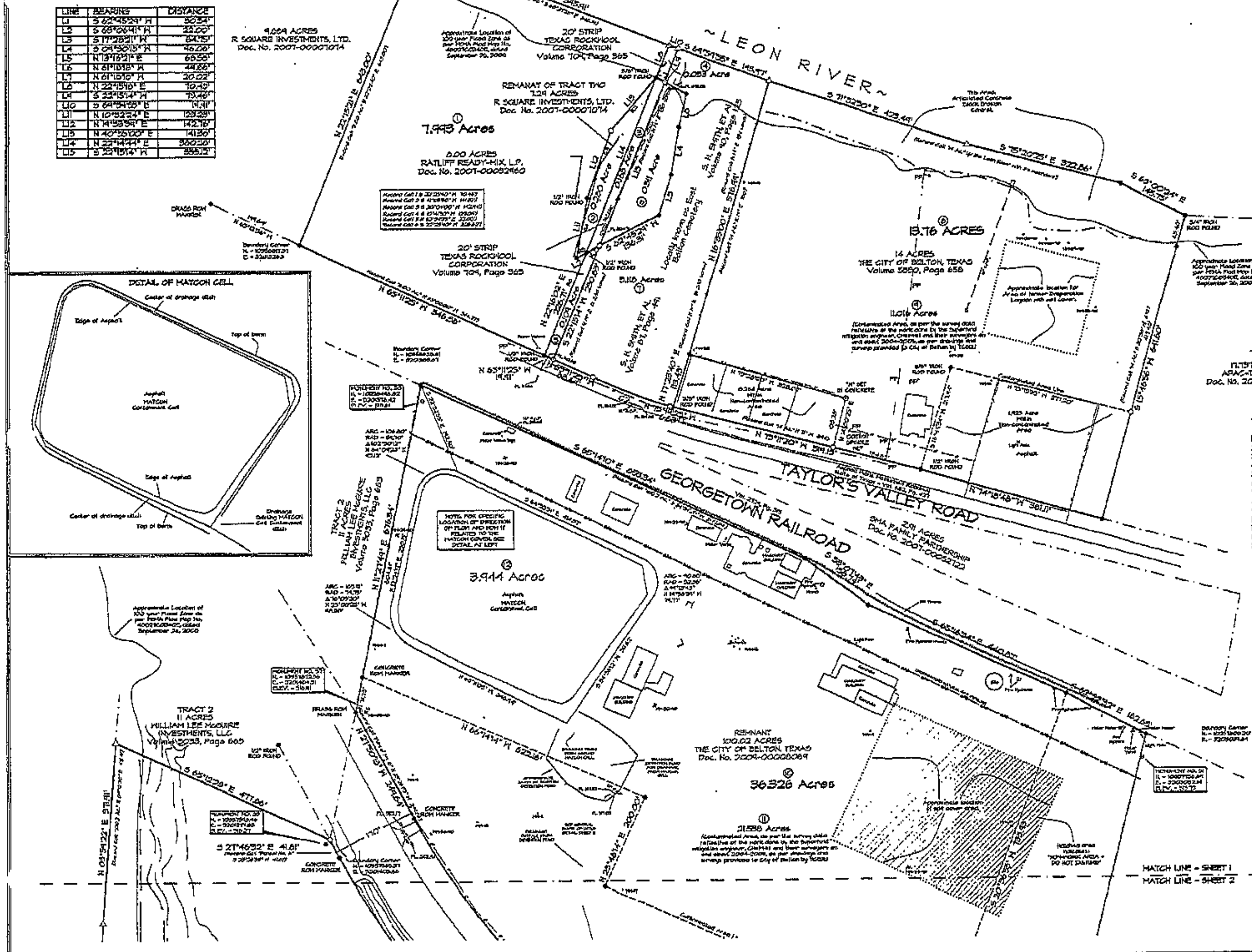
- **BOUNDARY SURVEY - 2 DRAWINGS**
- **RECORD DRAWINGS - SHEETS 1, 18, AND 19**
  (*Prepared by CH2M HILL and provided in the Remedial Action Report)*

BOUNDARY SURVEY
ROCKWOOL INDUSTRIES FEDERAL SUPERFUND SITE.
In Belton, Bell County, Texas.

This sketch is to accompany a Field Note Description.

* REFER TO SHEET TITLED "TOPOGRAPHY SURVEY" FOR TOPOGRAPHY INFORMATION.

LINE	BEARING	DISTANCE
L1	S 62°45'29" W	50.34'
L2	S 65°06'41" W	22.00'
L3	S 17°28'21" W	64.75'
L4	S 04°30'15" W	46.00'
L5	N 13°16'21" E	66.56'
L6	N 61°10'18" W	44.66'
L7	N 61°10'10" W	20.02'
L8	N 22°15'10" E	70.49'
L9	S 22°15'14" W	73.46'
L10	S 64°54'35" E	14.41'
L11	N 10°52'24" E	129.29'
L12	N 14°58'54" E	142.76'
L13	N 40°55'00" E	141.30'
L14	N 22°14'44" E	360.20'
L15	S 22°15'14" W	335.12'



TRACT DESIGNATIONS:

1). 7.993 acre tract - Ratliff Ready-Mix tract
2). 0.280 acre tract - R Square Investments tract Contaminated area
3). 0.168 acre tract - Rockwool 20' Strip Contaminated area
4). 0.083 acre tract - Remnant of Rockwool 20' Strip
5). 0.109 acre tract - Remnant of Rockwool 20' Strip
6). 0.511 acre tract - Bell County Colored Cemetery contaminated area
7). 5.118 acre tract - Bell County Colored Cemetery remainder
8). 19.76 acre tract - City of Belton Tract B
9). 11.016 acre tract - City of Belton Tract B contaminated area
10). 36.326 acre tract - City of Belton Tract C
11). 21.558 acre tract - City of Belton Tract C contaminated area
12). 3.944 acre tract - MATCON containment cell
13). 41.087 acre tract - City of Belton south tract

MONITORING WELL TABLE

MON WELL	TOP OF LOCKED WELL COVER	TOP OF CONCRETE	NG	NORTHING	EASTING
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	506.28	504.00	504.27	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* - DENOTES WELL SAID TO BE ABANDONED BY TCEQ

This sketch represents a survey made on the ground. During the performance of this survey persons working under my supervision observed conditions within and along the boundaries and to the best of my knowledge they are as shown. This document is not valid for any purpose unless signed and sealed by a Registered Professional Land Surveyor.

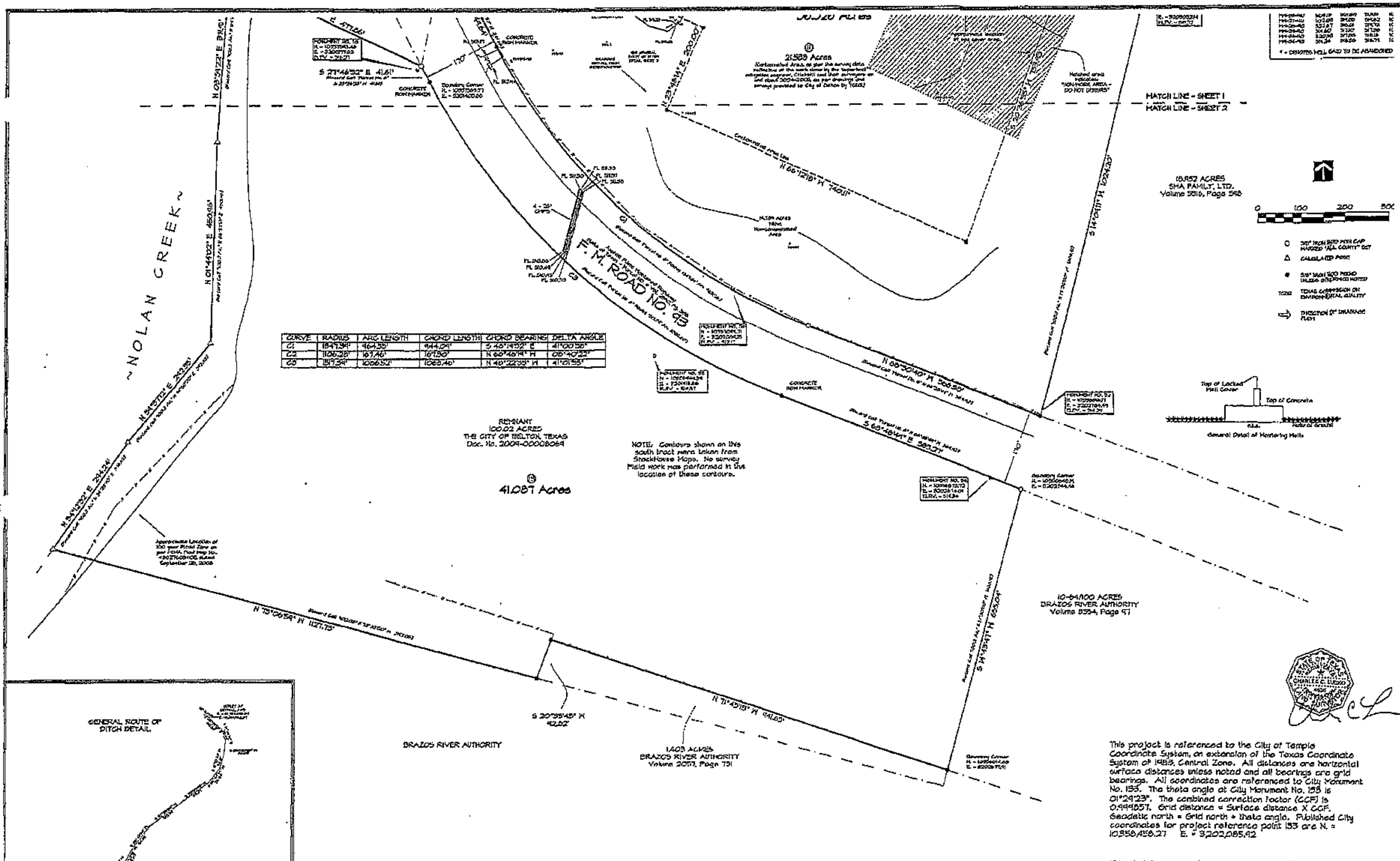
Sheet 1 of 2

REVISIONS:

BOUNDARY SURVEY
ROCKWOOL INDUSTRIES FEDERAL SUPERFUND SITE. In Belton, Bell County, Texas.

ALL COUNTY SURVEYING, INC.
1303 South 21st Street, Temple, Texas 76504
(254) 778-2272 FAX (254) 774-7608
Tx Firm Lic No. 10023600

Survey completed: March 2012
Scale: 1" = 100'
Job No.: 120112
Dwg No.: 120112
Drawn by: DMP
Surveyor: GCL 4636



CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
C1	1347.39'	964.55'	944.09'	S 46°19'32" E	41°00'56"
C2	1106.28'	167.46'	167.30'	N 60°46'19" W	08°40'22"
C3	1517.34'	1006.52'	1063.40'	N 48°22'35" W	41°01'55"

BOUNDARY SURVEY
ROCKWOOL INDUSTRIES FEDERAL SUPERFUND SITE.
In Belton, Bell County, Texas.

This sketch is to accompany a Field Note Description.

This project is referenced to the City of Temple Coordinate System, an extension of the Texas Coordinate System of 1983, Central Zone. All distances are horizontal surface distances unless noted and all bearings are grid bearings. All coordinates are referenced to City Monument No. 133. The theta angle at City Monument No. 133 is 01°29'23". The combined correction factor (CCF) is 0.999857. Grid distance = Surface distance X CCF. Geodetic north = Grid north + theta angle. Published City coordinates for project reference point 133 are N. = 10,358,458.27 E. = 3,202,085.92

This sketch represents a survey made on the ground. During the performance of this survey persons working under my supervision observed conditions within and along the boundaries and to the best of my knowledge they are as shown. This document is not valid for any purpose unless signed and sealed by a Registered Professional Land Surveyor.

Sheet 2 of 2

REVISIONS:

BOUNDARY SURVEY
ROCKWOOL INDUSTRIES FEDERAL SUPERFUND SITE. In Belton, Bell County, Texas.

ALL COUNTY SURVEYING, INC.
1303 South 21st Street, Temple, Texas 76504
(254) 778-2272 FAX (254) 774-7608
Tx Firm Lic No. 10023600

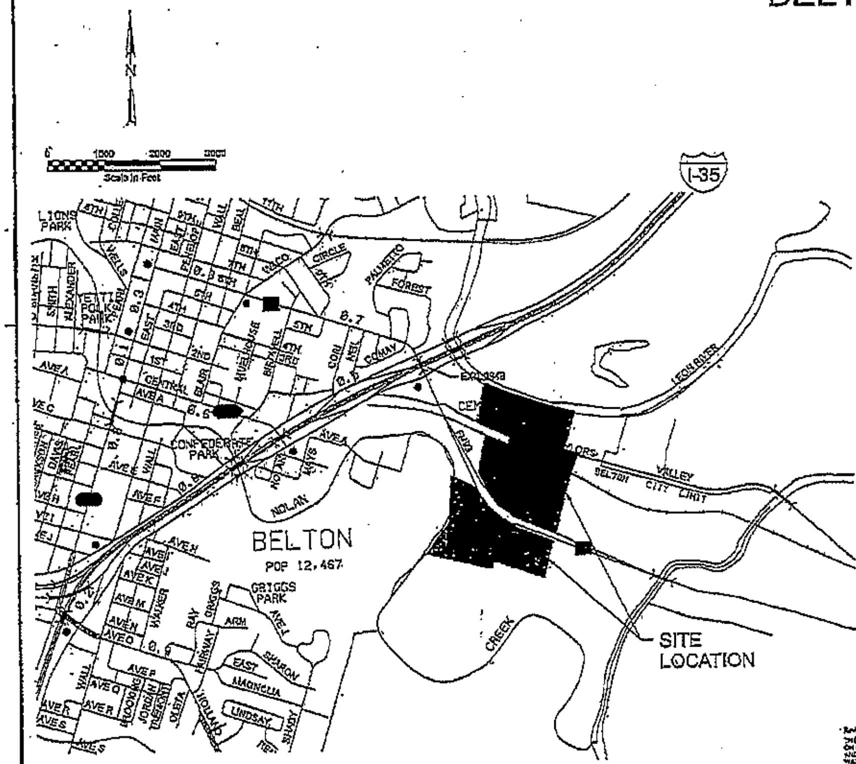
Survey completed: March 2012
Scale: 1" = 100'
Job No.: 120112
Dwg No.: 120112
Drawn by: DMP
Surveyor: CCL 84636

AS-BUILT DRAWINGS

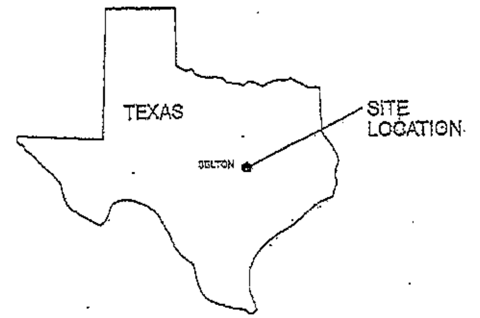
SOIL / WASTE EXCAVATION AND SITE RESTORATION

ROCKWOOL INDUSTRIES, INC SUPERFUND SITE

BELTON, TEXAS



LOCATION MAP



INDEX TO DRAWINGS		
SHT NO.	DWG NO.	SHEET TITLE / DESCRIPTION
1	C-1	SITE LOCATION AND DRAWING INDEX
2	C-2	SITE VICINITY MAP AND ACCESS PLAN
3	C-3	SITE PREPARATION PLAN GEER PROPERTY - CEMETERY AREA AND NORTH PROPERTY
4	C-4	SITE PREPARATION PLAN OU2 AND CENTRAL PROPERTY
5	C-5	EXCAVATION / WASTE REMOVAL PLAN GEER PROPERTY - CEMETERY AREA
6	C-6	EXCAVATION / WASTE REMOVAL PLAN NORTH PROPERTY
7	C-7	EXCAVATION / WASTE REMOVAL PLAN LEON RIVER EMBANKMENT
8	C-8	EXCAVATION / WASTE REMOVAL PLAN OU2 AND CENTRAL PROPERTY
9	C-9	COVER AND FINISHED GRADE PLAN GEER PROPERTY - CEMETERY AREA
10	C-10	COVER AND FINISHED GRADE PLAN NORTH PROPERTY
11	C-11	FINISHED GRADE PLAN - CONTAINMENT CELL OU2 AND CENTRAL PROPERTY
12	C-12	CULVERT PROFILES AND DETAILS GEER PROPERTY - CEMETERY AREA
13	C-13	SECTIONS GEER PROPERTY - CEMETERY AREA AND NORTH PROPERTY
14	C-14	SECTIONS OU2 AND CENTRAL PROPERTY
15	C-15	DETAILS COVER, CHAIN LINK FENCE, AND SEDIMENT FENCE
16	C-16	DETAILS STORMWATER AND LEON RIVER EMBANKMENT
17	C-17	EXCAVATION PLAN CONTAINMENT CELL
18	C-18	FINISHED GRADE PLAN CONTAINMENT CELL
19	C-19	SECTIONS AND DETAILS CONTAINMENT CELL
20	C-20	DETAILS MONITORING WELL

RECORD DRAWINGS
Revisions Drawn By JB Date 1-2006

DSGN	RE THOMPSON / JA BOOTH	1	1/2006	RECORD DRAWINGS	JB	DS	VERIFY SCALE: BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
DR	DC EVANS						
CHK	RE THOMPSON / MD WILSON						
APVD	DJ STEED	NO.	DATE	REVISION	BY	APVD	

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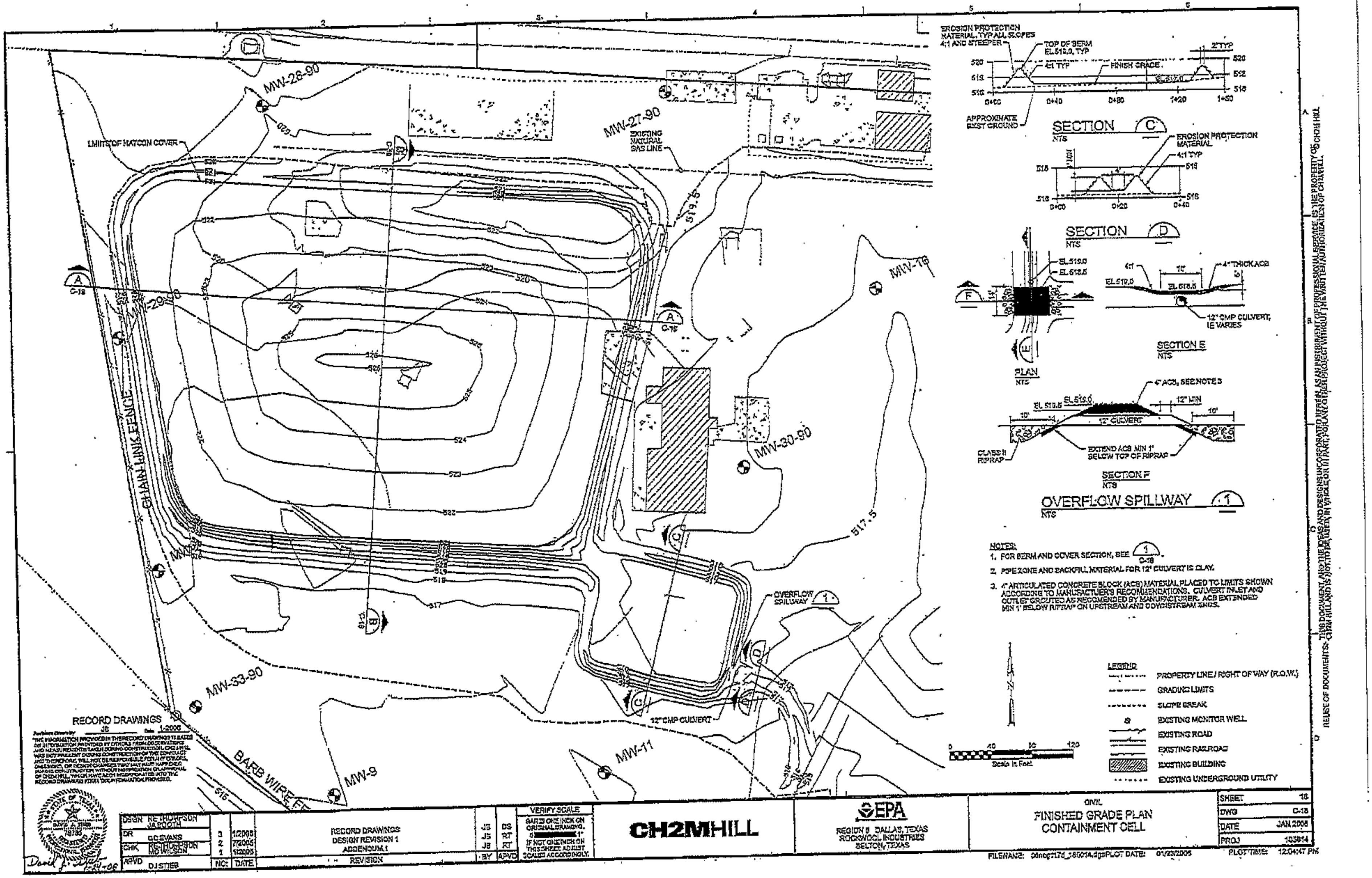
ROCKWOOL INDUSTRIES
BELTON, TEXAS

CIVIL

SITE LOCATION AND DRAWING INDEX

SHEET	1
DWG.	C-1
DATE	JAN 2006
PROJ	185014

FILENAME: 05xc1004_185014.dgn PLOT DATE: 01/23/2006 PLOT TIME: 11:40:08 AM


MW-28-90
MW-27-90
EXISTING NATURAL GAS LINE
LIMITS OF MATCON COVER
MW-29-90
MW-18
MW-30-90
CHAIN LINK FENCE
MW-33-90
BARB WIRE FE
MW-9
MW-11
517.5
519.5
OVERFLOW SPILLWAY
12" CMP CULVERT
RECORD DRAWINGS
EROSION PROTECTION MATERIAL, TYP ALL SLOPES 4:1 AND STEEPER
TOP OF BERM EL.519.0, TYP
4:1 TYP
FINISH GRADE
2' TYP
APPROXIMATE EXIST GROUND
SECTION C
NTS
EROSION PROTECTION MATERIAL
SECTION D
NTS
EL.519.0
EL.518.5
4" THICK ACB
12" CMP CULVERT, IE VARIES
SECTION E
NTS
PLAN
NTS
4" ACB, SEE NOTE 3
12" MIN
12" CULVERT
CLASS II RIPRAP
EXTEND ACB MIN 1' BELOW TOP OF RIPRAP
SECTION F
NTS
OVERFLOW SPILLWAY 1
NTS
NOTES:
1. FOR BERM AND COVER SECTION, SEE 1 C-18
2. PIPE ZONE AND BACKFILL MATERIAL FOR 12" CULVERT IS CLAY.
3. 4" ARTICULATED CONCRETE BLOCK (ACB) MATERIAL PLACED TO LIMITS SHOWN ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. CULVERT INLET AND OUTLET GROUTED AS RECOMMENDED BY MANUFACTURER. ACB EXTENDED MIN 1' BELOW RIPRAP ON UPSTREAM AND DOWNSTREAM ENDS.
LEGEND
PROPERTY LINE / RIGHT OF WAY (R.O.W.)
GRADING LIMITS
SLOPE BREAK
EXISTING MONITOR WELL
EXISTING ROAD
EXISTING RAILROAD
EXISTING BUILDING
EXISTING UNDERGROUND UTILITY
Scale in Feet
REUSE OF DOCUMENTS: THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF CH2M HILL AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF CH2M HILL.
DSGN RE THOMPSON JA BOOTH
DR DC EVANS
CHK RE THOMPSON MO WILSON
APVD DJ STIEB
3 1/2006 RECORD DRAWINGS JB DS
2 7/2005 DESIGN REVISION 1 JB RT
1 1/2005 ADDENDUM 1 JB RT
NO. DATE REVISION BY APVD
VERIFY SCALE
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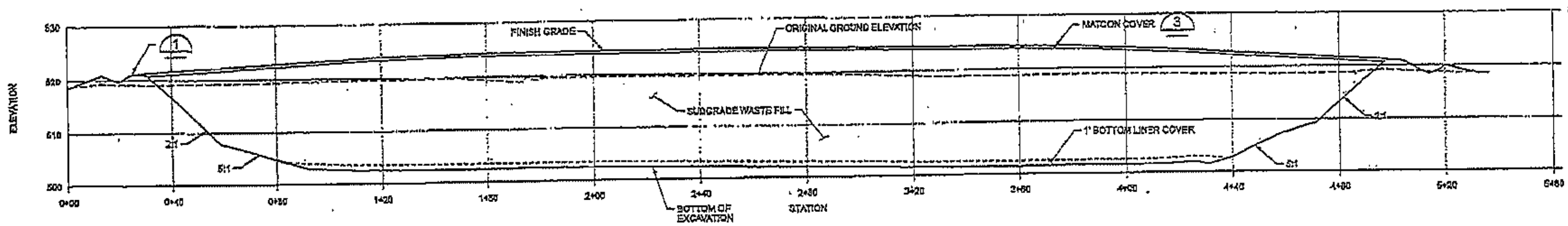
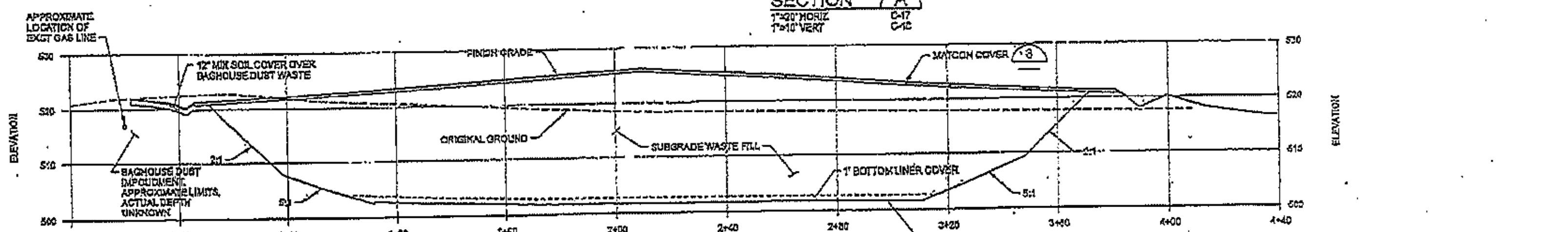
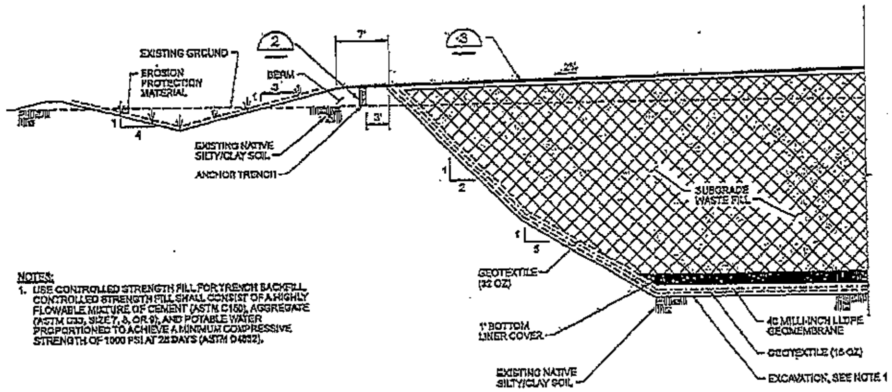
REGION 6 DALLAS, TEXAS
ROCKWOOL INDUSTRIES
BELTON, TEXAS
CIVIL
FINISHED GRADE PLAN
CONTAINMENT CELL
SHEET 16
DWG C-15
DATE JAN 2006
PROJ 185814
PLOT TIME: 12:04:47 PM



SECTION A
1"=20' HORIZ
1"=10' VERT
C-17
C-18

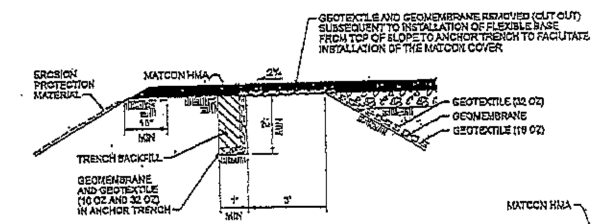


SECTION B
1"=20' HORIZ
1"=10' VERT
C-17
C-18

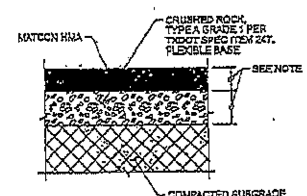


CONTAINMENT CELL DETAIL 1
NTS
C-17, C-18

NOTES:
1. USE CONTROLLED STRENGTH FILL FOR TRENCH BACKFILL. CONTROLLED STRENGTH FILL SHALL CONSIST OF A HIGHLY FLOWABLE MIXTURE OF CEMENT (ASTM C150), AGGREGATE (ASTM C33, SIZE 7, 8, OR 9), AND POTABLE WATER PROPORTIONED TO ACHIEVE A MINIMUM COMPRESSIVE STRENGTH OF 1000 PSI AT 28 DAYS (ASTM D4832).



ANCHOR TRENCH DETAIL 2
NTS



NOTE: MINIMUM THICKNESS AS DETERMINED BY WILDER CONSTRUCTION.

COVER DETAIL 3
NTS

RECORD DRAWINGS
JD 1-2006

DSGN	RE THOMPSON JA BEXTEL	3	1/2006	RECORD DRAWINGS	JB	CS
DR	DC EVANS	2	7/2005	DESIGN REVISION 1	JB	RT
CHK	RE THOMPSON MD WILSON	1	5/2005	ADDENDUM 1	JB	RT
APVD	D ASTIER	NO.	DATE	REVISION	BY	APVD

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REGION 6 DALLAS, TEXAS
ROCKWOOL INDUSTRIES
BELTON, TEXAS

CIVIL
SECTIONS AND DETAILS
CONTAINMENT CELL

SHEET	19
DWG	C-19
DATE	JAN 2006
PROJ	185014

FILENAME: 05nc2120_185014.dgn PLOT DATE: 01/20/2006 PLOT TIME: 12:03:50 PM

APPENDIX D

FIGURES 1 THROUGH 4
FROM MATCON® O&M PLAN

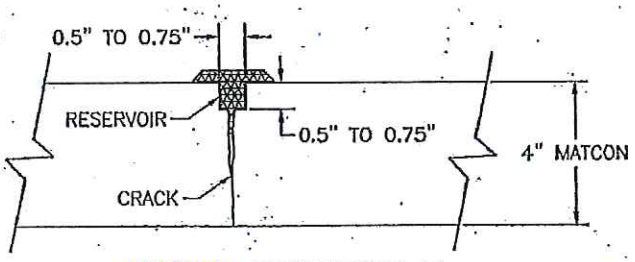

FIGURE 1: CROSS SECTION OF CRACK SEALING GENERALLY CALLED A STANDARD RECESSED BAND-AID

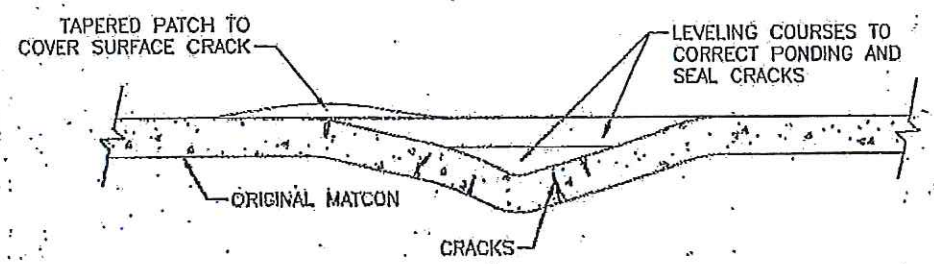

FIGURE 2: TYPICAL PATCHING CONFIGURATIONS

NOTE: FIGURES ARE NOT TO SCALE

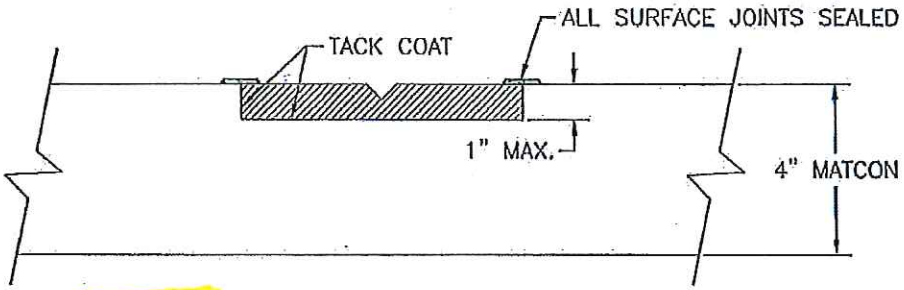

FIGURE 3: SHALLOW PATCH TO REPAIR SURFACE DEFECT. MILL OUT AREA TO BE PATCHED TO A DEPTH NOT TO EXCEED 1". INLAY WITH HIGH QUALITY MATCON MIXTURE AFTER APPLYING HEAVY TACK COAT. SEAL ALL EDGES.

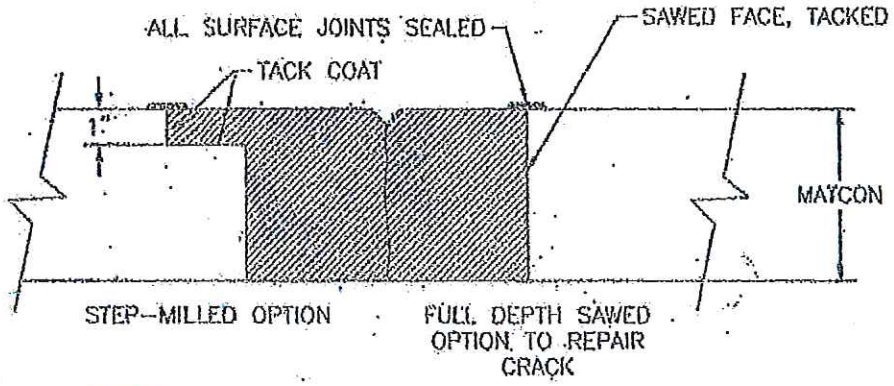

FIGURE 4: FULL DEPTH PATCH TO REPAIR CRACK. REMOVE MATCON BY SAWING OR MILLING IN SEVERAL PASSES TO MINIMIZE DAMAGE TO ADJACENT MATCON. TACK COAT ALL SURFACES. PLACE MATCON PATCH MIXTURE IN TWO LIFTS - BOTTOM LIFT PLACED, THEN IMMEDIATELY FOLLOWED BY TOP LIFT AND COMPACTED. SEAL ALL EDGES.

Appendix H

Asphalt Repair Details

(Figure 1 through Figure 4)

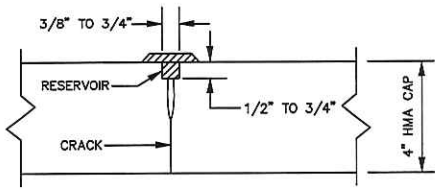

FIGURE 1 - CRACK SEALING RESERVOIR

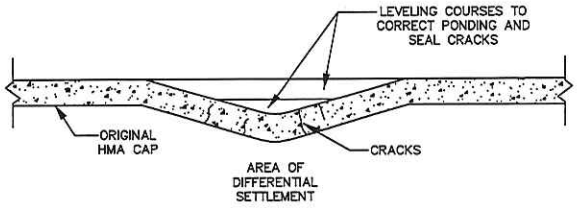

FIGURE 2 - LEVELING PATCH

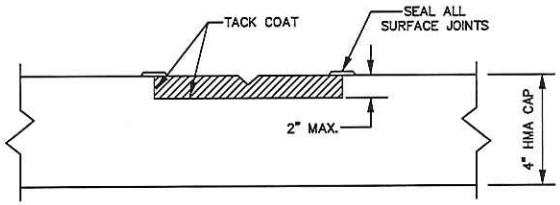

FIGURE 3 - SHALLOW PATCH

NOTE:
MILL OUT AREA TO BE PATCHED TO A DEPTH NOT TO EXCEED 2".

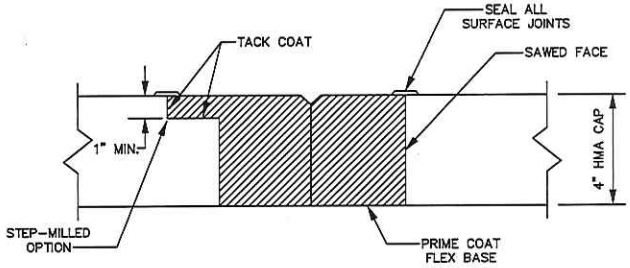

FIGURE 4 - FULL DEPTH PATCH

NOTES:
1. SAW CUT OR MILL EDGES TO REMOVE EXISTING MATERIAL.
2. PLACE AND COMPACT HMA PATCH MATERIAL IN 2 LIFTS.

STATE OF TEXAS
DAVID R. FRIELS
51700
REGISTERED PROFESSIONAL ENGINEER
11/5/13
F-5650

CBI
12005 FORD ROAD, SUITE 600
DALLAS, TEXAS 75234
(972) 773-8400 OFFICE
(972) 773-8401 FAX

OFFICE: DALLAS	DATE: 11-5-13	ACAD FILE: 98658l.dwg

ASPHALT REPAIR DETAILS

CLIENT: TEXAS COMMISSION ON ENVIRONMENTAL QUALITY			PM: AK
LOCATION: ROCKWOOL INDUSTRIES, INC. BELTON, TEXAS			CHECKED: DF
DESIGNED: DF	DRAWN: SDJF	PROJECT NO.: 149865	APPENDIX: H

Appendix I

Specifications and Data Sheets

300 ITEMS — SURFACE COURSES AND PAVEMENT

ITEM 300
ASPHALTS, OILS, AND EMULSIONS

300.1. Description. Provide asphalt cements, cutback and emulsified asphalts, performance-graded asphalt binders, and other miscellaneous asphalt materials as specified on the plans.

300.2. Materials. Provide asphalt materials that meet the stated requirements when tested in accordance with the referenced Department, AASHTO, and ASTM test methods. Refer to the Material Inspection Guide (maintained by the Construction Division), Section 11. "Asphalt Inspection, Quality Control and Quality Assurance," for sampling and testing requirements.

Acronyms used in this Item are defined in Table 1.

Table 1
Acronyms

Acronym	Definition
Test Procedure Designations	
Tex	Department
T or R	AASHTO
D	ASTM
Polymer Modifier Designations	
P	polymer-modified
SBR or L	styrene-butadiene rubber (latex)
SBS	styrene-butadiene-styrene block co-polymer
TR	tire rubber (from ambient temperature grinding of truck and passenger tires)
AC	asphalt cement
AE	asphalt emulsion
AE-P	asphalt emulsion prime
A-R	asphalt-rubber
C	cationic
EAP&T	emulsified asphalt prime and tack
H-suffix	harder residue (lower penetration)
HF	high float
MC	medium-curing

Table 1 (continued)
Acronyms

Acronym	Definition
MS	medium-setting
PCE	prime, cure, and erosion control
PG	performance grade
RC	rapid-curing
RS	rapid-setting
S-suffix	stockpile usage
SCM	special cutback material
SS	slow-setting

A. Asphalt Cement. Asphalt cement must be homogeneous, water-free, and nonfoaming when heated to 347°F, and must meet Table 2 requirements.

Table 2
Asphalt Cement

Property	Test Procedure	Viscosity Grade									
		AC-0.6		AC-1.5		AC-3		AC-5		AC-10	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity	T 202										
140°F, poise		40	80	100	200	250	350	400	600	800	1,200
275°F, poise		0.4	–	0.7	–	1.1	–	1.4	–	1.9	–
Penetration, 77°F, 100g, 5 sec.	T 49	350	–	250	–	210	–	135	–	85	–
Flash point, C.O.C., °F	T 48	425	–	425	–	425	–	425	–	450	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–	99.0	–	99.0	–
Spot test	Tex-509-C	Neg.		Neg.		Neg.		Neg.		Neg.	
Tests on residue from Thin-Film Oven Test:	T 179										
Viscosity, 140°F, poise	T 202	–	180	–	450	–	900	–	1,500	–	3,000
Ductility[1], 77°F 5 cm/min., cm	T 51	100	–	100	–	100	–	100	–	100	–

1. If AC-0.6 or AC-1.5 ductility at 77°F is less than 100 cm, material is acceptable if ductility at 60°F is more than 100 cm.

B. Polymer-Modified Asphalt Cement. Polymer-modified asphalt cement must be smooth and homogeneous, and comply with the requirements of Table 3. If requested, supply samples of the base asphalt cement and polymer additives.

Table 3
Polymer-Modified Asphalt Cement

Property	Test Procedure	Polymer-Modified Viscosity Grade							
		AC-5 w/2% SBR		AC-10 w/2% SBR		AC-15P		AC-20-5TR	
		Min	Max	Min	Max	Min	Max	Min	Max
Polymer		SBR		SBR		SBS		TR	
Polymer content, % (solids basis)	Tex-533-C	2.0	–	2.0	–	3.0	–	5.0	–
Dynamic shear, G*/sin δ, 64°C, 10 rad/s, kPa	T 315	–	–	–	–	–	–	1.0	–
Viscosity									
140°F, poise	T 202	700	–	1,300	–	1,500	–	2,000	–
275°F, poise	T 202	–	7.0	–	8.0	–	8.0	–	10.0
Penetration, 77°F, 100 g, 5 sec.	T 49	120	–	80	–	100	150	75	115
Ductility, 5cm/min., 39.2°F, cm	T 51	70	–	60	–	–	–	–	–
Elastic recovery, 50°F, %	Tex-539-C	–	–	–	–	55	–	55	–
Softening point, °F	T 53	–	–	–	–	–	–	120	–
Polymer separation, 48 hr.	Tex-540-C	None		None		None		None	
Flash point, C.O.C., °F	T 48	425	–	425	–	425	–	425	–
Tests on residue from Thin-Film Oven Test:	T 179								
Retained penetration ratio, 77°F	T 49	–	–	–	–	0.60	1.00	0.60	1.00
Tests on residue from RTFOT aging and pressure aging:	Tex-541-C and R 28								
Creep stiffness	T 313								
S, -18°C, MPa		–	–	–	–	–	–	–	300
m-value, -18°C		–	–	–	–	–	–	0.300	–

C. Cutback Asphalt. Cutback asphalt must meet the requirements of Tables 4, 5, and 6 for the specified type and grade. If requested, supply samples of the base asphalt cement and polymer additives.

Table 4
Rapid-Curing Cutback Asphalt

Property	Test Procedure	Type–Grade					
		RC-250		RC-800		RC-3000	
		Min	Max	Min	Max	Min	Max
Kinematic viscosity, 140°F, cSt	T 201	250	400	800	1,600	3,000	6,000
Water, %	T 55	–	0.2	–	0.2	–	0.2
Flash point, T.O.C., °F	T 79	80	–	80	–	80	–
Distillation test:	T 78						
Distillate, percentage by volume of total distillate to 680°F							
to 437°F		40	75	35	70	20	55
to 500°F		65	90	55	85	45	75
to 600°F		85	–	80	–	70	–
Residue from distillation, volume %		70	–	75	–	82	–
Tests on distillation residue:							
Penetration, 100 g, 5 sec., 77°F	T 49	80	120	80	120	80	120
Ductility, 5 cm/min., 77°F, cm	T 51	100	–	100	–	100	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–
Spot test	Tex-509-C	Neg.		Neg.		Neg.	

Table 5
Medium-Curing Cutback Asphalt

Property	Test Procedure	Type–Grade							
		MC-30		MC-250		MC-800		MC-3000	
		Min	Max	Min	Max	Min	Max	Min	Max
Kinematic viscosity, 140°F, cSt	T 201	30	60	250	500	800	1,600	3,000	6,000
Water, %	T 55	–	0.2	–	0.2	–	0.2	–	0.2
Flash point, T.O.C., °F	T 79	100	–	150	–	150	–	150	–
Distillation test:	T 78								
Distillate, percentage by volume of total distillate to 680°F									
to 437°F		–	25	–	10	–	–	–	–
to 500°F		40	70	15	55	–	35	–	15
to 600°F		75	93	60	87	45	80	15	75
Residue from distillation, volume %		50	–	67	–	75	–	80	–
Tests on distillation residue:									
Penetration, 100 g, 5 sec., 77°F	T 49	120	250	120	250	120	250	120	250
Ductility, 5 cm/min., 77°F, cm[1]	T 51	100	–	100	–	100	–	100	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–	99.0	–
Spot test	Tex-509-C	Neg.		Neg.		Neg.		Neg.	

1. If the penetration of residue is more than 200 and the ductility at 77°F is less than 100 cm, the material is acceptable if its ductility at 60°F is more than 100 cm.

Table 6
Special-Use Cutback Asphalt

Property	Test Procedure	Type–Grade					
		MC-2400L		SCM I		SCM II	
		Min	Max	Min	Max	Min	Max
Kinematic viscosity, 140°F, cSt	T 201	2,400	4,800	500	1,000	1,000	2,000
Water, %	T 55	–	0.2	–	0.2	–	0.2
Flash point, T.O.C., °F	T 79	150	–	175	–	175	–
Distillation test:	T 78						
Distillate, percentage by volume of total distillate to 680°F							
to 437°F		–	–	–	–	–	–
to 500°F		–	35	–	0.5	–	0.5
to 600°F		35	80	20	60	15	50
Residue from distillation, volume %		78	–	76	–	82	–
Tests on distillation residue:							
Polymer		SBR		–		–	
Polymer content, % (solids basis)	Tex-533-C	2.0	–	–	–	–	–
Penetration, 100 g, 5 sec., 77°F	T 49	150	300	180	–	180	–
Ductility, 5 cm/min., 39.2°F, cm	T 51	50	–	–	–	–	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–

D. Emulsified Asphalt. Emulsified asphalt must be homogeneous, not separate after thorough mixing, and meet the requirements for the specified type and grade in Tables 7, 8, 9, and 10.

Table 7
Emulsified Asphalt

Property	Test Procedure	Type–Grade									
		Rapid-Setting		Medium-Setting				Slow-Setting			
		HFRS-2		MS-2		AES-300		SS-1		SS-1H	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72										
77°F, sec.		–	–	–	–	75	400	20	100	20	100
122°F, sec.		150	400	100	300	–	–	–	–	–	–
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1
Miscibility	T 59	–		–		–		Pass		Pass	
Cement mixing, %	T 59	–	–	–	–	–	–	–	2.0	–	2.0
Coating ability and water resistance:	T 59										
dry aggregate/after spray		–		–		Good/Fair		–		–	
wet aggregate/after spray		–		–		Fair/Fair		–		–	
Demulsibility, 35 ml of 0.02 N $CaCl_2$, %	T 59	50	–	–	30	–	–	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	1	–	1	–	1
Freezing test, 3 cycles[1]	T 59	–		Pass		–		Pass		Pass	
Distillation test:	T 59										
Residue by distillation, % by wt.		65	–	65	–	65	–	60	–	60	–
Oil distillate, % by volume of emulsion		–	0.5	–	0.5	–	5	–	0.5	–	0.5
Tests on residue from distillation:											
Penetration, 77°F, 100 g, 5 sec.	T 49	100	140	120	160	300	–	120	160	70	100
Solubility in trichloroethylene, %	T 44	97.5	–	97.5		97.5	–	97.5	–	97.5	–
Ductility, 77°F, 5 cm/min., cm	T 51	100	–	100		–	–	100	–	80	–
Float test, 140°F, sec.	T 50	1,200	–	–		1,200	–	–	–	–	–

1. Applies only when the Engineer designates material for winter use.

Table 8
Cationic Emulsified Asphalt

Property	Test Procedure	Type–Grade											
		Rapid-Setting				Medium-Setting				Slow-Setting			
		CRS-2		CRS-2H		CMS-2		CMS-2S		CSS-1		CSS-1H	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72												
77°F, sec.		–	–	–	–	–	–	–	–	20	100	20	100
122°F, sec.		150	400	150	400	100	300	100	300	–	–	–	–
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1
Cement mixing, %	T 59	–	–	–	–	–	–	–	–	–	2.0	–	2.0
Coating ability and water resistance:	T 59												
dry aggregate/after spray		–		–		Good/Fair		Good/Fair		–		–	
wet aggregate/after spray		–		–		Fair/Fair		Fair/Fair		–		–	
Demulsibility, 35 ml of 0.8% sodium dioctyl sulfosuccinate, %	T 59	70	–	70	–	–	–	–	–	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	1	–	1	–	1	–	1
Particle charge	T 59	Positive		Positive		Positive		Positive		Positive		Positive	
Distillation test:	T 59												
Residue by distillation, % by wt.		65	–	65	–	65	–	65	–	60	–	60	–
Oil distillate, % by volume of emulsion		–	0.5	–	0.5	–	7	–	5	–	0.5	–	0.5
Tests on residue from distillation:													
Penetration, 77°F, 100 g, 5 sec.	T 49	120	160	70	110	120	200	300	–	120	160	70	110
Solubility in trichloroethylene, %	T 44	97.5	–	97.5	–	97.5	–	97.5	–	97.5	–	97.5	–
Ductility, 77°F, 5 cm/min., cm	T 51	100	–	80	–	100	–	–	–	100	–	80	–

Table 9
Polymer-Modified Emulsified Asphalt

Property	Test Procedure	Type–Grade											
		Rapid-Setting				Medium-Setting				Slow-Setting			
		RS-1P		HFRS-2P		AES-150P		AES-300P		AES-300S		SS-1P	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72												
77°F, sec.		–	–	–	–	75	400	75	400	75	400	30	100
122°F, sec.		50	200	150	400	–	–	–	–	–	–	–	–
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1
Miscibility	T 59	–		–		–		–		–		Pass	
Coating ability and water resistance:	T 59												
dry aggregate/after spray		–		–		Good/Fair		Good/Fair		Good/Fair		–	
wet aggregate/after spray		–		–		Fair/Fair		Fair/Fair		Fair/Fair		–	
Demulsibility, 35 ml of 0.02 N $CaCl_2$, %	T 59	60	–	50	–	–	–	–	–	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	1	–	1	–	1	–	1
Breaking index, g	Tex-542-C	–	80	–	–	–	–	–	–	–	–	–	–
Distillation test:[1]	T 59												
Residue by distillation, % by wt.		65	–	65	–	65	–	65	–	65	–	60	–
Oil distillate, % by volume of emulsion		–	3	–	0.5	–	3	–	5	–	7	–	0.5
Tests on residue from distillation:													
Polymer content, wt. % (solids basis)	Tex-533-C	–	–	3.0	–	–	–	–	–	–	–	3.0	–
Penetration, 77°F, 100 g, 5 sec.	T 49	225	300	90	140	150	300	300	–	300	–	100	140
Solubility in trichloroethylene, %	T 44	97.0	–	97.0	–	97.0	–	97.0	–	97.0	–	97.0	–
Viscosity, 140°F, poise	T 202	–	–	1,500	–	–	–	–	–	–	–	1,300	–
Float test, 140°F, sec.	T 50	–	–	1,200	–	1,200	–	1,200	–	1,200	–	–	–
Ductility[2], 39.2°F, 5 cm/min., cm	T 51	–	–	50	–	–	–	–	–	–	–	50	–
Elastic recovery[2], 50°F, %	Tex-539-C	55	–	55	–	–	–	–	–	–	–	–	–
Tests on RTFO curing of distillation residue	Tex-541-C												
Elastic recovery, 50°F, %	Tex-539-C	–	–	–	–	50	–	50	–	30	–	–	–

1. Exception to T 59: Bring the temperature on the lower thermometer slowly to 350°F ±10°F. Maintain at this temperature for 20 min. Complete total distillation in 60 ±5 min. from the first application of heat.

2. HFRS-2P must meet one of either the ductility or elastic recovery requirements.

Table 10
Polymer-Modified Cationic Emulsified Asphalt

Property	Test Procedure	Type-Grade					
		Rapid-Setting				Slow-Setting	
		CRS-1P		CRS-2P		CSS-1P	
		Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72						
77°F, sec.		–	–	–	–	20	100
122°F, sec.		50	150	150	400	–	–
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1
Demulsibility, 35 ml of 0.8% sodium dioctyl sulfosuccinate, %	T 59	60	–	70	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	1
Breaking index, g	Tex-542-C	–	80	–	–	–	–
Particle charge	T 59	Positive		Positive		Positive	
Distillation test:[1]	T 59						
Residue by distillation, % by weight		65	–	65	–	62	–
Oil distillate, % by volume of emulsion		–	3	–	0.5	–	0.5
Tests on residue from distillation:							
Polymer content, wt. % (solids basis)	Tex-533-C	–	–	3.0	–	3.0	–
Penetration, 77°F, 100 g, 5 sec.	T 49	225	300	90	150	55	90
Viscosity, 140°F, poise	T 202	–	–	1,300	–	–	–
Solubility in trichloroethylene, %	T 44	97.0	–	97.0	–	97.0	–
Softening point, °F	T 53	–	–	–	–	135	–
Ductility, 77°F, 5 cm/min., cm	T 51	–	–	–	–	70	–
Ductility[2], 39.2°F, 5 cm/min., cm	T 51	–	–	50	–	–	–
Elastic recovery[2], 50°F, %	Tex-539-C	45	–	55	–	–	–

1. Exception to T 59: Bring the temperature on the lower thermometer slowly to 350°F ±0°F. Maintain at this temperature for 20 min. Complete total distillation in 60 ±5 min. from the first application of heat.
2. CRS-2P must meet one of either the ductility or elastic recovery requirements.

E. Specialty Emulsions. Specialty emulsions may be either asphalt-based or resin-based and must meet the requirements of Table 11.

Table 11
Specialty Emulsions

Property	Test Procedure	Type–Grade					
		Medium-Setting				Slow-Setting	
		AE–P		EAP&T		PCE[1]	
		Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72						
77°F, sec.		–	–	–	–	10	100
122°F, sec.		15	150	–	–	–	–
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1
Miscibility[2]	T 59	–		Pass		Pass	
Demulsibility, 35 ml of 0.10 N $CaCl_2$, %	T 59	–	70	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	–
Particle size[5], % by volume < 2.5 µm	Tex-238-F[3]	–	–	90	–	90	–
Asphalt emulsion distillation to 500°F followed by Cutback asphalt distillation of residue to 680°F:	T 59 & T 78						
Residue after both distillations, % by wt.		40	–	–	–	–	–
Total oil distillate from both distillations, % by volume of emulsion		25	40	–	–	–	–
Residue by distillation, % by wt.	T 59	–	–	60	–	–	–
Residue by evaporation[4], % by wt.	T 59	–	–	–	–	60	–
Tests on residue after all distillation(s):							
Viscosity, 140°F, poise	T 202	–	–	800	–	–	–
Kinematic viscosity[5], 140°F, cSt	T 201	–	–	–	–	100	350
Flash point C.O.C., °F	T 48	–	–	–	–	400	–
Solubility in trichloroethylene, %	T 44	97.5	–	–	–	–	–
Float test, 122°F, sec.	T 50	50	200	–	–	–	–

1. Supply with each shipment of PCE:
a) a copy of a lab report from an approved analytical lab, signed by a lab official, indicating the PCE formulation does not meet any characteristics of a Resource Conservation Recovery Act (RCRA) hazardous waste;
b) a certification from the producer that the formulation supplied does not differ from the one tested and that no listed RCRA hazardous wastes or PCBs have been mixed with the product; and
c) a Material Safety Data Sheet.
2. Exception to T 59: In dilution, use 350 ml of distilled or deionized water and a 1,000-ml beaker.
3. Use Tex-238-F, beginning at "Particle Size Analysis by Laser Diffraction," with distilled or deionized water as a medium and no dispersant, or use another approved method.
4. Exception to T 59: Leave sample in the oven until foaming ceases, then cool and weigh.
5. PCE must meet either the kinematic viscosity requirement or the particle size requirement.

F. Recycling Agent. Recycling agent and emulsified recycling agent must meet the requirements in Table 12. Additionally, recycling agent and residue from emulsified recycling agent, when added in the specified proportions to the recycled asphalt, must meet the properties specified on the plans.

Table 12
Recycling Agent and Emulsified Recycling Agent

Property	Test Procedure	Recycling Agent		Emulsified Recycling Agent	
		Min	Max	Min	Max
Viscosity, Saybolt Furol, 77°F, sec.	T 72	–	–	15	100
Sieve test, %	T 59	–	–	–	0.1
Miscibility[1]	T 59	–		No coagulation	
Residue by evaporation[2], % by wt.	T 59	–	–	60	–
Tests on recycling agent or residue from evaporation:					
Flash point, C.O.C., °F	T 48	400	–	400	–
Kinematic viscosity,	T 201				
140°F, cSt		75	200	75	200
275°F, cSt		–	10.0	–	10.0

1. Exception to T 59: Use 0.02 N $CaCl_2$ solution in place of water.
2. Exception to T 59: Maintain sample at 300°F until foaming ceases, then cool and weigh.

G. Crumb Rubber Modifier. Crumb rubber modifier (CRM) consists of automobile and truck tires processed by ambient temperature grinding.

CRM must be:

- free from contaminants including fabric, metal, and mineral and other nonrubber substances;
- free-flowing; and
- nonfoaming when added to hot asphalt binder.

When tested in accordance with Tex-200-F, Part I, using a 50-g sample, the rubber gradation must meet the requirements of the grades in Table 13.

Table 13
CRM Gradations

Sieve Size (% Passing)	Grade A		Grade B		Grade C		Grade D	Grade E
	Min	Max	Min	Max	Min	Max		
#8	100	–	–	–	–	–		
#10	95	100	100	–	–	–	As	
#16	–	–	70	100	100	–	shown	As
#30	–	–	25	60	90	100	on the	approved
#40	–	–	–	–	45	100	plans	
#50	0	10	–	–	–	–		
#200	–	–	0	5	–	–		

H. Crack Sealer. Polymer modified asphalt-emulsion crack sealer must meet the requirements of Table 14. Rubber-asphalt crack sealer must meet the requirements of Table 15.

Table 14
Polymer-Modified Asphalt Emulsion Crack Sealer

Property	Test Procedure	Min	Max
Rotational viscosity, 77°F, cP	D 2196, Method A	10,000	25,000
Sieve test, %	T 59	–	0.1
Storage stability, 1 day, %	T 59	–	1
Evaporation Residue by evaporation, % by wt.	Tex-543-C	 65	 –
Tests on residue from evaporation: Penetration, 77°F, 100 g, 5 sec. Softening point, °F Ductility, 39.2°F, 5 cm/min., cm	 T 49 T 53 T 51	 35 140 100	 75 – –

Table 15
Rubber-Asphalt Crack Sealer

Property	Test Procedure	Class A		Class B	
		Min	Max	Min	Max
CRM content, Grade A or B, % by wt.	Tex-544-C	22	26	–	–
CRM content, Grade B, % by wt.	Tex-544-C	–	–	13	17
Virgin rubber content[1], % by wt.		–	–	2	–
Flash point[2], COC, °F	T 48	400	–	400	–
Penetration[3], 77°F, 150 g, 5 sec.	T 49	30	50	30	50
Penetration[3], 32°F, 200 g, 60 sec.	T 49	12	–	12	–
Softening point, °F	T 53	–	–	170	–
Bond[4]	D5329	–		Pass	

1. Provide certification that the min. % virgin rubber was added.
2. Before passing the test flame over the cup, agitate the sealing compound with a 3/8- to 1/2-in. (9.5- to 12.7-mm) wide, square-end metal spatula in a manner so as to bring the material on the bottom of the cup to the surface, i.e., turn the material over. Start at one side of the thermometer, move around to the other, and then return to the starting point using 8 to 10 rapid circular strokes. Accomplish agitation in 3 to 4 sec. Pass the test flame over the cup immediately after stirring is completed.
3. Exception to T 49: Substitute the cone specified in ASTM D 217 for the penetration needle.
4. No crack in the crack sealing materials or break in the bond between the sealer and the mortar blocks over 1/4 in. deep for any specimen after completion of the test.

I. Asphalt-Rubber Binders. Asphalt-rubber (A-R) binders are mixtures of asphalt binder and CRM, which have been reacted at elevated temperatures. The A-R binders meet D 6114 and contain a minimum of 15% CRM by weight. Types I or II, containing CRM Grade C, are used

for hot mixed aggregate mixtures. Types II or III, containing CRM Grade B, are used for surface treatment binder. Table 16 describes required binder properties.

Table 16
A-R Binders

Property	Test Procedure	Binder Type					
		Type I		Type II		Type III	
		Min	Max	Min	Max	Min	Max
Apparent viscosity, 347°F, cP	D 2196, Method A	1,500	5,000	1,500	5,000	1,500	5,000
Penetration, 77°F, 100 g, 5 sec.	T 49	25	75	25	75	50	100
Penetration, 39.2°F, 200 g, 60 sec.	T 49	10	–	15	–	25	–
Softening point, °F	T 53	135	–	130	–	125	–
Resilience, 77°F, %	D 5329	25	–	20	–	10	–
Flash point, C.O.C., °F	T 48	450	–	450	–	450	–
Tests on residue from Thin-Film Oven Test:	T 179						
Retained penetration ratio, 39.2°F, 200 g, 60 sec., % of original	T 49	75	–	75	–	75	–

J. Performance-Graded Binders. PG binders must be smooth and homogeneous, show no separation when tested in accordance with Tex-540-C, and meet Table 17 requirements.

Separation testing is not required if:

- a modifier is introduced separately at the mix plant either by injection in the asphalt line or mixer,
- the binder is blended on site in continuously agitated tanks, or
- binder acceptance is based on field samples taken from an in-line sampling port at the hot mix plant after the addition of modifiers.

Table 17
Performance-Graded Binders

Property and Test Method	Performance Grade																		
	PG 58			PG 64				PG 70				PG 76				PG 82		
	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28
Average 7-day max pavement design temperature, °C[1]	< 58			< 64				< 70				< 76				< 82		
Min pavement design temperature, °C[1]	>-22	>-28	>-34	>-16	>-22	>-28	>-34	>-16	>-22	>-28	>-34	>-16	>-22	>-28	>-34	>-16	>-22	>-28
ORIGINAL BINDER																		
Flash point, T 48, Min, °C	230																	
Viscosity, T 316:[2,3] Max, 3.0 Pa·s, test temperature, °C	135																	
Dynamic shear, T 315:[4] G*/sin(δ), Min, 1.00 kPa Test temperature @ 10 rad/sec., °C	58			64				70				76				82		
Elastic recovery, D 6084, 50°F, % Min	–	–	30	–	–	30	50	–	30	50	60	30	50	60	70	50	60	70
ROLLING THIN-FILM OVEN (Tex-541-C)																		
Mass loss, Tex-541-C, Max, %	1.0																	
Dynamic shear, T 315: G*/sin(δ), Min, 2.20 kPa Test temperature @ 10 rad/sec., °C	58			64				70				76				82		
PRESSURE AGING VESSEL (PAV) RESIDUE (R 28)																		
PAV aging temperature, °C	100																	
Dynamic shear, T 315: G*/sin(δ), Max, 5000 kPa Test temperature @ 10 rad/sec., °C	25	22	19	28	25	22	19	28	25	22	19	28	25	22	19	28	25	22

Table 17 (continued)
Performance-Graded Binders

Property and Test Method	Performance Grade																		
	PG 58			PG 64				PG 70				PG 76				PG 82		
	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28
Average 7-day max pavement design temperature, °C[1]	< 58			< 64				< 70				< 76				< 82		
Min pavement design temperature, °C[1]	>-22	>-28	>-34	>-16	>-22	>-28	>-34	>-16	>-22	>-28	>-34	>-16	>-22	>-28	>-34	>-16	>-22	>-28
Creep stiffness, T 313:[5,6] *S*, max, 300 MPa, *m*-value, min, 0.300 Test temperature @ 60 sec., °C	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18
Direct tension, T 314:[6] Failure strain, min, 1.0% Test temperature @ 1.0 mm/min., °C	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18

1. Pavement temperatures are estimated from air temperatures using an algorithm contained in a Department-supplied computer program, may be provided by the Department, or by following the procedures outlined in AASHTO MP 2 and PP 28.

2. This requirement may be waived at the Department's discretion if the supplier warrants that the asphalt binder can be adequately pumped, mixed, and compacted at temperatures that meet all applicable safety, environmental, and constructability requirements. At test temperatures where the binder is a Newtonian fluid, any suitable standard means of viscosity measurement may be used, including capillary (T 201 or T 202) or rotational viscometry (T 316).

3. Viscosity at 135°C is an indicator of mixing and compaction temperatures that can be expected in the lab and field. High values may indicate high mixing and compaction temperatures. Additionally, significant variation can occur from batch to batch. Contractors should be aware that variation could significantly impact their mixing and compaction operations. Contractors are therefore responsible for addressing any constructability issues that may arise.

4. For quality control of unmodified asphalt binder production, measurement of the viscosity of the original asphalt binder may be substituted for dynamic shear measurements of $G^*/\sin(\delta)$ at test temperatures where the asphalt is a Newtonian fluid. Any suitable standard means of viscosity measurement may be used, including capillary (T 201 or T 202) or rotational viscometry (T 316).

5. Silicone beam molds, as described in AASHTO TP 1-93, are acceptable for use.

6. If creep stiffness is below 300 MPa, direct tension test is not required. If creep stiffness is between 300 and 600 MPa, the direct tension failure strain requirement can be used instead of the creep stiffness requirement. The *m*-value requirement must be satisfied in both cases.

300.3. Equipment. Provide all equipment necessary to transport, store, sample, heat, apply, and incorporate asphalts, oils, and emulsions.

300.4. Construction.

A. Typical Material Use. Table 18 shows typical materials used for specific applications. These are typical uses only. Circumstances may require use of other material.

Table 18
Typical Material Use

Material Application	Typically Used Materials
Hot-mixed, hot-laid asphalt mixtures	PG binders, A-R binders Types I and II
Surface treatment	AC-5, AC-10, AC-5 w/2% SBR, AC-10 w/2% SBR, AC-15P, AC-20-5TR, HFRS-2, MS-2, CRS-2, CRS-2H, HFRS-2P, CRS-2P, A-R binders Types II and III
Surface treatment (cool weather)	RS-1P, CRS-1P, RC-250, RC-800, RC-3000, MC-250, MC-800, MC-3000, MC-2400L
Precoating	AC-5, AC-10, PG 64-22, SS-1, SS-1H, CSS-1, CSS-1H
Tack coat	PG Binders, SS-1H, CSS-1H, EAP&T
Fog seal	SS-1, SS-1H, CSS-1, CSS-1H
Hot-mixed, cold-laid asphalt mixtures	AC-0.6, AC-1.5, AC-3, AES-300, AES-300P, CMS-2, CMS-2S
Patching mix	MC-800, SCM I, SCM II, AES-300S
Recycling	AC-0.6, AC-1.5, AC-3, AES-150P, AES-300P, recycling agent, emulsified recycling agent
Crack sealing	SS-1P, polymer mod AE crack sealant, rubber asphalt crack sealers (Class A, Class B)
Microsurfacing	CSS-1P
Prime	MC-30, AE-P, EAP&T, PCE
Curing membrane	SS-1, SS-1H, CSS-1, CSS-1H, PCE
Erosion control	SS-1, SS-1H, CSS-1, CSS-1H, PCE

B. Storage and Application Temperatures. Use storage and application temperatures in accordance with Table 19. Store and apply materials at the lowest temperature yielding satisfactory results. Follow the manufacturer's instructions for any agitation requirements in storage. Manufacturer's instructions regarding recommended application and storage temperatures supercede those of Table 19.

Table 19
Storage and Application Temperatures

Type–Grade	Application		Storage Maximum (°F)
	Recommended Range, °F	Maximum Allowable (°F)	
AC-0.6, AC-1.5, AC-3	200–300	350	350
AC-5, AC-10	275–350	350	350
AC-5 w/2% SBR, AC-10 w/2% SBR, AC-15P, AC-20-5TR	300–375	375	360
RC-250	125–180	200	200
RC-800	170–230	260	260
RC-3000	215–275	285	285
MC-30, AE-P	70–150	175	175
MC-250	125–210	240	240
MC-800, SCM I, SCM II	175–260	275	275
MC-3000, MC-2400L	225–275	290	290
HFRS-2, MS-2, CRS-2, CRS-2H, HFRS-2P, CRS-2P, CMS-2, CMS-2S, AES-300, AES-300S, AES-150P, AES-300P	120–160	180	180
SS-1, SS-1H, CSS-1, CSS-1H, PCE, EAP&T, SS-1P, RS-1P, CRS-1P, CSS-1P, recycling agent, emulsified recycling agent, polymer mod AE crack sealant	50–130	140	140
PG binders	275–350	350	350
Rubber asphalt crack sealers (Class A, Class B)	350–375	400	–
A-R binders Types I, II, and III	325–425	425	425

300.5. Measurement and Payment. The work performed, materials furnished, equipment, labor, tools, and incidentals will not be measured or paid for directly, but is subsidiary or is included in payment for other bid Items.

ITEM 301
ASPHALT ANTISTRIPPING AGENTS

301.1. Description. Furnish and incorporate all required asphalt antistripping agents in asphalt concrete paving mixtures and asphalt-stabilized base mixtures to meet moisture resistance testing requirements.

334.5. Measurement. This Item will be measured by the by the ton of composite asphalt concrete mixture of the type used in the completed and accepted work.

Measurement will be made on scales in accordance with Item 520, "Weighing and Measuring Equipment."

For mixture produced by a weigh-batch plant or a modified weigh-batch plant, measurement will be determined on the batch scales unless surge-storage or stockpiling is used. Keep records of the number of batches, batch design, and the weight of the composite asphalt concrete mixture. The composite asphalt concrete mixture is defined as the asphalt, primer, aggregate, additives, and any residual moisture that is not designated to be deducted. Where surge-storage or stockpiling is used, measurement of the material taken from the surge-storage bin or stockpile will be made on truck scales or suspended hopper scales.

334.6. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under Article 334.5, "Measurement," will be paid for at the unit price bid for "Hot-Mix Cold-Laid Asphalt Concrete Pavement" of the type, surface aggregate classification, and asphalt binder specified.

This price is full compensation for surface preparation, materials including tack coat, placement, equipment, labor, tools, and incidentals.

Pay adjustment for ride quality, when required, will be determined in accordance with Item 585, "Ride Quality for Pavement Surfaces."

ITEM 340

DENSE-GRADED HOT-MIX ASPHALT (METHOD)

340.1. Description. Construct a pavement layer composed of a compacted, dense-graded mixture of aggregate and asphalt binder mixed hot in a mixing plant.

340.2. Materials. Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications.

Notify the Engineer of all material sources. Notify the Engineer before changing any material source or formulation. When the Contractor makes a source or formulation change, the Engineer will verify that the requirements of this Item are met and may require a new laboratory mixture design, trial

batch, or both. The Engineer may sample and test project materials at any time during the project to verify compliance.

A. **Aggregate.** Furnish aggregates from sources that conform to the requirements shown in Table 1, and as specified in this Section, unless otherwise shown on the plans. Provide aggregate stockpiles that meet the definition in this Section for either coarse aggregate or fine aggregate. When reclaimed asphalt pavement (RAP) is allowed by plan note, provide RAP stockpiles in accordance with this Section. Aggregate from RAP is not required to meet Table 1 requirements unless otherwise shown on the plans. Supply mechanically crushed gravel or stone aggregates that meet the definitions in Tex-100-E. The Engineer will designate the plant or the quarry as the sampling location. Samples must be from materials produced for the project. The Engineer will establish the surface aggregate classification (SAC) and perform Los Angeles abrasion, magnesium sulfate soundness, and Micro-Deval tests. Perform all other aggregate quality tests listed in Table 1. Document all test results on the mixture design report. The Engineer may perform tests on independent or split samples to verify Contractor test results. Stockpile aggregates for each source and type separately. Determine aggregate gradations for mixture design and production testing based on the washed sieve analysis given in Tex-200-F, Part II. Do not add material to an approved stockpile from sources that do not meet the aggregate quality requirements of the Department's *Bituminous Rated Source Quality Catalog* (BRSQC) unless otherwise approved.

   1. **Coarse Aggregate.** Coarse aggregate stockpiles must have no more than 20% material passing the No. 8 sieve. Provide aggregates from sources listed in the BRSQC. Provide aggregate from nonlisted sources only when tested by the Engineer and approved before use. Allow 30 calendar days for the Engineer to sample, test, and report results for nonlisted sources.

      Provide coarse aggregate with at least the minimum SAC shown on the plans. SAC requirements apply only to aggregates used on the surface of travel lanes, unless otherwise shown on the plans. The SAC for sources on the Department's AQMP is listed in the BRSQC.

      Class B aggregate meeting all other requirements in Table 1 may be blended with a Class A aggregate in order to meet requirements for Class A materials. When blending Class A and B aggregates to meet a Class A requirement, ensure that at least 50% by weight of

the material retained on the No. 4 sieve comes from the Class A aggregate source. Blend by volume if the bulk specific gravities of the Class A and B aggregates differ by more than 0.300. When blending, do not use Class C or D aggregates. For blending purposes, coarse aggregate from RAP will be considered as Class B aggregate.

2. **RAP.** RAP is salvaged, milled, pulverized, broken, or crushed asphalt pavement. Crush or break RAP so that 100% of the particles pass the 2-in. sieve.

   RAP from either Contractor- or Department-owned sources, including RAP generated during the project, is permitted only when shown on the plans. Department-owned RAP, if allowed for use, will be available at the location shown on the plans. When RAP is used, determine asphalt content and gradation for mixture design purposes. Perform other tests on RAP when shown on the plans.

   When RAP is allowed by plan note, use no more than 30% RAP in Type A or B mixtures unless otherwise shown on the plans. For all other mixtures, use no more than 20% RAP unless otherwise shown on the plans.

   Do not use RAP contaminated with dirt or other objectionable materials. Do not use the RAP if the decantation value exceeds 5% and the plasticity index is greater than 8. Test the stockpiled RAP for decantation in accordance with the laboratory method given in Tex-406-A, Part I. Determine the plasticity index using Tex-106-E if the decantation value exceeds 5%. The decantation and plasticity index requirements do not apply to RAP samples with asphalt removed by extraction.

   Do not intermingle Contractor-owned RAP stockpiles with Department-owned RAP stockpiles. Remove unused Contractor-owned RAP material from the project site upon completion of the project. Return unused Department-owned RAP to the designated stockpile location.

3. **Fine Aggregate.** Fine aggregates consist of manufactured sands, screenings, and field sands. Fine aggregate stockpiles must meet the gradation requirements in Table 2. Supply fine aggregates that are free from organic impurities. The Engineer may test the fine aggregate in accordance with Tex-408-A to verify the material is free from organic impurities. At most 15% of the total aggregate may be field sand or other uncrushed fine aggregate. With the

exception of field sand, use fine aggregate from coarse aggregate sources that meet the requirements shown in Table 1, unless otherwise approved.

If 10% or more of the stockpile is retained on the No. 4 sieve, test the stockpile and verify that it meets the requirements in Table 1 for coarse aggregate angularity (Tex-460-A) and flat and elongated particles (Tex-280-F).

Table 1
Aggregate Quality Requirements

Property	Test Method	Requirement
Coarse Aggregate		
SAC	AQMP	As shown on plans
Deleterious material, %, max	Tex-217-F, Part I	1.5
Decantation, %, max	Tex-217-F, Part II	1.5
Micro-Deval abrasion, %, max	Tex-461-A	Note 1
Los Angeles abrasion, %, max	Tex-410-A	40
Magnesium sulfate soundness, 5 cycles, %, max	Tex-411-A	30[2]
Coarse aggregate angularity, 2 crushed faces, %, min	Tex 460-A, Part I	85[3]
Flat and elongated particles @ 5:1, %, max	Tex-280-F	10
Fine Aggregate		
Linear shrinkage, %, max	Tex-107-E	3
Combined Aggregate[4]		
Sand equivalent, %, min	Tex-203-F	45

1. Not used for acceptance purposes. Used by the Engineer as an indicator of the need for further investigation.
2. Unless otherwise shown on the plans.
3. Unless otherwise shown on the plans. Only applies to crushed gravel.
4. Aggregates, without mineral filler, RAP, or additives, combined as used in the job-mix formula (JMF).

Table 2
Gradation Requirements for Fine Aggregate

Sieve Size	% Passing by Weight or Volume
3/8"	100
#8	70–100
#200	0–30

B. Mineral Filler. Mineral filler consists of finely divided mineral matter such as agricultural lime, crusher fines, hydrated lime, cement, or fly ash. Mineral filler is allowed unless otherwise shown on the plans. Do not use more than 2% hydrated lime or cement, unless otherwise shown on the plans. The plans may require or disallow specific mineral fillers. When used, provide mineral filler that:

- is sufficiently dry, free-flowing, and free from clumps and foreign matter;
- does not exceed 3% linear shrinkage when tested in accordance with Tex-107-E; and
- meets the gradation requirements in Table 3.

Table 3
Gradation Requirements for Mineral Filler

Sieve Size	% Passing by Weight or Volume
#8	100
#200	55–100

C. Baghouse Fines. Fines collected by the baghouse or other dust-collecting equipment may be reintroduced into the mixing drum.

D. Asphalt Binder. Furnish the type and grade of performance-graded (PG) asphalt binder specified on the plans in accordance with Section 300.2.J, "Performance-Graded Binders."

E. Tack Coat. Unless otherwise shown on the plans or approved, furnish CSS-1H, SS-1H, or a PG binder with a minimum high-temperature grade of PG 58 for tack coat binder in accordance with Item 300, "Asphalts, Oils, and Emulsions."

Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use. If required, verify that emulsified asphalt proposed for use meets the minimum residual asphalt percentage specified in Item 300, "Asphalts, Oils, and Emulsions."

The Engineer will obtain at least 1 sample of the tack coat binder per project and test it to verify compliance with Item 300. The Engineer will obtain the sample from the asphalt distributor immediately before use.

F. Additives. When shown on the plans, use the type and rate of additive specified. Other additives that facilitate mixing or improve the quality of the mixture may be allowed when approved.

If lime or a liquid antistripping agent is used, add in accordance with Item 301, "Asphalt Antistripping Agents." Do not add lime directly into the mixing drum of any plant where lime is removed through the exhaust stream unless the plant has a baghouse or dust collection system that reintroduces the lime back into the drum.

340.3. Equipment. Provide required or necessary equipment in accordance with Item 320, "Equipment for Asphalt Concrete Pavement."

340.4. Construction. Design, produce, store, transport, place, and compact the specified paving mixture in accordance with the requirements of this Item. Unless otherwise shown on the plans, provide the mix design. The Department will perform quality assurance (QA) testing. Provide quality control (QC) testing as needed to meet the requirements of this Item.

A. Mixture Design.

1. **Design Requirements.** Use a Level II specialist certified by a Department-approved hot-mix asphalt certification program to develop the mixture design. Have the Level II specialist sign the design documents. Unless otherwise shown on the plans, use the typical weight design example given in Tex-204-F, Part I, to design a mixture meeting the requirements listed in Tables 1 through 6. Use an approved laboratory to perform the Hamburg Wheel test and provide results with the mixture design, or provide the laboratory mixture and request that the Department perform the Hamburg Wheel test. The Construction Division maintains a list of approved laboratories. Furnish the Engineer with representative samples of all materials used in the mixture design. The Engineer will verify the mixture design. If the design cannot be verified by the Engineer, furnish another mixture design.

   The Contractor may submit a new mixture design at anytime during the project. The Engineer will approve all mixture designs before the Contractor can begin production.

   Provide the Engineer with a mixture design report using Department-provided software. Include the following items in the report:

   - the combined aggregate gradation, source, specific gravity, and percent of each material used;
   - results of all applicable tests;
   - the mixing and molding temperatures;
   - the signature of the Level II person or persons who performed the design;
   - the date the mixture design was performed; and
   - a unique identification number for the mixture design.

Table 4
Master Gradation Bands (% Passing by Weight or Volume) and Volumetric Properties

Sieve Size	A Coarse Base	B Fine Base	C Coarse Surface	D Fine Surface	F Fine Mixture
1-1/2"	98.0–100.0	–	–	–	–
1"	78.0–94.0	98.0–100.0	–	–	–
3/4"	64.0–85.0	84.0–98.0	95.0–100.0	–	–
1/2"	50.0–70.0	–	–	98.0–100.0	–
3/8"	–	60.0–80.0	70.0–85.0	85.0–100.0	98.0–100.0
#4	30.0–50.0	40.0–60.0	43.0–63.0	50.0–70.0	80.0–86.0
#8	22.0–36.0	29.0–43.0	32.0–44.0	35.0–46.0	38.0–48.0
#30	8.0–23.0	13.0–28.0	14.0–28.0	15.0–29.0	12.0–27.0
#50	3.0–19.0	6.0–20.0	7.0–21.0	7.0–20.0	6.0–19.0
#200	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0
Design VMA[1], % Minimum					
–	12.0	13.0	14.0	15.0	16.0
Plant-Produced VMA, % Minimum					
–	11.0	12.0	13.0	14.0	15.0

1. Voids in Mineral Aggregates.

Table 5
Laboratory Mixture Design Properties

Property	Test Method	Requirement
Target laboratory-molded density, %	Tex-207-F	96.0[1]
Tensile strength (dry), psi (molded to 93% ±1% density)	Tex-226-F	85–200[2]
Boil test[3]	Tex-530-C	–

1. Unless otherwise shown on the plans.
2. May exceed 200 psi when approved and may be waived when approved.
3. Used to establish baseline for comparison to production results. May be waived when approved.

Table 6
Hamburg Wheel Test Requirements[1]

High-Temperature Binder Grade	Minimum # of Passes[2] @ 0.5" Rut Depth, Tested @ 122°F
PG 64 or lower	10,000
PG 70	15,000
PG 76 or higher	20,000

1. Tested in accordance with Tex-242-F.
2. May be decreased or waived when shown on the plans.

B. Job-Mix Formula Approval. The job-mix formula (JMF) is the combined aggregate gradation and target asphalt percentage used to establish target values for mixture production. JMF is the original

laboratory mixture design used to produce the trial batch. The Engineer and the Contractor will verify JMF based on plant-produced mixture from the trial batch unless otherwise approved. The Engineer may accept an existing mixture design previously used on a Department project and may waive the trial batch to verify JMF. If the JMF is not verified by the Engineer from the trial batch, adjust the JMF or redesign the mix and produce as many trial batches as necessary to verify the JMF.

Provide the Engineer with split samples of the mixtures and blank samples used to determine the ignition oven correction factors. The Engineer will determine the aggregate and asphalt correction factors from the ignition oven using Tex-236-F.

The Engineer will use a Texas gyratory compactor calibrated in accordance with Tex-914-F in molding production samples.

The Engineer will perform Tex-530-C and retain the tested sample for comparison purposes during production. The Engineer may waive the requirement for the boil test.

C. **JMF Field Adjustments.** Produce a mixture of uniform composition closely conforming to the approved JMF.

If, during initial days of production, the Contractor or Engineer determines that adjustments to the JMF are necessary to achieve the specified requirements, or to more nearly match the aggregate production, the Engineer may allow adjustment of the JMF within the tolerances of Table 7 without a laboratory redesign of the mixture.

The Engineer will adjust the asphalt content to maintain desirable laboratory density near the optimum value while achieving other mix requirements.

Table 7
Operational Tolerances

Description	Test Method	Allowable Difference from JMF Target
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F	±5.0[1]
Individual % retained for sieves smaller than #8 and larger than #200		±3.0[1]
% passing the #200 sieve		±2.0[1]
Asphalt content, %	Tex-236-F	±0.3[1]
Laboratory-molded density, %	Tex-207-F	±1.0
VMA, %, min		Note 2

1. When within these tolerances, mixture production gradations may fall outside the master grading limits; however, the percent passing the #200 sieve will be considered out of tolerance when outside the master grading limits.
2. Test and verify that Table 4 requirements are met.

D. Production Operations. Perform a new trial batch when the plant or plant location is changed. The Engineer may suspend production for noncompliance with this Item. Take corrective action and obtain approval to proceed after any production suspension for noncompliance.

1. **Operational Tolerances.** During production, do not exceed the operational tolerances in Table 7. Stop production if testing indicates tolerances are exceeded on:
   - 3 consecutive tests on any individual sieve,
   - 4 consecutive tests on any of the sieves, or
   - 2 consecutive tests on asphalt content.

   Begin production only when test results or other information indicate, to the satisfaction of the Engineer, that the next mixture produced will be within Table 7 tolerances.

2. **Storage and Heating of Materials.** Do not heat the asphalt binder above the temperatures specified in Item 300, "Asphalts, Oils, and Emulsions" or outside the manufacturer's recommended values. On a daily basis, provide the Engineer with the records of asphalt binder and hot-mix asphalt discharge temperatures in accordance with Item 320, "Equipment for Asphalt Concrete Pavement." Unless otherwise approved, do not store mixture for a period long enough to affect the quality of the mixture, nor in any case longer than 12 hr.

3. **Mixing and Discharge of Materials.** Notify the Engineer of the target discharge temperature and produce the mixture within 25°F of the target. Monitor the temperature of the material in the truck

before shipping to ensure that it does not exceed 350°F. The Department will not pay for or allow placement of any mixture produced at more than 350°F. Control the mixing time and temperature so that substantially all moisture is removed from the mixture before discharging from the plant.

E. Hauling Operations. Before use, clean all truck beds to ensure mixture is not contaminated. When a release agent is necessary to coat truck beds, use a release agent on the approved list maintained by the Construction Division.

F. Placement Operations. Prepare the surface by removing raised pavement markers and objectionable material such as moisture, dirt, sand, leaves, and other loose impediments from the surface before placing mixture. Remove vegetation from pavement edges. Place the mixture to meet the typical section requirements and produce a smooth, finished surface with a uniform appearance and texture. Offset longitudinal joints of successive courses of hot mix by at least 6 in. Place mixture so longitudinal joints on the surface course coincide with lane lines, or as directed. Ensure that all finished surfaces will drain properly. Place mixture within the compacted lift thickness shown in Table 8, unless otherwise shown on the plans or allowed.

Table 8
Compacted Lift Thickness and Required Core Height

Mixture Type	Compacted Lift Thickness	
	Minimum (in.)	Maximum (in.)
A	3.00	6.00
B	2.50	5.00
C	2.00	4.00
D	1.50	3.00
F	1.25	2.50

1. **Weather Conditions.** Place mixture when the roadway surface temperature is 60°F or higher unless otherwise approved. Measure the roadway surface temperature with a handheld infrared thermometer. Unless otherwise shown on the plans, place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable in the opinion of the Engineer.
2. **Tack Coat.** Clean the surface before placing the tack coat. Unless otherwise approved, apply tack coat uniformly at the rate directed by the Engineer. The Engineer will set the rate between 0.04 and 0.10 gal. of residual asphalt per square yard of surface area. Apply

a thin, uniform tack coat to all contact surfaces of curbs, structures, and all joints. Prevent splattering of tack coat when placed adjacent to curb, gutter, and structures. Roll the tack coat with a pneumatic-tire roller when directed. The Engineer may use Tex-243-F to verify that the tack coat has adequate adhesive properties. The Engineer may suspend paving operations until there is adequate adhesion.

G. Lay-Down Operations.

1. **Minimum Mixture Placement Temperatures.** Use Table 9 for suggested minimum mixture placement temperatures.
2. **Windrow Operations.** When hot mix is placed in windrows, operate windrow pickup equipment so that substantially all the mixture deposited on the roadbed is picked up and loaded into the paver.

Table 9
Suggested Minimum Mixture Placement Temperature

High-Temperature Binder Grade	Minimum Placement Temperature (Before Entering Paver)
PG 64 or lower	260°F
PG 70	270°F
PG 76	280°F
PG 82 or higher	290°F

H. Compaction. Use air void control unless ordinary compaction control is specified on the plans. Avoid displacement of the mixture. If displacement occurs, correct to the satisfaction of the Engineer. Ensure pavement is fully compacted before allowing rollers to stand on the pavement. Unless otherwise directed, use only water or an approved release agent on rollers, tamps, and other compaction equipment. Keep diesel, gasoline, oil, grease, and other foreign matter off the mixture. Unless otherwise directed, operate vibratory rollers in static mode when not compacting, when changing directions, or when the plan depth of the pavement mat is less than 1-1/2 in.

Use tamps to thoroughly compact the edges of the pavement along curbs, headers, and similar structures and in locations that will not allow thorough compaction with the rollers. The Engineer may require rolling with a trench roller on widened areas, in trenches, and in other limited areas.

Allow the compacted pavement to cool to 160°F or lower before opening to traffic unless otherwise directed. When directed, sprinkle the finished mat with water or limewater to expedite opening the roadway to traffic.

1. **Air Void Control.** Compact dense-graded hot-mix asphalt to contain from 5% to 9% in-place air voids. Do not increase the asphalt content of the mixture to reduce pavement air voids.
   a. **Rollers.** Furnish the type, size, and number or rollers required for compaction, as approved. Use a pneumatic-tire roller to seal the surface, unless otherwise shown on the plans. Use additional rollers as required to remove any roller marks.
   b. **Air Void Determination.** Unless otherwise shown on the plans, obtain 2 roadway specimens at each location selected by the Engineer for in-place air void determination. The Engineer will measure air voids in accordance with Tex-207-F and Tex-227-F. Before drying to a constant weight, cores may be predried using a Corelok or similar vacuum device to remove excess moisture. The Engineer will use the average air void content of the 2 cores to calculate the in-place air voids at the selected location.
   c. **Air Voids Out of Range.** If the in-place air void content in the compacted mixture is below 5% or greater than 9%, change the production and placement operations to bring the in-place air void content within requirements. The Engineer may suspend production until the in-place air void content is brought to the required level, and may require a test section as described in Section 340.4.H.1.d, "Test Section."
   d. **Test Section.** Construct a test section of 1 lane-width and at most 0.2 mi. in length to demonstrate that compaction to between 5% and 9% in-place air voids can be obtained. Continue this procedure until a test section with 5% to 9% in-place air voids can be produced. The Engineer will allow only 2 test sections per day. When a test section producing satisfactory in-place air void content is placed, resume full production.
2. **Ordinary Compaction Control.** Furnish the type, size, and number or rollers required for compaction, as approved. Furnish at least 1 medium pneumatic-tire roller (minimum 12-ton weight). Use the control strip method given in Tex-207-F, Part IV, to establish rolling patterns that achieve maximum compaction.

Follow the selected rolling pattern unless changes that affect compaction occur in the mixture or placement conditions. When such changes occur, establish a new rolling pattern. Compact the pavement to meet the requirements of the plans and specifications.

When rolling with the 3-wheel, tandem or vibratory rollers, start by first rolling the joint with the adjacent pavement and then continue by rolling longitudinally at the sides. Proceed toward the center of the pavement, overlapping on successive trips by at least 1 ft., unless otherwise directed. Make alternate trips of the roller slightly different in length. On superelevated curves, begin rolling at the low side and progress toward the high side unless otherwise directed.

I. **Irregularities.** Immediately take corrective action if surface irregularities, including but not limited to segregation, rutting, raveling, flushing, fat spots, mat slippage, color, texture, roller marks, tears, gouges, streaks, or uncoated aggregate particles, are detected. The Engineer may suspend production or placement operations until the problem is corrected.

At the expense of the Contractor and to the satisfaction of the Engineer, remove and replace any mixture that does not bond to the existing pavement or that has other surface irregularities identified above.

J. **Ride Quality.** Use Surface Test Type A to evaluate ride quality in accordance with Item 585, "Ride Quality for Pavement Surfaces," unless otherwise shown on the plans.

340.5. Measurement. Hot mix will be measured by the ton of composite hot mix, which includes asphalt, aggregate, and additives. Measure the weight on scales in accordance with Item 520, "Weighing and Measuring Equipment."

340.6. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Dense-Graded Hot-Mix Asphalt (Method)" of the type, surface aggregate classification, and binder specified. These prices are full compensation for surface preparation, materials including tack coat, placement, equipment, labor, tools, and incidentals.

Trial batches will not be paid for unless they are incorporated into pavement work approved by the Department.

DEERY® BRAND 102
PAVEMENT PRESERVATION PRODUCTS

HOT APPLIED SEALANT, Part No. 80102

PRODUCT DATA SHEET
JANUARY 2011

DESCRIPTION DEERY 102 is a hot applied, single component, elastically modified composition of asphalt cement, virgin synthetic polymer, premium rubber, and other modifiers. The sealant contains no solvent, is pre-reacted and conforms to the requirements of **ASTM D6690 Type II, ASTM D3405, AASHTO M324 Type II and AASHTO M301**. Material is tested for low temperature performance at -20°F (-29°C) using 50% extension. VOC=0 g/l. Previously labeled as CMC #102.

USE DEERY 102 is a moderate viscosity pavement preservation sealant intended for highway, street and aviation applications for sealing longitudinal and transverse joints and random cracks in Asphalt or Concrete pavements where a free flowing material is desirable. Properly installed, DEERY 102 is an effective barrier against damage from debris and moisture infiltration into cracks and joints within regions experiencing moderate high and low pavement temperatures.

HEATING Sealant shall be heated in a hot-oil jacketed melter capable of constant mechanical agitation and equipped with a calibrated thermometer to monitor sealant temperature. Material shall be heated to and maintained at the Recommended Application Temperature during use. Material can be cooled and then reheated, but only if prolonged heating is avoided. Prolonged heating at or above Recommended Application Temperature may severely damage product. If overheating damage occurs, immediately drain machine completely and refill with new material.

APPLICATION DEERY 102 is pre-reacted and can be applied immediately after heating to Recommended Application Temperature. With pavement temperature at 40°F (4°C) or higher, place material into clean, dry crack or prepared reservoir by means of a hand-held pour pot, wheeled push bander or wand applicator. Squeegee any excess sealant tight to pavement surface. Pavement may be warmed to 40°F (4°C) or higher with a Hot Air Lance.

PROPERTIES of DEERY 102
When sampled and heated to maximum heating temperature in accordance with ASTM D5167:

TEST	METHOD	SPECIFICATION
Cone Penetration @ 77°F (25°C)	ASTM D5329	90 dmm maximum
Flow @ 140°F (60°C)	ASTM D5329	3.0 mm maximum
Softening Point	ASTM D5329	176°F (80°C) minimum
Bond @ -20°F (-29°C), 50% ext., 12.7 mm sample	ASTM D5329	Pass 3 cycles
Resilience @ 77°F (25°C)	ASTM D5329	60% minimum
Asphalt Compatibility	ASTM D5329	Pass
Recommended Application Temperature	ASTM D5167	380-400°F (193-204°C)*
Maximum Heating Temperature	ASTM D6690	400°F (204°C)

*Temperature of product measured at pavement surface. Use highest Recommended Application Temperature in cool weather.
*Prolonged heating at or above Recommended Application Temperature may severely damage product.

PACKAGING Material is packaged in cardboard boxes sized to accommodate a maximum of 40 lb (18.0 kg). Material contained in each box is wrapped in a quick melt liner which is dissolved and incorporated into the melted product. Standard packaging is 30 lb (13.6 kg) per box, palletized 75 boxes per pallet with an approximate net weight of 2,250 lb (1,021.0 kg). Pallets are moisture protected with a plastic wrapping and bound with a minimum of two layers of UV resistant stretch wrap.

FOR ADDITIONAL INFORMATION
Call:1-800-227-4059 toll free
Email:info@deeryamerican.com
Web: www.deeryamerican.com

PERFORMANCE Temperature fluctuations, site conditions, surface preparation, traffic, installation technique, material selection, shape factor and surface treatment compatibility influence the effectiveness and useful life of Pavement Preservation treatments. Consider and monitor each element for optimum results. Purchaser and end user should determine applicability for use in their specific conditions.

WARRANTY Manufacturer warrants that these products meet applicable ASTM, AASHTO, Federal or State specifications at time of shipment. Techniques used for the preparation of the cracks and joints prior to sealing or filling are beyond our control as are the use and application of the products; therefore, manufacturer shall not be responsible for improperly applied or misused products. Remedies against manufacturer, as agreed to by manufacturer, are limited to replacing nonconforming product or refund (full or partial) of purchase price from manufacturer. All claims for breach of this warranty must be made within three (3) months of the date of use or twelve (12) months from the date of delivery by manufacturer. whichever is earlier. There shall be no other warranties expressed or implied. **For optimum performance, follow manufacturer recommendations for product installation.**

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INSTALLATION INSTRUCTIONS
HOT-APPLIED ROADSAVER, POLYFLEX , PARKING LOT AND ASPHALT RUBBER PRODUCTS

JANUARY 2008

READ BEFORE USING THIS PRODUCT

GENERAL: These products are hot-applied, single component polymer/rubber modified asphalts supplied in solid form used to seal or fill cracks or joints in asphalt concrete or Portland cement concrete pavements. These products are not fuel resistant, and should not be used in fuel or oil spill prone areas. To use, product is removed from the package, heated in a melter and applied to the pavement. Details on product specifications, climate and usage suitability, and product selection are contained in Product Data Sheets.

MELTING AND APPLICATION: These products must be melted in jacketed double boiler melters with effective agitation that meet requirements of Appendix X1.1 of ASTM D6690. Crafco Supershot, EZ Series 2, and EZ Pour melters are recommended. Do not use direct fired or air heated machines. Heat transfer oil should not exceed 525°F (274°C). The melter must be capable of safely heating product to 400°F (204°C). CAUTION: Stop agitation when adding product to prevent splashing. Product is heated to between the minimum application temperature and the maximum heating temperature which are shown on product containers and Product Data Sheets. These products are most effectively applied with pressure feed wand systems. RoadSaver, PolyFlex and Parking Lot products can also be applied using gravity feed pour pots (Part No.40200 and 40201).

APPLICATION LIFE: Application life when heated to application temperature is approximately 12 to 15 hours and may be extended by adding fresh product as quantity in the melter decreases. Product shall be agitated during installation. Product may be reheated once to application temperature, after initial heat up. When application life has been exceeded, RoadSaver and Parking Lot products will thicken, become "stringy" and may then gel. If this occurs, product should immediately be removed from the melter and discarded. Asphalt Rubber and PolyFlex products will soften when overheated or heated for too long.

PAVEMENT TEMPERATURES: Apply product when pavement temperature exceeds 40°F (4°C). Lower temperatures may result in reduced adhesion due to presence of moisture or ice. If pavement temperature is lower than 40°F (4°C), it may be warmed using a heat lance (Part No. 45650) that puts no direct flame on the pavement. If installing at lower pavement temperature than 40°F (4°C), extreme care should be used to insure that cracks or joints are dry and free from ice and other contaminants. Product temperature should be maintained at the maximum heating temperature. If installing product at night, assure that dew is not forming on the pavement surface. Applied product should be checked by qualified personnel to assure that adhesion is adequate.

TRAFFIC CONTROLS: Place traffic controls in accordance with Part 6, Temporary Controls, of the FHWA Manual on Uniform Traffic Control devices (MUTCD) to protect the work site for the duration of the repairs.

CRACK / JOINT CLEANING: For appropriate adhesion, cracks or joints must be thoroughly clean and dry immediately prior to product installation. After widening or debris removal, and just prior to product installation, final cleaning shall use high pressure 90 psi (620kpa) minimum, dry, oil free compressed air to remove any remaining dust. Both sides of the crack or joint shall be cleaned. Surfaces should be inspected to assure adequate cleanliness and dryness.

ASPHALT PAVEMENT CRACK SEALING: Crack sealing consists of installing extensible sealants into routed reservoirs in working cracks in pavements in good condition.

Reservoir Cutting: Based on the 98% LTPPBIND temperature range (difference from high to low), cracks are to be routed as follows:

Temperature Grade Range	Reservoir Width	Reservoir Depth
80°C or less	½" (12 mm)	¾" (19 mm)
86°C	¾" (19 mm)	¾" (19 mm)
92°C	1 1/8" (28 mm)	½" (12 mm)
98° or greater	1 ½" (38 mm)	½" (12 mm)

Reservoir width should not exceed 1 ½" (38 mm). Cutting should remove at least 1/8" (3 mm) from each side and produce vertical, intact surfaces with no loosely bonded aggregate. The pavement should be sound enough to resist significant spalling during cutting. Final reservoir width should not exceed twice the cutter width or 1 ½" (38 mm) maximum.

Installation and Finishing: After cleaning, sealant at the required temperature is installed in the reservoir. Sealant can be installed with up to a 3/8" (10 mm) underfill, flush fill, or with an overband cap that does not exceed 1/16" (1.5mm) above the pavement surface, and not greater than a 2" (50 mm) width beyond crack edges, depending on project specifications. These configurations are achieved using appropriate wand tips, shoes or squeegees. To reduce surface tack, Crafco DeTack or other approved material may be applied.

ASPHALT PAVEMENT CRACK FILLING: Crack filling consists of installing flexible, traffic resistant product into prepared, cleaned, non-working pavement cracks. Filler can be installed in routed or unrouted cracks or in surface overbands.

Routed Reservoir – Routed reservoirs are recommended for longest life. Guidelines for determining reservoir use are:

1. Crack density should not exceed approximately 20% (linear feet of cracks per square feet of pavement area).
2. Pavement should be sound enough to resist significant spalling during cutting. (Final reservoir width should not exceed double the cutter width, or 1 ½"(38 mm) maximum

Reservoir Dimensions – Determined as follows:

1. The cut should remove at least 1/8" (3mm) from each side of the crack and cut back to sound pavement.
2. Minimum width is ½" (12 mm), maximum is 1 ½" (38 mm).
3. Recommended cut depth is ¾" (19 mm).
4. Reservoirs are then cleaned with compressed air.

Cleaned Unrouted Cracks – Cracks may be cleaned and filled without reservoirs, but longer life is achieved with reservoirs. Cleaning consists of using high-pressure dry, clean compressed air, brushing, or vacuum techniques to remove debris.

Surface Overbands – Product can be applied in overbands after crack cleaning with compressed air. Overbands should not exceed 1/16" (1.5 mm) high above the pavement surface and not extend greater than 2" (50 mm) beyond each crack edge.

Filler Installation and Finishing – Same as sealant installation and finishing.

PORTLAND CEMENT CONCRETE PAVEMENT JOINT SEALING AND RESEALING: Joint sealing and resealing consist of

CRAFCO INC
AN ERGON COMPANY
420 N. Roosevelt Ave. • Chandler AZ 85226
1-800-528-8242 • (602) 276-0406 • FAX (480) 961-0513
www.crafco.com

PRODUCT DATA SHEET

ASPHALT RUBBER 541

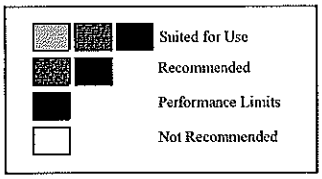
PART NO. 34541

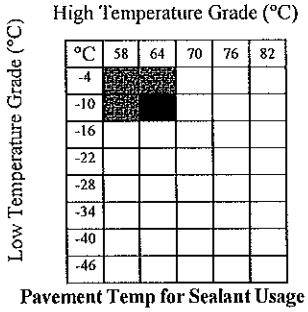
JANUARY 2008

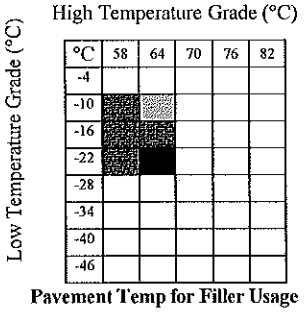
READ BEFORE USING THIS PRODUCT

GENERAL Crafco Asphalt Rubber 541 is a hot-applied asphalt based product used to seal and fill cracks and joints in asphalt or portland cement concrete pavements in moderate to warm climates. Asphalt Rubber 541 is supplied in solid form which when melted and properly applied forms an adhesive and flexible compound that resists cracking in the winter and resists flow at summer temperatures. Asphalt Rubber 541 is used in highway, street, airfield and parking lot pavements and is applied to pavement cracks and joints using pressure feed melter applicators. At application temperature, Asphalt Rubber 541 is a higher viscosity, non self-leveling product. Asphalt Rubber 541 contains virgin rubber, vulcanized granulated crumb rubber, and selected paving asphalt. Asphalt rubber 541 is produced to meet requirements of the Texas Highway Department for Rubber Asphalt Crack Sealer. VOC = 0 g/l.

USAGE GUIDELINES Asphalt Rubber 541 pavement temperature performance limits are 64-10 for crack sealing and 64-22 for crack filling. Usage recommendations are shown in Crafco pavement temperature grade charts shown at the right. Refer to Crafco Product Selection Procedures to determine sealant or filler use and pavement temperature grades.







SPECIFICATION CONFORMANCE Crafco Asphalt Rubber 541 meets all requirements of State of Texas Department of Highways for Rubber Asphalt Crack Sealer (Texas SDHPT Item 300.2 Class B) and exceeds requirements of ASTM D5078.

Test	Texas SDHPT 300.2 Class B Limits
Minimum Application Temperature	380°F (193°C)
Maximum Heating Temperature	400°F (204°C)
Cone Penetration, 77°F (25°C)	30-50
Cone Penetration, 32°F (0°C), 200 g 60 sec.	12 min.
Softening Point (ASTM D36)	170°F (77°C) min.
Flash Point, modified C.O.C.	400°F (204°C) min.
Virgin Rubber Polymer, % by wt.	2% min.
Granulated vulcanized rubber, % by wt.	13-17%
Bond@20°F (-7°C), 50% ext	Pass 3 cycles.

INSTALLATION Prior to use, the user must read and follow Installation Instructions for Hot-Applied RoadSaver, PolyFlex, Parking Lot and Asphalt Rubber Products to verify proper product selection, heating methods, pavement preparation procedures, application geometry, usage precautions and safety procedures. These instructions are provided with each pallet of product.

PACKAGING Packaging consists of individual boxes of product which are palletized into shipping units. Boxes contain a non-adherent film which permits easy removal of the product. Each pallet contains 72 boxes which are stacked in six layers of 12 boxes per layer. The weight of product in each box does not exceed 40 lbs. (18kg) and pallet weights do not exceed 2,880 lbs. (1310kg). Pallets of product are weighed and product is sold by the net weight of product. Product boxes are manufactured from double wall kraft board producing a minimum bursting test certification of 350 psi (241 N/cm^2) and using water resistant adhesives. Boxes use tape closure and do not contain any staples. Boxes are labeled with the product name, part number, lot number, specification conformance, application temperatures and safety instructions. Palletized units are protected from the weather using a three mil thick plastic bag, a weather and moisture resistant cap sheet and a minimum of two layers of six month u.v. protected stretch wrap. Pallets are labeled with the product part number, lot number and net weight. Installation Instructions are provided with each pallet in a weather resistant enclosure.

WARRANTY CRAFCO, Inc. warrants that CRAFCO products meet applicable ASTM, AASHTO, Federal or State specifications at time of shipment. Techniques used for the preparation of the cracks and joints prior to sealing or filling are beyond our control as are the use and application of the products; therefore, Crafco shall not be responsible for improperly applied or misused products. Remedies against Crafco, Inc., as agreed to by Crafco, are limited to replacing nonconforming product or refund (full or partial) of purchase price from Crafco, Inc. All claims for breach of this warranty must be made within three (3) months of the date of use or twelve (12) months from the date of delivery by Crafco, Inc. whichever is earlier. There shall be no other warranties expressed or implied. **For optimum performance, follow Crafco recommendations for product installation.**

installing extensible sealants into sawn and cleaned joint reservoirs in PCC pavements.

Reservoir Sawing – New concrete should be cured for at least 7 days prior to sawing the joint reservoir. Joint spacing should be at the design dimension, generally from approximately 12 to 20 ft. (3.7 to 6.2m). Joints shall be at least ¼" (6mm) wide, and should not exceed 1½" (38mm). For new pavements designed with narrow joints using the initial narrow saw cut as the reservoir, spaced at 15 ft (5m) maximum, and when using low modulus type sealants, joint width may be as narrow as 1/8 inch (3mm). Contact Crafco for more details. Reservoir depth should allow a sealant depth to width ratio of 1:1 to 2:1, sufficient depth for backer rod, and the specified surface recess. Reservoirs shall be cut no deeper than required. When resealing, old sealant can be removed by knives, plows or sawing. Sawing shall slightly widen the joint by 1/8 to ¼ inch (3-6mm) to remove all traces of old sealant and produce clean, intact vertical surfaces. Maximum joint width is 1 ½ inch (38mm).

Reservoir Cleaning – After sawing, joints shall be flushed with water to remove sawing slurry and allowed to dry. Just prior to installing sealant, both joint surfaces shall be cleaned using sandblasting, brushing or other means to remove any remaining of sawing residue. Final cleaning is then done with high-pressure (minimum 90 psi , 62N/cm2) clean, dry , oil free compressed air the same day that sealant is installed. Moisture and oil traps are required on the compressor. Joints must be inspected to assure cleanliness by rubbing a finger along each face to spot dust or other contaminants. If found, recleaning should occur until joints are completely clean and dry. The objective of sawing and cleaning is to provide vertical, intact, clean concrete bonding surfaces free from all contaminants and are dry.

Backer Rod – After cleaning, heat resistant backer rod (ASTM D5249, Type I) approx. 25% larger than the joint width shall be installed to the required depth without damage or punctures. Punctures or damage to backer rod may cause sealant bubbling.

Sealant Installation – Concrete should be cured at least 7 days prior to installing sealant. Sealant heated to required temperature is installed per project specifications. Typical installations include a recess up to ¼ inch (6mm), flush, or with a surface overband (maximum 1/16" (1.5mm) above the surface, and 2" (50 mm) maximum beyond each joint edge).

INSTALLATION PRECAUTIONS: In certain situations, additional consideration needs to be given to product selection and application geometries.

Parking lots and other areas subjected to slow moving traffic and pedestrians: Product used must be stiff enough at hot summer temperatures to resist pick up and should not be applied on top of the pavement surface. Product should have a high temperature grade at least one step above the LTPPBIND grade for the climate. For even better pick-up resistance, increase by two grades.

Pavement to receive an Overlay, Surface Treatment, or Seal Coat: Product will be subjected to overlay heat effects and carriers for surface treatments and seal coats. If product is applied on top of the pavement, and an overlay is then placed, bumps may occur during compaction. Refer to "Bump Formation & Prevention in Asphalt Concrete Overlays Which Have Been Crack Sealed" (www.crafco.com) for more information. Solvents or other carriers in surface treatments may soften product. Prior to placing a surface treatment or seal coat, a test strip should be placed to verify compatibility of the product and treatment.

High Severity Cracked Areas: Highly cracked areas (fatigue cracks in wheel paths) should not be treated by covering cracks because pavement friction may be affected. These cracks can be filled if followed by a surface treatment or overlay to restore friction.

Fuel or Oil Spill Areas: These products should not be used in fuel or oil spill areas due to softening of the sealant that may occur. Sealant will not adhere to asphalt or concrete pavements surfaces that are contaminated with oil spills.

Crack Sealing or Filling in Pavements with Surface Treatments: When crack sealing or filling pavements with chip seals, slurry seals, and open graded friction courses, routing should be deep enough to extend through the surface treatment layer into the underlying asphalt concrete. This anchors product into solid pavement for better bonding.

CLEAN OUT: If melters used require clean out, follow manufacturer's instructions. If solvent is used, insure it does not contaminate product because dilution and flash problems may occur.

STORAGE: Pallets of product are protected with a weather resistant covering. During storage, this covering must be intact to prevent boxes from getting wet. If wet, boxes may lose strength and crush. Rips in the pallet covering should be repaired to maintain packaging integrity. Pallets should be stored on a dry, level surface with good drainage. Pallets should not be stacked because crushing of bottom boxes may occur. Product properties are not affected by packaging deterioration.

SAFETY PRECAUTIONS: Since these products are heated to elevated temperatures, it is essential that operations be conducted safely. All personnel need to be aware of hazards of using hot applied materials and safety precautions. Before use, the crew should read and understand product use and safety information on the box and the product MSDS. User should check D.O.T. requirements for transportation of product at elevated temperatures above 212°F (100°C).

HAZARDS ASSOCIATED WITH HOT-APPLIED MATERIALS: Skin contact with hot materials causes burns. Over exposure to fumes may cause respiratory tract irritation, nausea, or headaches. Precautions are to be taken to prevent contact with hot material and to avoid inhalation of fumes for everyone in the vicinity. Safety precautions should include:

1. Protective clothing to prevent skin contact with hot material.
1. Care when adding product to melters to reduce splashing.
3. Careful operation of wands or pour pots that apply product.
4. Traffic and pedestrian control measures which meet or exceed MUTCD requirements to prevent access to work areas while product is in a molten state.
5. Avoidance of material fumes.
6. Proper application configurations with a minimum amount of material excess.
7. Appropriate clean up of excessive applications or product spills.

ADDITIONAL INFORMATION: Additional information regarding these products is available by contacting your distributor or Crafco, Inc. This information includes:

1. Product Data Sheets
2. Material Safety Data Sheet,
3. Safety Manual
4. Sealing Cracks and Joints in Parking and Pedestrian Areas
5. "Bump Formation & Prevention In Asphalt Concrete Overlays Which Have Been Crack Sealed"
6. Sealant Selection Guide

SealMaster®
Pavement Products & Equipment

CrackMaster™ PL
Hot Pour Crack Sealant

SMT - 192

Revised: 1/13

1. PRODUCT NAME

CrackMaster PL
Hot Pour Crack Sealant

2. MANUFACTURER

ThorWorks Industries, Inc.
2520 S. Campbell St.
Sandusky, OH 44870
Phone: 800-326-1994
Fax: 419-626-5477
www.thorworks.com

Additional Plant Locations: SealMaster has a nationwide network of manufacturing and distribution facilities.

Phone 1-800-395-7325 or visit website at www.sealmaster.net to find the location near you.

3. PRODUCT DESCRIPTION & BENEFITS

CrackMaster PL is a single component, hot applied crack and joint sealant. When melted and properly applied it forms a resilient crack sealant for both asphaltic and cementatious pavements. CrackMaster PL forms a lasting seal that resists tracking in warm climates.

Basic Uses: CrackMaster PL is designed to seal expansion joints, longitudinal and transverse cracks, joints between concrete and asphalt shoulders, and random cracks in both asphalt and concrete pavements.

Composition: As supplied, CrackMaster PL is supplied in solid blocks comprised of asphaltic resins and synthetic polymer rubber.

Sizes: CrackMaster PL is supplied in 50 lb. cardboard cartons containing two 25 lb. blocks of material per carton.

Color: Black.

Limitations: Do not overheat material. Cracks must be free from moisture, dust, loose aggregate and other contaminates prior to application. Not recommended for cracks in excess of 1" wide.

4. TECHNICAL DATA

CrackMaster PL meets the following material requirements when tested in accordance with ASTM D6690. (see chart below).

Environmental Considerations: CrackMaster PL is considered a non-hazardous material.

5. INSTALLATION

Proper surface preparation will facilitate adequate adhesion and consequently the maximum service life of the sealant. The crack must be free from moisture, dust, and loose aggregate. Routing or wire brushing are preferred methods followed by a compressed air heat lance immediately prior to sealing. The substrate and air temperature must be above 40°F.

Methods: CrackMaster PL shall be melted in a conventional oil-jacketed unit equipped with an agitator and temperature control device for both material and heat transfer oil. Carefully insert blocks of material (with plastic bag) into melting equipment with agitator turned off. Load material slowly to avoid splashing. After the initial load of material has reached the recommended pouring temperature (370-390°F), fresh material may be added as sealant is used. Melt only enough material that will be used the same day. Avoid overheating material. Excessive heat could cause material to gel in the equipment or fail in crack and joints. A significant viscosity increase accompanied by stringiness signals the approach of gelation. If this occurs, immediately remove the material from the melter and dispose of it.

IMPORTANT: Protective apparel is recommended with application of CrackMaster PL. The extremely hot material will cause severe burns on contact with skin. OSHA Safety Regulations require workers to wear the following types of safety attire (see current OSHA/Safety Regulations for additional information): Hard hat with face shield; long sleeved shirt buttoned at the wrist; heat resistant gloves; long, cuffless pants; and safety toed work boots. Make certain all area around melter is clear of all debris and flammable materials. Avoid breathing vapors. Use with adequate ventilation.

Mixing Procedures:

Use material as supplied. Do not blend with other materials. After CrackMaster PL is melted it should be agitated or recirculated.

Application: Apply heated CrackMaster PL using either a pump and wand system or a pour

Chemical & Physical Analysis

Recommended Pour Temperature	370-390°F
Maximum Heating Temperature	400°F
Penetration (150 gr/5 sec.)	30-45
Resiliency	40% min
Flow at 140°F	0 mm
Softening Point	200°F min.
Ductility @ 77°F	30 cm
Tensile Adhesion	500%
Viscosity @ 375°F	60 ± 10 poise
Flexibility @ 20°F (1" Mandrel)	Pass
Specific Gravity	1.18
Asphalt Compatibility	Compatible

CrackMaster PL
Hot Pour Crack Sealant
SMT - 192

SealMaster
January 2013
(Supersedes SMT-28 (4/99), (7/04), (8/05)

PAVING AND SURFACING
Pavement Sealer

CrackMaster™ PL
Hot Pour Crack Sealant

pot. For best results the sealant depth to width ratio should not exceed 2 to 1 (i.e. 2-inches deep to 1-inch wide). The cooled sealant height should not exceed 1/8" above surrounding pavement. Using a sealing shoe or squeegee, band the material 2 to 3 inches wide over the crack.

Estimating Material Requirements: Use the following chart as a guideline for estimating material requirements (based upon pounds of material needed for 100 feet of cracks):

Crack Width	Depth	lbs/100feet
3/8"	3/8"	6.9 lbs.
3/8"	1/2"	9.3 lbs.
1/2"	1/2"	12.3 lbs.
1/2"	1"	24.7 lbs.
3/4"	1/2"	18.5 lbs.
3/4"	3/4"	27.8 lbs.

The above coverage rates are only a guideline. Actual material usage may vary due to width of application and thickness of material above pavement surfaces.

Precautions: Cracks must be free from moisture, dust, dirt, and debris. Both substrate and air temperature must be above 40°F. Keep boxes of material dry during storage. Do not store in direct sunlight.

6. AVAILABILITY & COST

Availability: CrackMaster Hot Pour Crack Sealants are supported by a nationwide network of SealMaster facilities along with a national and international network of professional applicators.

Cost: Cost information can be obtained from a local SealMaster CrackMaster applicator. Contact SealMaster for the CrackMaster representative in your area.

7. WARRANTY

SealMaster warrants that CrackMaster PL meets the chemical composition and performance requirements set forth in section 4. Liability to the buyer or user of this product is limited to the replacement value of the product only.

9. TECHNICAL SERVICES

Manufacturer: Complete product specifications, material safety data sheets, and technical assistance is available from SealMaster.

Professional Applicators: Your local CrackMaster applicator is available to provide on-site inspections and recommendations to meet your specific needs.

10. FILING SYSTEMS

- SealMaster Online Specification at www.sealmaster.net
- Complete SealMaster Product and Equipment Catalog Available
- Sweet's Catalog
- Sweet's CD
- Sweet's Online
- Sweet's Directory

The statements made on this specification sheet are believed to be true and accurate and are intended to provide a guide for approved application practices. As workmanship, weather, construction, condition of pavement, tools utilized, and other variables affecting results are all beyond our control, the manufacturer warrants only that the material conforms to product specifications and any liability to the buyer or user of this product is limited to the replacement value of the product only. The manufacturer expressly disclaims any implied warranties of merchantability or fitness for a particular purpose. Warranty is void on multi-coat applications if material made by other manufacturers is used with this product.

Form No.: SMT-192
Revised: 1/13
Supersedes: SMT-28 (4/99), (7/04), (8/05)

ThorWorks Industries, Inc.
2520 South Campbell St.
Sandusky, OH 44870

Phone: 1-800-326-1994
FAX: 1-419-626-5477

www.sealmaster.net

SealMaster®
Pavement Products & Equipment

SealMaster®
Pavement Products & Equipment

CrackMaster™ Supreme
Hot Pour Crack Sealant

SMT - 190 Revised: 3/12

1. PRODUCT NAME
CrackMaster Supreme
Hot Pour Crack Sealant

2. MANUFACTURER
ThorWorks Industries, Inc.
2520 S. Campbell St.
Sandusky, OH 44870
Phone: 800-326-1994
Fax: 419-626-5477
www.thorworks.com

Additional Plant Locations: SealMaster has a nationwide network of manufacturing and distribution facilities.

Phone 1-800-395-7325 or visit website at www.sealmaster.net to find the location near you.

3. PRODUCT DESCRIPTION & BENEFITS
CrackMaster Supreme is a single component, hot-applied, rubberized asphalt crack and joint sealant. CrackMaster Supreme is specially formulated for both direct fire and oil-jacketed melters. It is heat stabilized to withstand temperatures up to 450°F without experiencing polymer degredation. When melted and properly applied it forms a resilient crack sealant for both asphaltic and cementatious pavements. CrackMaster Supreme meets manufacturer's specifications.

Basic Uses: CrackMaster Supreme is designed to seal expansion joints, longitudinal and transverse cracks, joints between concrete and asphalt shoulders, and random cracks in both asphalt and concrete pavements. CrackMaster Supreme is relatively hard and has a high softening point, which makes it well suited for parking lots and driveways.

Composition: As supplied, CrackMaster Supreme is supplied in solid blocks comprised of heat stablized polymers and asphalt.

Sizes: CrackMaster Supreme is supplied in 50 lb. cardboard cartons containing two 25 lb. blocks of material per carton.

Color: Black.

Limitations: Do not overheat material. Cracks must be free from moisture, dust, loose aggregate and other contaminates prior to application.

4. TECHNICAL DATA
CrackMaster Supreme meets the following material requirements when tested in accordance with ASTM D6690. (see chart below).

Environmental Considerations: CrackMaster Supreme is considered a non-hazardous material.

5. INSTALLATION
Proper surface preparation will facilitate adequate adhesion and consequently the maximum service life of the sealant. The crack must be free from moisture, dust, and loose aggregate. Routing or wire brushing are preferred methods followed by a compressed air heat lance immediately prior to sealing. The substrate and air temperature must be above 40°F.

Methods: CrackMaster Supreme may be melted in direct fired or oil jacketed melters. Carefully insert blocks of material (with plastic bag) into melting equipment with agitator turned off. Load material slowly to avoid splashing. After the initial load of material has reached the recommended pouring temperature (350-400°F), fresh material may be added as sealant is used. Melt only enough material that will be used the same day. Avoid overheating material. Excessive heat could cause material to gel in the equipment or fail in crack and joints. A significant viscosity increase accompanied by stringiness signals the approach of gelation. If this occurs, immediately remove the material from the melter and dispose of it.

IMPORTANT: Protective apparel is recommended with application of CrackMaster Supreme. The extremely hot material will cause severe burns on contact with skin. OSHA Safety Regulations require workers to wear the following types of safety attire (see current OSHA/Safety Regulations for additional information): Hard hat with face shield; long sleeved shirt buttoned at the wrist; heat resistant gloves; long, cuffless pants; and safety toed work boots. Make certain all area around melter is clear of all debris and flammable materials. Avoid breathing vapors. Use with adequate ventilation.

Mixing Procedures: Use material as supplied. Do not blend with other materials.

Application: Apply heated CrackMaster Supreme using either a pump and wand system or a pour pot. For best results the sealant depth to width ratio should not exceed 2 to 1 (i.e. 2-inches deep to 1-inch wide). The cooled sealant

Chemical & Physical Analysis

Recommended Application Temperature	350 - 400°F
Maximum Heating Temperature	450°F
Cone Penetration at 25°C	50 Max.
Flow at 60°C, mm	0
Softening Point	200°F Min.
Flexibility, 0°F	(1" Mandrel) - PASS
Specific Gravity	1.17
Asphalt Compatibility	PASSES

SealMaster
March 2012
(Supersedes SMT-190 (7/04), (8/05)

CrackMaster™ Supreme
Hot Pour Crack Sealant

height should not exceed 1/8" above surrounding pavement. Using a sealing shoe or squeegee, band the material 2 to 3 inches wide over the crack.

Estimating Material Requirements:
Use the following chart as a guideline for estimating material requirements (based upon pounds of material needed for 100 feet of cracks):

Crack Width	Depth	lbs/100feet
3/8"	3/8"	6.2 lbs.
3/8"	1/2"	8.3 lbs.
1/2"	1/2"	11.1 lbs.
1/2"	1"	22.2 lbs.
3/4"	1/2"	16.6 lbs.
3/4"	3/4"	25.00 lbs.

The above coverage rates are only a guideline. Actual material usage may vary due to width of application and thickness of material above pavement surfaces.

Precautions: Cracks must be free from moisture, dust, dirt, and debris. Both substrate and air temperature must be above 40°F. Keep boxes of material dry during storage. Do not store in direct sunlight.

6. AVAILABILITY & COST

Availability: CrackMaster Hot Pour Crack Sealants are supported by a nationwide network of SealMaster facilities along with a national and international network of professional applicators.

Cost: Cost information can be obtained from a local SealMaster CrackMaster applicator. Contact SealMaster for the CrackMaster representative in your area.

7. WARRANTY
SealMaster warrants that CrackMaster Supreme meets the chemical composition and performance requirements set forth in section 4. Liability to the buyer or user of this product is limited to the replacement value of the product only.

9. TECHNICAL SERVICES

Manufacturer: Complete product specifications, material safety data sheets, and technical assistance is available from SealMaster.

Professional Applicators: Your local CrackMaster applicator is available to provide on-site inspections and recommendations to meet your specific needs.

10. FILING SYSTEMS

- SealMaster Online Specification at www.sealmaster.net
- Complete SealMaster Product and Equipment Catalog Available
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- Sweet's Online
- Sweet's Directory

The statements made n this specification sheet are believed to be true and accurate and are intended to provide a guide for approved application practices. As workmanship, weather, construction, condition of pavement, tools utilized, and other variables affecting results are all beyond our control, the manufacturer warrants only that the material conforms to product specifications and any liability to the buyer or user of this product is limited to the replacement value of the product only. The manufacturer expressly disclaims any implied warranties of merchantability or fitness for a particular purpose. Warranty is void on multi-coat applications if material made by other manufacturers is used with this product.

Form No.: SMT-190
Revised: 3/12
Supersedes: SMT-190 (7/04), (8/05)

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www.sealmaster.net

SealMaster®
Pavement Products & Equipment

SealMaster®
Pavement Products & Equipment

MasterSeal™ Concentrate
Asphalt Based Pavement Sealer

SMT - 110 Revised: 9/13

1. PRODUCT NAME
MasterSeal Concentrate
Asphalt Based Pavement
Sealer

2. MANUFACTURER
SealMaster has a nationwide network of manufacturing and distribution facilities.

Phone: 800-395-7325
www.sealmaster.net

3. PRODUCT DESCRIPTION & BENEFITS
MasterSeal Concentrate is a mineral filled asphalt emulsion pavement sealer designed to protect and beautify asphalt pavement. MasterSeal Concentrate is formulated to be job-mixed with water and aggregate.

Basic Uses: MasterSeal Concentrate is designed to beautify and protect asphalt pavement surfaces including parking lots, airports, driveways, shopping malls, roadways, and more.

Composition: MasterSeal Concentrate is a mineral filled asphalt emulsion pavement sealer fortified with special surfactants to promote superior adhesion and durability. Select aggregate is job-mixed to produce a slip-resistant coating.

Sizes: MasterSeal Concentrate is available in 4,000 gallon bulk tankers, 55-gallon drums, and 5-gallon pails.

Color: MasterSeal Concentrate dries to a deep, rich black color.

Limitations: MasterSeal Concentrate shall not be applied when temperature is expected to drop below 50°F at any time within a 24 hour period after application.

4. TECHNICAL DATA
MasterSeal Concentrate meets the performance standards of ASTM D-2939.

Environmental Considerations: MasterSeal Concentrate does not contain asbestos. MasterSeal Concentrate is an environmentally friendly water based pavement sealer containing less than 15 grams per liter volatile organic content (VOC).

Physical/Chemical Properties: MasterSeal Concentrate is a premium quality pavement sealer that meets the following material requirements when tested in accordance with ASTM D 140, ASTM D 466, ASTM B117, ASTM D 529, ASTM D 2939, and ASTM D244 procedures. (see chart below)

5. INSTALLATION
Surface must be clean and free from all loose material and dirt. Pavement surface repairs should be made with a suitable hot or cold asphalt mix. Cracks should be filled with SealMaster hot pour or cold applied crack fillers. Treat all grease, oil, and gasoline spots or stains with SealMaster Petro Seal™ or Prep Seal™.

Methods: MasterSeal Concentrate shall be applied by either pressurized spray application equipment or self-propelled squeegee equipment. Pressurized spray equipment shall be capable of spraying pavement sealer with sand added. Equipment shall have continuous agitation or mixing capabilities to maintain homogeneous consistency of pavement sealer mixture throughout the application process. Self-propelled squeegee equipment shall have at least 2 squeegee or brush devices (one behind the other) to assure adequate distribution and penetration of sealer into bituminous pavement. Hand squeegees and brushes shall be acceptable in areas where practicality prohibits the use of mechanized equipment.

Mixing Procedures:
- For optimum results, MasterSeal Concentrate Pavement Sealer shall be mixed in accordance with the following mix design (based on 100 gallons for ease of calculation):
MasterSeal Concentrate.....100 gals.
Water.....15-25 gals.
Zetac or Top Tuff Polymer Additive.....1-2 gals.
Sand*.....300-500 lbs.
*(40-70 mesh AFS rating)

TEST	SPECIFICATIONS	RESULT
Material	Material shall be homogenous and show no separation or coagulation that cannot be overcome by moderate stirring.	PASSES
Chem. & Physical Analysis		
- Non Volatiles %	47% Minimum	PASSES
- Ash Non Volatiles %	30 - 60	PASSES
- Specific Gravity 25°C	1.18 Minimum	PASSES
Drying Time	8 Hr. Max.	PASSES
Adhesion & Resistance to Water	No Penetration or Loss of Adhesion	PASSES
Resistence to Heat	No Blistering or Sagging	PASSES
Flexibility	No Cracking or Flaking	PASSES
Resistence to Impact	No Chipping, Flaking or Cracking	PASSES

SealMaster
September 2013
(Supersedes SMT-110 - (8/06), (12/12), (6/13)

MasterSeal™ Concentrate
Asphalt Based Pavement Sealer

IMPORTANT: The above mix design is a typical recommendation. Alternative mix designs may be substituted to account for local pavement conditions and use of other pavement sealer additives. However, in all cases sand shall be used in the mix design.

NOTE: Top Tuff is manufactured by ThorWorks and is available from your regional SealMaster location.

Application: For optimum performance and durability apply two coats of properly mixed MasterSeal. A third coat of mixed MasterSeal may be applied to high traffic areas such as entrances, exits, and drive lanes.

Application Rate of Mixed MasterSeal: Apply properly mixed MasterSeal (MasterSeal, Water, Sand, Additive) at a rate of .11 to .13 gallon per square yard (70-82 square feet per gallon) per coat.

Estimating Material Requirements: To estimate gallons of MasterSeal Concentrate required to cover a specific area, use the following coverage rate:

- One gallon of MasterSeal Concentrate will cover approximately 100 - 120 square feet (11.1 to 13.3 square yards) per coat when properly mixed and applied.

Note: Coverage rates may vary due to pavement age and porosity.

Precautions: Both surface and ambient temperature shall be a minimum of 50°F. Temperature shall not drop below 50°F in a 24 hour period following application. New asphalt surfaces should be allowed to cure a minimum of four weeks under ideal weather conditions (70°F) before applying MasterSeal Concentrate. Keep Out Of Reach Of Children. Do not store unopened drums or pails in freezing temperatures.

6. AVAILABILITY & COST

Availability: MasterSeal Concentrate is supported by a nationwide network of SealMaster manufacturing facilities along with a national network of professional applicators.

Cost: Cost information can be obtained from a local MasterSeal Concentrate applicator. Contact SealMaster for the MasterSeal Concentrate representative in your area.

7. WARRANTY

SealMaster warrants that MasterSeal Concentrate meets the chemical composition and performance requirements set forth in section 4. Liability to the buyer or user of this product is limited to the replacement value of the product only.

8. MAINTENANCE

Periodic cleaning of parking lot surface will ensure optimum product service life.

9. TECHNICAL SERVICES

Manufacturer: Complete product specifications, material safety data sheets, and technical assistance is available from SealMaster.

Professional Applicators: Your local MasterSeal Concentrate applicator is available to provide on-site inspections and recommendations to meet your specific needs.

10. FILING SYSTEMS

- Sweet's Catalog
- Sweet's CD
- Sweet's Online
- Sweet's Directory
- SealMaster Online Specification at www.sealmaster.net
- Complete SealMaster Product and Equipment Catalog Available

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Form No.: SMT-110
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Supersedes: SMT-110 (8/06), (12/12), (6/13)

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Engineering Specifications For
Applying SealMaster Pavement Sealer To
Bituminous Surfaces

1. SCOPE

1.1 The following specifications pertain to the application of SealMaster pavement sealer over bituminous pavement surfaces.

1.2 Uses: SealMaster pavement sealer is designed to protect and beautify all bituminous pavement surfaces including, but not limited to: airport runways and taxiways, secondary roads and streets, highway shoulders, parking lots, and driveways. SealMaster pavement sealer prevents oxidation of the asphaltic binder, prevents weather damage, beautifies pavement, reduces maintenance costs, and adds years of life to pavement.

2 MATERIALS

Pavement Sealer Available Through SealMaster (Not Including Acrylics)

Coal-Tar: A Clay-Stabilized, Fuel-Resistant Coal Tar Emulsion. Formulated to be job mixed with sand and water.

Master-Seal: A Clay-Stabilized Mineral Filled Asphalt Emulsion. Formulated to be job mixed with sand and water.

LV: A Clay-Stabilized Asphalt Based Emulsion Fortified With Coal-Tar. Formulated to be job mixed with sand and water.

PMCTS: Coal-Tar Emulsion Fortified With Cross-Linking Rubber Polymer And Other Surfactants. Formulated to be job mixed with sand.

PMM: Mineral Reinforced Asphalt Emulsion With Polymers And Other Surfactants. Formulated to be job mixed with sand.

Liquid Road: High Performance Mineral And Fiber Reinforced Asphalt Emulsion Blended With Polymers And Other Surfactants. Formulated to be job mixed with sand.

PMB: A Polymer-Modified, Clay-Stabilized Coal-Tar Emulsion Fortified With Other Surfactants. Formulated to be job mixed with sand.

3. Application Equipment Requirements

3.1 Pressurized spray equipment – Shall be capable of spraying pavement sealer with sand added. Equipment shall have continuous agitation or mixing capabilities to maintain homogenous consistency of pavement sealer mixture throughout the application process.

3.2 Self-Propelled Squeegee Equipment – Shall have at least 2 squeegee or brush devices (one behind the other) to assure adequate distribution and penetration of sealer into the bituminous pavement. Equipment shall have continuous agitation or mixing capabilities to maintain homogenous consistency of pavement sealer mixture throughout the application process.

3.3 Hand squeegee and brushes shall be acceptable in areas where practicality prohibits the use of mechanized equipment.

4. Surface Preparation

4.1 New Asphalt must be allowed to cure at least 30 days – 60 days under good weather conditions. Before applying sealer, pour water on the asphalt surface. If a film of oil appears, the surface is not sufficiently cured. Required cure time shall be determined by project engineer.

4.2 Alligatored Areas -

4.2.1 Option 1- Alligatored areas shall be cut out, removed, and replaced with hot mix asphalt material

4.2.2 Option 2 – Alligatored areas shall be coated with GatorPave patching compound as manufactured by ThorWorks Industries, Inc.

4.3 Crack Repair

4.3.1 Surface and hairline cracks up to 1/8" wide do not require repair

4.3.2 Option 1 – Repair cracks with CrackMaster Hot Pour Crack Sealing Materials as supplied by SealMaster. Cracks shall be routed or wire brushed and blown clean and dry with a compressed air heat lance. Hot pour material shall then be poured into cracks and squeegeed flush to adjoining pavement.

4.3.3 Option 2 – Repair cracks with SealMaster cold applied pourable crack filler. Cracks shall be cleaned with a wire brush and power blower. Crack sealant shall be poured and squeegeed flush to adjacent pavement surface.

4.4 Oil Spot Treatment – Treat all grease, oil, gasoline and similar petroleum stains or spots with SealMaster PetroSeal, or PrepSeal oil spot primer.

4.5 Pavement Cleaning – Immediately prior to sealing, all loose materials, dirt, and debris shall be removed from pavement surface by power blower or mechanical sweeping equipment.

5. Pavement Sealer Mixing Procedure

5.1 For optimum results, mix SealMaster pavement sealer in accordance with the manufacturers specifications of the specific sealer being used.

5.2 Charge undiluted sealer to the mixing tank and dilute sealer (if necessary in accordance with mix design) with clean potable water while agitating. If using additives in the mix design, predilute Sealer VM, Top Tuff, or Zetac with water (1:1 ratio) to avoid polymer shock and facilitate uniform dispersion. Add prediluted Sealer VM, Top Tuff, or Zetac slowly while agitating. When the rubberized mixture has thickened, add the sand slowly. Mix thoroughly before and slowly during application.

6. Pavement Sealer Application Procedures

6.1 A minimum of two (2) coats are recommended. Apply by squeegee, brush, or mechanical spray, or squeegee application equipment designed specifically for such purposes (refer to section 3 of specification)

6.2 Weather Requirements – Temperature must be a minimum of 50 degrees F and rising for a period of not less than 24 hours. Do not apply when temperature is expected to drop below 50 degrees F in a 24 hour period. Do not apply if rain is forecast within 24 hours.

6.3 Curing Time – Allow final coat of pavement sealer to cure a minimum of 24 hours before opening to traffic.

7. Traffic Markings

7.1 Materials – Traffic Paint applied to freshly sealed bituminous pavement shall be a 100% Acrylic Waterborne paint. Use of solvent borne paints shall not be permitted.

7.2 Equipment – Mechanical equipment designed primarily for traffic markings shall be used to apply Acrylic-Based paints.

7.3 Application – Pavement sealer must cure a minimum of 24 hours prior to applying traffic marking paint.

NEYRA®

Jennite AE

Application Specification NJ-S3

PRODUCT NAME
Jennite AE

MANUFACTURER
Neyra Industries, Inc.
10700 Evendale Drive
Cincinnati, Ohio 45241

Phone: 513-733-1000
Toll Free: 800-543-7077
Fax: 513-733-3989

Email: info@neyra.com
Web: www.neyra.com
Web: www.jenniteusa.com

- Application Specification NJ-S3 provides guidelines for applying Jennite AE pavement sealer on heavy traffic areas.
- NJ-S3 requires three applications of Jennite AE slurry (Jennite AE with 5-6 pounds of sand per gallon of undiluted Jennite AE) and one application of Polyprime penetrating pavement primer.
- Application Specification NJ-S2 is also available for moderate traffic areas.
- Customized CSI format application specifications are also available upon request.

PURPOSE

To provide a protective surface coating for sound asphalt pavements against damage from salts, sun and water using Jennite AE, a refined polymer modified emulsion.

1.0 GENERAL

1.1 The contractor shall furnish all labor, material, equipment, services and supervision required to complete this project complying with the outlined specifications.

1.2 The contractor shall examine the work site prior to submitting a bid. The submission of a bid shall be evidence that this requirement has been met. Failure to inspect the site prior to bidding will not relieve the contractor of the responsibility of performing all work included in this contract.

1.3 Work related rubbish shall be removed and the job site shall be kept clean, neat and orderly at all times.

1.4 All buildings, walks, steps, fences, trees, etc., shall be protected. Any damage done by the contractor shall be repaired by him at no cost to the owner.

1.5 If directed by the owner or his representative, the contractor shall furnish a certificate of insurance and evidence of compliance with state workmen's compensation regulations.

2.0 MATERIALS

2.1 Refined polymer modified emulsion must be Jennite AE as manufactured by Neyra Industries, Inc. and meet all the applicable standards as outlined in Jennite AE Product Data Sheet 101. Jennite AE must be rubberized and the rubber must be hot blended into the refined asphalt base prior to emulsification.

2.2 The polymer modified emulsion shall be prepared from a high temperature refined asphalt base modified with high molecular weight virgin polymer rubber.

2.3 If directed by the owner or his representative, the contractor shall certify that the product to be delivered and applied is Jennite AE manufactured by Neyra Industries, Inc. and Neyra Industries, Inc. shall certify that Jennite AE meets the requirements of this specification and Jennite AE Product Data Sheet 101.

2.4 If directed by the owner or his representative, samples of the emulsion that the contractor proposes to use shall be submitted by the contractor.

2.5 Mineral aggregate shall be added at 5 - 6 lbs./gal. of undiluted Jennite AE. The mineral aggregate shall be clean and dry silica sand free from foreign matter. This mineral aggregate shall have an American Foundry Society Grain Fineness Rating of 50 to 70, with no more than 2% retained on 30 mesh or coarser, no more than 10% passing 140 mesh and no more than 0.3% passing 200 mesh.

2.6 Dilution with water may be required for workability when sand slurry Jennite AE is used. Any water used for mixing shall be clean and potable and shall be added in the minimum quantity sufficient for good application consistency, but not in excess of 15% of the volume of undiluted Jennite AE.

3.0 SURFACE PREPARATION

3.1 The pavement surface to be coated must be sound and surface cured to obtain maximum performance. To be sound, the pavement surface course shall be oil free and properly compacted over base and subbase courses that are well drained and sufficiently stable to resist traffic loads for which the pavement is to be used without deflection.

To be surface cured, new pavements must be allowed to age so that they are free of light oils and present a waterbreak free surface when water is poured over them. To perform this test,

st one or two gallons of clean water rom a suitable clean container (such as a 5 gallon pail) out on the surface. The water should sheet out and wet the surface uniformly without ribboning, crawling or showing oil rings. If the clean water does not wet the surface uniformly, the asphalt is not ready for coating and should age longer.

3.2 Minor pavement repairs can be made with hot mix asphalt. Areas that have been softened by petroleum derivatives or that have failed due to any other cause shall be repaired according to applicable regional specifications.

3.3 Vegetation shall be removed from all surfaces to be sealed.

3.4 Surfaces to be sealed shall be thoroughly cleaned to remove all foreign debris (dirt, silt, gravel, leaves, etc.) using a mechanically powered forced air sweeper and steel bristle hand brooms.

3.5 Mud areas shall be scraped thor- ughly, scrub-washed and/or pressure ised with clear fresh water.

3.6 Oil spots shall be scraped of excess oil. After cleaning, oil spots shall be coated with Petrobond acrylic oil spot primer (Product Data Sheet 152) to achieve superior Jennite AE adhesion and prevent bleeding.

3.7 Treat all surfaces to be sealed with a coat of Polyprime penetrating pavement primer (Product Data Sheet 155).

3.8 Cracks should be sealed according to applicable specifications using Plyolastic pourable crack filler (Product Data Sheet 131). For longer lasting protection, use one of the Thermo-Seal crack/joint sealants such as PLS (Product Data Sheet 145) or Spec+Plus DF (Product Data Sheet 146).

4.0 APPLICATION OF MATERIAL

4.1 Three applications of Jennite AE slurry shall be applied uniformly over the entire pavement surface, prepared described in Section 3 and shall be ee of holidays and pinholes. To insure a better bond, fog spraying the pavement with fresh clean water may be used to maintain workability and assure even spreading of the Jennite product.

4.2 Jennite AE shall be applied at a total minimum application rate of 0.10 gallon per square yard per coat based on undiluted Jennite AE.

Application Rate per Coat

	Gal/SY	Gal/SF
Concentrate	.10	.011
Mix	.12 - .15	.013 - .016
Primer	.015	.0016

4.3 Application must be made when ambient temperatures and pavement temperatures are above 50°F. Good drying conditions above 50°F are required during the subsequent 8 hours and no temperatures below 50°F should be anticipated for 48 hours.

4.4 Adequate time shall be allowed for each application to dry thoroughly (tack free) prior to each additional application. It is not recommended that the primer coat and the three successive coats of Jennite slurry be applied within one working day. Upon completion of the third application of Jennite, all traffic will be excluded from the coated surface. It is recommended the coating be allowed to cure for at least 24 hours of good drying conditions before opening to traffic.

4.5 The contractors shall barricade from traffic the sealed areas until material is thoroughly dried. Area should be tested for trafficability before opening to use.

5.0 METHOD OF APPLICATION

5.1 The machine that is used to apply Jennite AE shall have adequate agitation to keep material in proper suspension at all times. It should be equipped with a water fog bar so that the pavement can be dampened (but without puddles) when emulsion is applied if temperatures are above 85°F or in bright sun.

5.2 Any spray distributor or squeegee machine used for application of the coating shall be self-propelled, equipped with pneumatic tires, have full sweep agitator blades and be capable of applying the required coat weight of sand-reinforced Jennite AE evenly over the entire width of the application mechanism to provide a uniformly coated surface.

6.0 STRIPING

6.1 If pavement marking is required, Aexcel, an acrylic latex striping paint (Product Data Sheets 172 & 173) is recommended. When using a latex paint, allow the sealcoat to dry before striping. Organic solvent base paints shall not be used because they tend to discolor and can also cause shrinkage cracks.

7.0 MAINTENANCE

7.1 As a rule, a clean, well-marked parking lot is safer and will last longer. Occasional flushing with water or the use of a contract cleaning service will help to retain an attractive appearance. Care should be taken with snow removal techniques, since improperly operated steel blade snowplows can damage the coating as well as the asphalt pavement. Overuse of strong de-icer products or sand/salt blends can also accelerate wear of the pavement surface.

ADDITIONAL INFORMATION

Neyra Industries, Inc. offers application specifications to fit every need. Application Specification NJ-S2 is available for moderate traffic areas. Custom specifications are also available upon request. For further information, please contact us.

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