

EXHIBIT F

Final RAWP/FDR for RDU 5

**ANACONDA SMELTER NPL SITE
ANACONDA REGIONAL WATER, WASTE & SOILS
OPERABLE UNIT**

Final

***Remedial Design Unit (RDU) 5 Anaconda Active Railroad Beds
Remedial Action Work Plan/Final Design Report (RAWP/FDR)***

Atlantic Richfield Company

September 19, 2003

**Comments to the Draft Final Remedial Design Unit (RDU) 5
Anaconda Active Railroad Beds Remedial Action Work Plan/Final Design Report
Prepared for Atlantic Richfield Company by Pioneer Technical Services, Inc.
Dated August 15, 2003**

General Comment

Although this design document has been prepared under the ARWW&S OU, an earlier draft design prepared under the Community Soils OU addressed many of the railroad areas of concern and design components that are included in this submittal. The Agencies provided ARCo comments to the CS OU Railroad design report in June 2001. In May 2002, ARCo requested transferring the active Rarus Railroad to the ARWW&S OU. The Agencies agreed to this request, and provided ARCo with a position paper to direct the future Active Railroad remedial design process.

Atlantic Richfield Company Response:

Atlantic Richfield Company has utilized the position paper in finalizing the RAWP/FDR.

General Comment

While many of the Agencies comments and direction provided in June 2001 and May 2002 have been adequately addressed, many have been not. Nevertheless, the Agencies are in general agreement with the design presented in this document, although it lacks significant detail. This design can be approved with comment. Replacement pages should be provided to address the specific comments listed below. Additional design details as described below should be provided during RA through the Request for Change process.

Atlantic Richfield Company Response:

Due to the extent of comments provided by the Agencies on the *Draft Final Remedial Design Unit (RDU) 5 Anaconda Active Railroad Beds Remedial Action Work Plan/Final Design Report* (August 15, 2003), the Document will be modified and re-submitted instead of providing replacement pages and using the Request for Change process.

Specific Comments

1. Agency Comment:

Page 1, Section 1.1 Purpose and Scope, first paragraph. Add the following sentence at the end of this paragraph: "This RAWP/FDR also meets the requirements of the May 2002 Agency Position Paper on Railroads."

Atlantic Richfield Company Response:

Appropriate text from the May 2002 Agency Position Paper on Railroads will be incorporated directly into the revised/Final RAWP/FDR; consequently, the Agencies request to add this specific sentence is not necessary.

2. Agency Comment:

Page 1, Section 1.1 Purpose and Scope, bullets Add the following two bullets to the specific elements of work

- *Construction of storm water engineered controls and best management practices, where necessary,*
- *Monitoring of ground water quality where wastes are left in place, as appropriate,*

Atlantic Richfield Company Response:

The text will be added to Section 1.1.

3. Agency Comment:

Page 2, Section 1.2 Description of the Selected Response Action for Railroad Beds, first paragraph. This sections notes that the response action selected for railroads by the CS OU ROD has been "modified by discussions between the EPA and PRPs." These modifications were summarized in the May 2002 Agency Position Paper, which are attached to these comments.

Atlantic Richfield Company Response:

Appropriate text from the May 2002 Agency Position Paper on Railroads will be incorporated directly into the revised/Final RAWP/FDR; consequently, the Agencies request to add this specific sentence is not necessary.

4. Agency Comment:

In addition to the Selected Remedy from the CS OU ROD that are quoted in this section, the following remedial requirements from the attached May 2002 Agency Position Paper should be added to the end of this section.

"The Selected Remedy for railroad bed materials, identified in the Community Soils ROD, was only intended to address the active line through the community of Anaconda. The Remedy generally requires that an engineered cover be constructed over the waste material to prevent direct contact, and to reduce erosion and transport of contaminants to residential areas. Abandoned and historic railroad bed materials have been identified in the community and have subsequently been included to the Community Soils project

The Agencies have determined that these materials should be addressed as a miscellaneous waste in accordance with the Selected Remedy identified in the ARWW&S ROD. The ARWW&S remedy generally requires that miscellaneous waste materials located outside of the designated Waste Management Areas be removed and consolidated to a WMA "

"The ARWW&S ROD also acknowledged the use of dedicated developments as follows.

Dedicated development is the construction of improvements on the land and the dedication of that improved land for a dedicated use. A dedicated development may include restrictions on the property in the form of restrictive covenants, negative easements, or other mechanisms that restrict the use of the property to accomplish a specific purpose. Examples include: parks, trails, golf course, airport, railroad, motor raceways, etc. Land dedicated to a public entity has a high likelihood of maintaining the permanence of ICs

Dedicated developments for public use have previously been established within the Anaconda Smelter NPL Site as part of the Selected Remedy for the OW/EADA OU. These developments include the Old Works Golf Course and trail system. The active railroad lines within the Anaconda Smelter NPL Site have been determined by EPA to be dedicated developments "

Atlantic Richfield Company Response:

The text will be added to the end of Section 1.2.

5. Agency Comment:

Bullet number 2 of the railroads selected remedy provided in Section 1.2 notes that retaining walls and/or curbing will be used to control surface water runoff and to separate the railbed from residential areas. Neither of these design components are included in this RAWP/FDR. More discussion on this is provided below in the comments to Section 4.7.

Atlantic Richfield Company Response:

The barriers (Jersey Barriers) described in the third paragraph of Section 5.3 of the RAWP/FDR and shown on Sheets 11 (layout) and 14 and 16 (details) of the design drawings will essentially function as barrier walls/curbing and will provide several additional functions as part of this design, including:

- 1) Prohibit vehicular traffic from traveling or parking on the installed caps located adjacent to streets or alleys;
- 2) Physically separate the railroad bed from residential areas; and
- 3) Aid in controlling surface water runoff.

6. Agency Comment:

Page 2, Section 1.3 Description of Remedial Action Objectives, second sentence, which reads: "an action level has not been developed for directly addressing the railroad bed materials within the ARWW&S OU" is incorrect. Arsenic action levels are based primarily on land use designation, secondarily on media. These action levels apply to waste, including railroad beds. See Section 6.1 of the ARWW&S OU ROD decision summary. Provide the arsenic cleanup action table at the top of Page DS-34 within the text of this section, as these cleanup levels are the remedial action objectives for this action. This table is as follows.

<u>Land Use Designation</u>	<u>Media</u>	<u>Concentration</u>	<u>Risk</u>
Residential	Soil and Waste	250 ppm	8E-05
Commercial/Industrial	Soil and Waste	500 ppm	4E-05
Recreational	Soil and Waste	1,000 ppm	4E-05
Agricultural	Soil only	1,000 ppm	1E-04
Steep Slope/Open Space	Soil only	2,500 ppm	1E-05

Atlantic Richfield Company Response:

The requested text will be removed and the table will be added to Section 1.3.

7. Agency Comment:

RDU 5 West lies entirely within the community of Anaconda, all land use is either residential or commercial/industrial, depending on land use adjacent to the railroad. This has consistently been the Agencies' position since October 1996 CS OU ROD, as restated in the June 2001 comments on the draft CS OU Railroad RAWP/FDR, and the May 2002 Agency Position Paper, that were provided to ARCo. As stated on page DS-45 of the CS OU ROD: "Because the railbed material is located within the community of Anaconda, the above action levels of 250 and 500 ppm for residential and commercial/industrial areas, respectively, are applied to the railbed material."

Atlantic Richfield Company Response:

Land use within "RDU 5 West" is not entirely either residential or commercial/industrial land use. There are also recreational, agricultural and/or open space areas adjacent to the active "RDU 5 West" railroad beds.

8. Agency Comment:

Page 3, Section 1.4.1 Risk-Based Screening Levels/Action Levels. The Agencies have previously requested that this section be deleted in its entirety (see June 2001). The discussion presented here has no relevance to remedial design and action. Table 2 is a soils action level table, which is not relevant to wastes. The cleanup discussion provided above in the comments to Section 1.3

should be used in lieu of this section. If ARCo insists on retaining this section for some inexplicable reason, it should be revised in accordance with the comments above.

Atlantic Richfield Company Response:

Section 1.4.1 will be deleted, in entirety. As noted above, Section 1.3 will be revised as requested by the Agencies.

9. Agency Comment:

Page 6, Section 2 Performance Standards. Add the following sentence: "Final performance standards will be provided by EPA and MDEQ."

Atlantic Richfield Company Response:

Based on conversations between Atlantic Richfield Company legal representatives and EPA legal representatives on September 8, 2003, inclusion of this sentence in the text of the RAWP/FDR is not required.

10. Agency Comment:

Page 7, Section 3.1 Lines of Authority, Communication and Coordination, second paragraph. It should be noted that because of the lack of detail concerning the attached construction drawings, EPA QA/QC Oversight will be critical in developing acceptable construction activities in the field. In addition, coordination is required with Anaconda-Deer Lodge County and the Montana Department of Transportation where construction activities could affect streets, roads or highways.

Atlantic Richfield Company Response:

The construction drawings will be modified to explicitly indicate specific sections along the railroad bed where individual cover types (e.g. Type 1 Aggregate cover vs. riprap cover) will be installed. Please note that the RAWP/FDR text and construction drawings provided in the August 15, 2003 submittal do, in fact, indicate in detail where the individual cover types are required, as follows:

- The West Valley portion of the railroad bed is subject to removal/disposal and grading of the excavated footprint (as indicated in Section 5.1 of the RAWP/FDR text and Sheets 5 and 6);
- Size No 5 Ballast is required within 3 feet of active tracks in railroad yards (as indicated in Sections 4.3.1, 5.2 and 5.3.2 of the RAWP/FDR text, Section 820 of the Technical Specifications and Detail 10, Sheet 15);
- Granular borrow cover is required in railroad yard storage areas (as indicated in Sections 4.3.2.3, 5.2 and 5.3.2 of the RAWP/FDR text, Section 820 of the Technical Specifications and Detail 10, Sheet 15 and Sheets 9 and 10);

- Size No. 24 Ballast is required within 3 feet of active tracks along the Anaconda Mainline (as indicated in Sections 4.3.1 and 5.3 of the RAWP/FDR text, Section 820 of the Technical Specifications and Detail 4, Sheet 13);
- Riprap cover is required along the Anaconda Mainline where side slopes are steeper than 4:1 (as indicated in Section 4.3.2.2 of the RAWP/FDR text, Section 820 of the Technical Specifications and Detail 7, Sheet 15),
- The AFFCO Spur is subject to removal/disposal and revegetation of the excavated footprint (as indicated in Section 5.3.1 of the RAWP/FDR text, Sheet 8 and Details 8 and 9 on Sheet 15);
- Type 1 Aggregate is the required on all other areas associated with the Anaconda Mainline, within the adjacent vegetation line (as indicated in Sections 4 3.2.1 and 5.3 of the RAWP/FDR text, Section 820 of the Technical Specifications and Details 4 and 6, Shccts 13 and 14, respectively); and
- Barriers are required in specific areas along the Anaconda Mainline (as indicated in Sections 5.3 of the RAWP/FDR text, Section 840 of the Technical Specifications and Sheets 11 [layout] and 16 [detail]).

Presentation of the design will be modified/clarified, but all design components have previously been provided.

11. Agency Comment:

Page 8, Section 4.1 West Valley. Revise the first paragraph as follows:

The general design applicable to the West Valley Railroad Bed include removal of the rails, ties and railroad bed ~~except at street crossings and access road spurs leading to residential driveways. At these crossings, rails and ties will be removed up to the edge of the asphalt or roadway surface aggregate. The RA will not be conducted at the crossings since the waste materials are adequately covered in these areas. Similarly, Where the West Valley Railroad Bed crosses Warm Springs Creek (approximately 0.3 mile west of Anaconda) via a small trestle, the rails and ties and bed material will be removed up to the edge of the trestle, not disturbing the trestle~~

There are about 30 crossings along the rail line, ranging from rotten boards and gravel to asphalt over the ties and rails. Leaving these crossings in place not only makes the removal of waste incomplete, but results in unnecessary maintenance and the potential for safety problems. The stability of a 20 foot wide section of rails and ties sitting 2 feet or so above the ground and subject to traffic is questionable. Also, it is questionable whether leaving rails and ties in place meeting federal and state requirements for railroad abandonment. In addition, it is the Agencies understanding that in order to comply with the agreement reached between MT DOT, Rarus, and ARCo regarding the condition of property prior to transfer, all crossings that may contain waste must be removed. Replacement of these crossings need to be addressed with MT DOT and ADLC.

Atlantic Richfield Company Response:

As discussed during the August 28, 2003 meeting between the Agencies and Atlantic Richfield Company, the design will be revised to include removal of rails, ties and bed material at dirt/gravel railroad bed crossings and replacement with clean aggregate at the crossing where legal easement agreements exist between the landowner and resident/governmental entity. At asphalt crossings, the rails, ties and bed material will be removed up to the edge of the asphalt, the asphalt will be cut outside the end of the ties, the rails and ties will be removed, and the cut area will be backfilled with compacted road base to a height approximately 4-inches below the existing asphalt. The compacted road base will then be covered with 4-inches of new asphalt.

Replacement of crossings is primarily a landowner easement issue, but will be coordinated with ADLC and MDT, as necessary.

12. Agency Comment:

The trestle across Warm Springs Creek may be left in place if all waste is removed from adjacent to the creek. The bridge has timber retaining walls as abutments. It appears that removal of the waste material up to the walls will take care of this, but if deeper waste is encountered in the abutments it must be removed. The bridge is also used as a crossing for two utility lines, so it would be best to leave it in place at this time if possible.

Atlantic Richfield Company Response:

Comment Noted.

13. Agency Comment:

Page 8, Section 4 1 West Valley, second paragraph This paragraph describes the proposed West Valley removal action. Additional consideration should be given to the condition of the rail line after removal of the waste. Reaches where the rail line sits even with the original ground may end up with a 1 ½ foot deep pond after rainstorms. This could also occur in fill areas if the waste does not extend beyond the vegetation line allowing the cut to daylight. The area of removal will also be susceptible to weed infestation and dust. The dust from off-road vehicle use could be worse than it is now, and it is a constant irritation to the adjacent homeowners. The dust and weed concern, as well as aesthetics, may be especially high in the area adjacent to the West Valley subdivision and in the town of Anaconda. Since agreements may shift ownership of the property, including post-removal responsibilities, these issues should be clearly outlined in this RAWP as well as any agreements. If planned future development is years away, consideration of interim controls (i.e., revegetation) should also be considered.

Atlantic Richfield Company Response:

As indicated in Section 5 1 of the RAWP/FDR, Note No. 6 on Sheet 6 and Detail 2 on Sheet 12, after removal of the West Valley railroad bed material, the excavated footprint would be rough

graded (to eliminate voids/holes and overly steep slopes). This is an integral part of standard excavation/grading procedures. There is no intention of leaving holes within the excavated footprint as part of this design.

As discussed during the August 28, 2003 meeting between Atlantic Richfield Company and the Agencies, the dust and weed issues are the responsibility of the landowner under local and state ordinances and will continue following completion of the West Valley railroad bed removal.

14. Agency Comment:

During transportation, measures should be implemented to prevent spillage and/or leakage of the waste material. This is consistent with the current SST Parcel 152 project and was what ADLC required when materials were hauled from the golf course villa excavation to the Opportunity Ponds

Atlantic Richfield Company Response:

Comment noted. Measures will be taken to minimize the spillage and leakage of waste material during transportation activities consistent with the current SST Parcel 152 project.

15. Agency Comment:

Silt fence or other BMPs may be required during excavation to prevent materials from entering adjacent areas, especially where water and wetlands exist. This concern could carry on after removal if no reclamation of the excavated area occurs.

Atlantic Richfield Company Response:

Comment noted. BMPs will be installed, as necessary, during the course of construction, as indicated in Sections 4.7 and 4.8 of the RAWP/FDR.

16. Agency Comment:

Page 9, Section 4.3 Engineered Covers/Surface Capping. The discussion provided in this section suggests that the only objectives of surface capping is to provide a layer of uncontaminated media over areas where action levels are exceeded. It fails to identify the minimum design criteria provided in the May 2002 Position Paper which included: a minimum of six inches of select material that will provide a permanent barrier to waste material for human health protection, promote surface flow without erosion, reduce infiltration, and provide a wearing surface durable for the operation of the anticipated rail service

Atlantic Richfield Company Response:

Installation of coarse aggregate materials, including riprap provides a permanent barrier and will reduce erosion and consequently transport of contaminated materials to residential areas. The

text will be modified to emphasize this objective. As stated in Atlantic Richfield's response to Agency comments (dated October 31, 2000) regarding the original Anaconda Railroads RAWP/FDR submittal (under the CSOU)... "The purpose of ballast on a railroad bed is to provide an effective structural base to support heavy loading and to promote drainage. Proper drainage is absolutely critical to the trouble free operation of a railroad." Although the proposed design may reduce infiltration, it is understood that some infiltration will likely occur, a key function of ballast on a railroad bed is to facilitate infiltration.

17. Agency Comment:

Page 11, Section 4 3 1 Ballast Covers, second to last sentence in this section Delete this sentence referencing the Anaconda Granulated Slag Pile Position Paper Supporting a No Action Record of Decision. This document was never approved and is not part of the Administrative Record Note that the Agencies approval of using furnace slag as ballast is contingent on its acceptance by the railroad and that it is limited to the yard areas where access is limited to the public Slag is not approved for use on the mainline

Atlantic Richfield Company Response:

Although the *Anaconda Granulated Slag Pile Position Paper Supporting a No Action Record of Decision* was never approved, it remains part of the Administrative Record. Therefore, no modification of the original text is required.

Although slag has not been approved for use as ballast on the mainline under this design, the PRPs anticipate that slag will be approved for use on mainlines by the Agencies in the future. The use of slag in other areas requires Agency approval

18. Agency Comment:

Page 11, Section 4 3 2 Coarse Aggregate Covers. The design is lacking detail regarding the ability of the covers to reduce erosion of underlying waste materials and slope stability. In addition, the design does not specify where specific cover designs will be used

Atlantic Richfield Company Response:

As stated above, installation of coarse aggregate materials, including riprap will reduce erosion and consequently transport of contaminated materials to residential areas. Erosion is currently not an issue on flat railroad bed surfaces in Anaconda where Type 1 Aggregate (3-inch minus aggregate with very few fines) would be installed. Installation of the aggregate will further minimize erosion potential. Additionally, the existing side slopes associated with the railroad bed are very short in length (e.g. maximum slope length of approximately 15 feet in places along the Anaconda Mainline), are not excessively steep and are currently quite stable. Although some minor erosion rills are evident in places along the railroad bed side slopes, there is no evidence of impending slope failure. Installation of coarse aggregate and riprap is a standard engineering "hard armoring" practice used to reduce erosion of underlying materials.

19. Agency Comment:

In recent technical discussions with ARCo, it was indicated that other materials and cover designs will likely be used for this project.

Atlantic Richfield Company Response:

Discussions were consistent with the design as previously submitted.

20. Agency Comment:

The specification call for 6 inches of riprap. The riprap has a maximum size of 12 inches and a D50 of 6"-8" (the specs say 6-8, the narrative says 4-8) The thickness could be closer to 15 inches, and could encroach on adjacent areas.

Atlantic Richfield Company Response:

The narrative and Technical Specifications will be modified to be consistent, indicating a D50 of 4 - 8 inches. The riprap specification is identical to the riprap design implemented on railroad bed side slopes for the Butte Railroad Time Critical Removal Action (TCRA). The specification calls for 100% of the riprap material to pass through a 12-inch screen (i.e., maximum size < 12-inches).

21. Agency Comment:

The use of rock and riprap materials adjacent to railroads in residential areas should also be reviewed by ADLC.

Atlantic Richfield Company Response:

Use of rock and riprap materials on railroad beds is a landowner (railroad) preference issue.

22. Agency Comment:

Giving the extent of the above comments, ARCo may wish to address them through the Request for Change process prior to construction of the railroad sections where slope stability and erosion is a concern. A walkthrough with the Agencies is recommended to identify these areas

Atlantic Richfield Company Response:

The RAWP/FDR will be modified/clarified and re-submitted for approval rather than finalizing the design under the Request for Change process.

23. Agency Comment:

Page 13, Section 4.7 Storm Water Controls. This section states that "specific drainage controls will incorporate the natural topography of the site, as well as additional engineered controls " There are no drawings of these controls in Appendix A As described in Appendix A, extensive field fitting of storm water BMPs and controls will be necessary, given the lack of detail in this design Engineered controls designs may require submittal of Request for Change forms to document that they meet design criteria and performance standards for storm water management established by the Agencies for the ARWW&S OU

Atlantic Richfield Company Response:

The only location where silt fence (or other BMPs) is currently anticipated to be required under this design is near the bridge abutments where the West Valley Railroad crosses Warm Springs Creek west of Anaconda (approximately station 189+60 as indicated on Sheet 6). The Drawings will be enhanced to show the proposed location of the silt fence and installation details. Atlantic Richfield Company is not aware of any other surface water or wetlands areas that exist in close proximity to the railroad bed requiring BMPs; however, if additional areas are identified during the course of construction, additional BMPs will be implemented as necessary.

Extensive drainage controls are not anticipated to be necessary as part of this design. Any need for minor drainage controls identified during the course of construction, will be implemented as part of standard grading procedures.

24. Agency Comment:

Page 14, Section 4.8 Erosion Control Delete the first sentence which reads "Due to the location and physical characteristics of the railroad beds involved with this RA, significant erosion control measures are not anticipated to be applicable." No supporting documentation or design analysis is provided to support this statement, and it appears to contradict the remedial requirements As discussed above, erosion control measures are intended to reduce the migration of underlying waste materials to residential areas, including surface and ground water. These controls will have to be field fit with adequate EPA and PRPs QA/QC Oversight

Atlantic Richfield Company Response:

The intended purpose this sentence was to indicate that extensive construction phase BMPs are not anticipated to be required as part of this design (with the exception of where the West Valley Railroad crosses Warm Springs Creek) due to a lack of surface water resources in close proximity to the project area and the flat nature of the railroad bed. The sentence will be eliminated or re-worded.

Additionally, as stated previously, installation of the proposed coarse aggregate and riprap covers represent standard engineering "hard armoring" practice used to reduce erosion potential of underlying materials.

25. Agency Comment:

Page 14, Section 4.8 Erosion Control, first paragraph, last sentence, revise to read "These measures will be incorporated to assure that erosion of waste materials will be minimized, "

Atlantic Richfield Company Response:

The sentence will be revised as requested.

26. Agency Comment:

Page 14, Section 4.8 Erosion Control, second paragraph, first sentence, revise to read ". migration of waste and silt off-site."

Atlantic Richfield Company Response:

The sentence will be revised as requested.

27. Agency Comment:

Page 16, Section 4.12 Historic Preservation. Add the following second bullet to A.:

2. *Coordinate the remedial action with the Anaconda-Deer Lodge County Historic Preservation Officer*

Atlantic Richfield Company Response:

Comment noted. The requested text will be added to Section 4.12.

28. Agency Comment:

Page 16, Section 4.13.1.1 Development Permit System Delete this section. It has no relevance to this remedial action. Railroads are Dedicated Developments; consequently, future development is forbidden. Replace with a section describing Dedicated Developments Refer to Section 6 of the attached May 2002 Agency Position Paper to complete this section. Note that a Dedicated Development Plan will be completed as part of the Railroad Operation and Maintenance Plan

Atlantic Richfield Company Response:

The Development Permit System has relevance to this remedial action, particularly to areas involving active lines requiring abandonment for implementation of remedial actions and future development.

29. Agency Comment:

Page 16 Add a new Section 4 15 Performance Monitoring, as follows

Section 4 15 Performance Monitoring

Unless determined to be unnecessary through a site conceptual model, ground water performance monitoring will likely be required for this action, since wastes are being left in place. In particular, the following performance monitoring will be required

- *Ground water monitoring will be required downgradient of the West Anaconda Yard, because (1) the yard is essentially flat and little will be done to promote runoff; (2) wastes are being left in place; and (3) there is a concern that furnace slag placed in direct contact with wastes may leach COCs in sufficient quantities to cause an exceedance of human health drinking water standards. This monitoring may be determined unnecessary if the site conceptual model demonstrates that percolation rates, COC loading, and natural attenuation processes are sufficient to protect the shallow ground water aquifer below the West Anaconda Yard.*

Final monitoring requirements, including the site conceptual models that provide the basis for determining those requirements, will be provided in the Long-Term Ground Water Management Plan

Atlantic Richfield Company Response:

The following language is suggested to be added to a new Section 4.15 Performance Monitoring "Unless determined to be unnecessary through a site conceptual model, ground water performance monitoring will likely be required for this action since wastes are being left in place Final monitoring requirements, including a site conceptual model that provides the basis of determining those requirements will be provided in the Long Term Ground Water Monitoring Plan, as necessary."

30. Agency Comment:

Page 18, Section 5.1 West Valley See previous comments to Section 4 1.

Atlantic Richfield Company Response:

See previous responses to comments to Section 4.1 (Agency Comment No. 13).

31. Agency Comment:

Page 19, Section 5.2 West Anaconda Yard At the end of the first paragraph after the last sentence ("The area is generally flat") add the following sentence. "EPA and DEQ have determined that the West Anaconda Yard is a Dedicated Development "

Atlantic Richfield Company Response:

Comment Noted. The requested text will be added to Section 5.2.

32. Agency Comment:

Page 20, Section 5.3 Anaconda Mainline, first complete paragraph, second sentence states. ". a barrier will be installed between the street or alley and the railroad bed. " The use of concrete Jersey barriers adjacent to roadways, alleys and parking areas should be reviewed by ADLC They are not very attractive and are generally not considered for permanent use. Also, the plans call for leaving several existing retaining walls in place. Some of these have deteriorated The stability of the existing walls should be evaluated, and if left in place, the monitoring and maintenance plan must address these specifically

Atlantic Richfield Company Response:

Although general perception is that Jersey barriers are for temporary use, Jersey barriers are normally utilized for permanent use, especially as barriers within and along transportation corridors. Jersey barrier specifications included in the design are consistent with MDT specifications and use. Adjacent to streets and/or alleys Jersey barriers will be placed on railroad property along the railroad Right-of-Way or along easement lines established through existing railroad agreements.

Atlantic Richfield Company has discussed the deteriorated wall along Front Street and will remove the wall and replace it with a barrier to prevent vehicular access adjacent to Front Street.

33. Agency Comment:

Page 19, Section 5.3.2 East Anaconda Yard. At the end of the first paragraph after the last sentence ("The area is generally flat") add the following sentence "EPA and DEQ have determined that the East Anaconda Yard is a Dedicated Development. "

Atlantic Richfield Company Response:

Comment Noted. The requested text will be added to Section 5.3.2.

34. Agency Comment:

Page 21, Section 5.4 Maintenance and Monitoring Procedures. Under the bulleted monitoring activities add "ground water monitoring".

Atlantic Richfield Company Response:

The statement "Ground water monitoring, if necessary" will be added.

35. Agency Comment:

A discussion must be included about replacing ballast between the ties as part of the regular maintenance operations. It is expected that eventually all contaminated ballast will be replaced by clean ballast in the course of routine maintenance.

Atlantic Richfield Company Response:

This is an Operation and Maintenance issue that is best addressed in the Operations and Maintenance Plan.

36. Agency Comment:

Page 21, Section 5.4 Maintenance and Monitoring Procedures, last paragraph. Delete the first sentence which reads "The FRA regulations meet or exceed the CERCLA maintenance and monitoring procedures required for active rail lines upon completion of RA construction activities." Replace with the following:

Maintenance and monitoring of the Active Railroad Beds is anticipated to be partly addressed by standard railroad operations. However, the entire Active Railroad Beds portion of this OU will be addressed by the Railroad Operation and Maintenance Plan, which includes the Dedicated Development Plan. Superfund maintenance and monitoring activities for the Active Railroad Beds will be similar to other properties having covers and storm water run on and run off control structures

The Railroad Operation and Maintenance Plan (Dedicated Development Plan) will also include a contingency plan in the event that the Active Railroad becomes abandoned. When the railroad is abandoned, either complete removal of waste materials and remediation of contaminated soils or construction of a new dedicated development, such as a trail, will be required. If a trail is developed when the Active Railroad is abandoned, the trail design must meet applicable remedial requirements and be approved by the Agencies

Atlantic Richfield Company Response:

The text has been removed as requested. The Operations and Maintenance text is more appropriately addressed in the Operations and Maintenance Plan.

A contingency plan is not necessary because Active Railroads have a dedicated use and their use and change in use is heavily regulated. No development can or will occur on a railroad bed without a significant regulatory process. In order to change the use of an Active Railroad bed, the owner would be required to petition the Surface Transportation Board (STB) to abandon the Right-of-Way. The EPA is required by the STB to review and comment on the railroad abandonment plan that must be provided by the developer/petitioner. In effect, a contingency plan is already in place due to the need to petition the STB prior to changing use of an active railroad Right-of-Way.

37. Agency Comment:

Page 22, Section 5 4 Maintenance and Monitoring Procedures, first paragraph, second to last sentence. Revise as follows "Therefore, railroads are a dedicated use subject to adjacent land use designation ~~an open space/recreational clean up standards~~

Atlantic Richfield Company Response:

Comment noted. The revision will be made as requested.

38. Agency Comment:

Page 22, Section 7 0 Remedial Action Schedule. Please provide a schedule Based on technical discussion between the Agencies and ARCo, it was mentioned that the remedial action may take up to ten years to complete. Although the Agencies support using local workers (i.e , Rarus) to complete the action, a ten year time frame is unacceptable. The Agencies suggest a 3 - 5 year time frame be developed with Rarus

Atlantic Richfield Company Response:

Section 7.0 Remedial Action Schedule, will be modified to indicate that RA associated with the Anaconda Mainline will be completed within a 3 to 5 year time frame, and the East and West Yards will be completed within 10 years of issuance of an Order. Additionally, text will be included indicating removal of the West Valley railroad bed will commence as soon as reasonably possible after abandonment proceedings are complete.

39. Agency Comment:

Page 23, Section 8.0 References Delete reference to the Anaconda Granulated Slag Pile Position Paper Supporting a No Action Record of Decision. Add reference to the May 2002 Agency Position Paper.

Atlantic Richfield Company Response:

See previous response to Agency Comment No. 17.

End of Comments.

**ANACONDA SMELTER NPL SITE
ANACONDA REGIONAL WATER, WASTE & SOILS
OPERABLE UNIT**

Final

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Butte, Montana 59702**

September 19, 2003

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1.0 INTRODUCTION

This Remedial Action Work Plan/Final Design Report (RAWP/FDR) for Remedial Design Unit (RDU) 5 of the Anaconda Regional Water, Waste, & Soils (ARWW&S) Operable Unit (OU) outlines the remedial actions (RAs) applicable to Active Railroad beds within and near the community of Anaconda, Montana, within the ARWW&S OU. Remedial Design Unit 5 includes two separate designs for addressing railroad beds: 1) original ARWW&S OU RDU 5, including Active Railroad beds from where the railroad bed leaves the Streamside Tailings Operable Unit (SSTOU) near Durrant Canyon west to the East Anaconda Yard (addressed under a separate RAWP/FDR - refer to the *Draft Final Remedial Design Unit [RDU] 5 Active Railroads/Blue Lagoon Remedial Action Work Plan/Final Design Report [RAWP/FDR]* [Atlantic Richfield Company, 2003]); and 2) Active Railroad beds within and near the community of Anaconda, from the East Anaconda Yard extending west to where the railroad bed intersects North Cable Road west of Anaconda (formerly categorized within the Community Soils [CS] OU). As agreed upon between Atlantic Richfield Company (Atlantic Richfield) and the Agencies (U.S. Environmental Protection Agency [EPA] and Montana Department of Environmental Quality [DEQ]) under the CS OU Unilateral Administrative Order (UAO) for residential yards, the CS OU railroad beds were moved from the CS OU to the ARWW&S OU. Figure 7 outlines the historic and abandoned railroad beds still within the CS OU and the Active Railroad beds transferred to the ARWW&S OU.

Railroad beds to be addressed under this RAWP/FDR are shown on Figures 1 through 6. Figure 7 is a breakdown of the various railroad beds located within the Anaconda Smelter National Priorities List (NPL) Site. Figure 7 indicates which railroad beds fall under each OU and associated RDUs. This RAWP/FDR is being prepared by Atlantic Richfield for the Potentially Responsible Party (PRP) Group.

In general, railroads within the ARWW&S OU can be divided into the following three categories:

1. **Active Railroad - Open Space/Recreational/Agricultural Land Use.** The portion of the RARUS Railway (RARUS) railroad that extends from the location where the railroad leaves the SSTOU of the Butte-Silver Bow Creek NPL Site to the location it enters the Anaconda city limits at the East Anaconda Yard as shown on Figure 4 and Exhibit 1 of the CS OU *Record of Decision* (ROD) (EPA, 1996). This line is generally located in a relatively undeveloped setting.
2. **Anaconda Active Railroad - Residential, Commercial/Industrial, and Open Space Land Use.** The portion of the RARUS railroad that extends from the Anaconda city limits at the East Anaconda Yard westward to the West Anaconda Yard and includes the Brown Spur, a 4.7-mile segment that leads from the West Anaconda Yard to the Lime Quarry west of Anaconda (Exhibit 1 and Figure 4 of the CS OU ROD [EPA, 1996]). These lines are generally located within or in close proximity to residential areas.
3. **Abandoned Railroads** - Abandoned railroad beds have been identified within the community of Anaconda and throughout the ARWW&S OU - RDU 3 (Smelter Hill

Uplands), RDU 6 (South Opportunity), RDU 9 (Fluvial Tailings), RDU 13 (Old Works) and RDU 14 (Smelter Hill Facilities Area). While several of these railroad beds have been completely or partially remediated during previous response actions, many of them have not been addressed, but will be addressed under the individual RDU designs.

1.1 Purpose and Scope

The purpose of this RAWP/FDR is to present the RAs, including Construction Drawings (Appendix A of this RAWP/FDR) and Technical Specifications (Appendix B), for the major elements of work to be implemented under the RA. This RAWP/FDR has been developed under the oversight of the EPA Region VIII in consultation with DEQ and is an extension of the design analyses previously presented and discussed by the EPA/DEQ/Atlantic Richfield/RARUS in design and response to comments meetings.

The goal of the work described in this RAWP/FDR is to implement the remedy (described in the following subsections) applicable to Anaconda Active Railroad beds within RDU 5 located within and near Anaconda, and to provide for appropriate protection of human health and the environment in a manner consistent with the ARWW&S OU *Record of Decision* (ROD) (EPA, 1998) and the UAO. This RAWP/FDR also identifies the Performance Standards (see Section 2.0), which will be met by the various components of the remedy.

The designs described herein address the following specific elements of work for the site:

- Excavation and disposal of specified railroad bed materials, installation of aggregate covers, and other remedial measures for specified waste materials requiring RA within the OU;
- Preservation of historic features;
- Construction of storm water engineered controls and Best Management Practices (BMPs), where necessary,
- Monitoring of ground water quality where wastes are left in-place, as appropriate;
- Mitigation of environmental impacts during construction of the remedy; and
- Institutional Controls (ICs) for the site.

1.2 Description of the Selected Response Action for Railroad Beds

This section of the RAWP/FDR summarizes the selected response action presented in the CS OU ROD (EPA, 1996) as modified by discussions between the EPA and PRPs for railroad beds located near residential and commercial/industrial areas. The EPA's selected remedy for these railroad beds will reduce risk to human health through the following:

- Reduction of surface soil arsenic concentrations to acceptable levels; and
- Prevention of direct human contact with waste materials (i.e., railroad beds).

As stated in the CS OU ROD (EPA, 1996): *"The selected remedy will address contaminated railroad beds within the Community of Anaconda through the following*

1. *Construct an engineered cover over all contaminated railroad bed material within the community of Anaconda to prevent direct contact with, and reduce potential for erosion and transport of, contaminated materials to residential areas*
 - *Utilize large rock on portions of the railroad bed that have steeper fill slopes*
 - *Utilize clean ballast material on portions of the railroad bed strictly used for railroad operation.*
2. *Separate the existing boundary of the railbed from residential areas with a barrier to restrict access to the railbed and to control surface runoff from the railbed through the use of retaining walls and/or curbing*
3. *Maintain existing ICs to restrict access (i.e., governmental and private trespass regulations)*
4. *Institute operation and maintenance activities as necessary "*

The selected remedy for railroad bed materials, identified in the CS OU ROD (EPA, 1996), was only intended to address active lines through the community of Anaconda. The remedy generally requires that an Engineered Cover be constructed over the waste materials to prevent direct contact, and to reduce erosion and transport of contaminants to residential areas. Abandoned and historic railroad bed materials have been identified in the community and have been included in this project. The EPA has determined that these materials will be addressed as miscellaneous wastes in accordance with the selected remedy identified in the ARWW&S OU ROD (EPA, 1998). The ARWW&S OU remedy generally requires that miscellaneous waste materials located outside of the designated Waste Management Areas (WMAs) be removed and consolidated to a WMA.

The ARWW&S OU ROD (EPA, 1998) also acknowledged the use of dedicated developments as follows:

"Dedicated development is the construction of improvements on the land and the dedication of that improved land for a dedicated use. A dedicated development may include restrictions on the property in the form of restrictive covenants, negative easements, or other mechanisms that restrict the use of the property to accomplish a specific purpose. Examples include parks, trails, golf course, airport, railroad, motor raceways, etc. Land dedicated to a public entity has a high likelihood of maintaining the permanence of ICs."

Dedicated developments for public use have previously been established within the Anaconda Smelter NPL Site as part of the selected remedy for the Old Works/East Anaconda Development Area (OW/EADA) OU. These developments include the Old Works Golf Course and trail system. The Active Railroad lines within the Anaconda Smelter NPL Site have been determined by the EPA to be dedicated developments.

1.3 Description of Remedial Action Objectives

The primary objective of the RA for railroad beds is to prevent direct contact with, and reduce the potential for erosion and transport of railroad bed materials. Surficial concentrations of arsenic for the RDU 5 Anaconda Active Railroad beds generally exceed 1,000 milligrams per kilogram (mg/kg). Due to railroad bed materials being located in close proximity to residential, commercial/industrial, and open space/recreational areas, these action levels (residential, commercial/industrial, and open space/recreational) have been applied, as appropriate. Where the selected remedy is implemented, the clean up level at the surface will be achieved through the use of Engineered Covers. Arsenic action levels are based primarily on land use designation and media. These arsenic action levels apply to soil and wastes, including railroad beds. Arsenic action levels within the ARWW&S OU are as follows:

<u>Land Use Designation</u>	<u>Media</u>	<u>Concentration</u>	<u>Risk</u>
Residential	Soil and Waste	250 mg/kg	8E-05
Commercial/Industrial	Soil and Waste	500 mg/kg	4E-05
Recreational	Soil and Waste	1,000 mg/kg	1E-04
Agricultural	Soil Only	1,000 mg/kg	1E-04
Steep Slope/Open Space	Soil Only	2,500 mg/kg	1E-05

1.4 Background

1.4.1 Previous Data Collection/Evaluation Activities

1.4.1.1 Remedial Investigation/Feasibility Study Railroad Sampling Effort

Analytical data from previous site investigations throughout the ARWW&S OU and CS OU include results of more than 1,000 samples collected at locations covering an area of approximately 300 square miles (mi²). The magnitude and extent of arsenic, cadmium, copper, lead, and zinc concentrations in railroad beds were summarized during the Remedial Investigation/Feasibility Study (RI/FS) by compiling the available analytical data into a database for the Anaconda railroads.

Kriging exercises were conducted for surficial soil concentrations of arsenic, cadmium, copper, lead, and zinc in the community of Anaconda and regional area of the CS OU. However, kriging exercises were not conducted for railroad beds because the elevated metals concentrations present in railroad beds are believed to be the result of importation of contaminated materials during railroad bed construction, rather than aerial deposition of contaminants from the smelter. The Anaconda railroad beds database, compiled during the RI/FS, originally contained the analytical results of 29 samples collected from the 0 to 2-inch depth interval. The samples were collected from the bed of the main railroad line through the community of Anaconda (West Anaconda Yard, Anaconda Mainline, and East Anaconda Yard). A statistical summary of the surficial (0 to 2-inch depth) concentrations of arsenic, cadmium, copper, lead, and zinc is provided on Table 1.

1.4.1.2 Remedial Design Railroad Sampling Effort

Ninety-seven composite and discrete surface soil samples and 6 field duplicates were collected from 87 locations within various railroad areas during the Remedial Design (RD) sampling effort, conducted during the fall of 1997 and spring of 1998. Samples were collected from the 0 to 2-inch depth interval after the removal of any vegetative cover, ballast, or gravel. Samples were collected from active and historic railroad beds, as well as areas adjacent to Active Railroad beds. Analytical results for railroad bed soil samples collected during the RD sampling effort are presented in the *Anaconda Smelter NPL Site Community Soils Operable Unit, Anaconda Residential Soils and Railroad Areas – Remedial Design Data Summary Report* (AERL, 1999a). The results are summarized on Figures 1 through 6 of this RAWP/FDR, and are briefly discussed in the following sections. Complete analytical results, including sample site coordinates, are presented in Appendix E of the *Anaconda Residential Soils, Regional Soils, and Railroad Areas, Data Interpretive Report* (AERL, 1999b).

1.4.1.2.1 West Valley Railroad Bed

The West Valley portion of the railroad within RDU 5 extends from North Cable Road east to the railroad intersection on Pennsylvania Avenue (see Figures 2 and 3). Arsenic concentrations in these beds generally exceeded 1,000 mg/kg in surface samples collected during the RD sampling effort (1997/1998); results are shown on Figures 2 and 3. Deeper samples were collected along the West Valley Railroad Bed in August 2003; these results are shown on Figures 10 and 11. In general, the upper 1 to 2 feet of embankment materials used to construct the railroad bed exceed 1,000 mg/kg arsenic; however, the results indicate that the underlying native soils have not been impacted (see Figures 10 and 11). The West Valley portion of the railroad will be addressed during the RDU 5 Anaconda Active Railroad Beds RA.

1.4.1.2.2 Anaconda Mainline Railroad Bed

The majority of the mainline portion of the railroad within RDU 5 extends from the West Anaconda Yard to the East Anaconda Yard (Figures 4, 5, and 6). An additional segment categorized within the Anaconda Mainline includes a relatively short length of railroad bed extending west from the West Anaconda Yard to its intersection with Pennsylvania Avenue near the Hope Lutheran Church (Figure 3). Soil sampling was not conducted within the mainline section of the railroad (between the West Anaconda Yard and the East Anaconda Yard) during the RD sampling effort because this area had been adequately characterized during the RI. Arsenic concentrations for samples collected during the RI were generally above 1,000 mg/kg along the Anaconda Mainline portion of the railroad, results are shown on Figures 4, 5 and 6 (CTAR sample I.D. prefix).

1.4.1.2.2.1 AFFCO Spur

A short railroad spur (AFFCO Spur) branches off the Anaconda Mainline at the west end of the East Anaconda Yard (see Figure 8), this spur was not sampled during the RI, but RD sampling was conducted in January 2003. Arsenic concentrations within the AFFCO Spur are above 1,000 mg/kg; results are shown on Figure 8. This spur is considered part of the Anaconda Mainline.

The Anaconda Mainline portion of the railroad (including the AFFCO Spur) will be addressed during the RDU 5 Anaconda Active Railroad Beds RA.

1.4.1.2.3 Railroad Yards

The Active Railroad yards within RDU 5 include the West Anaconda Yard (Figure 4) and the East Anaconda Yard (Figure 6). Soil sampling conducted during the RD sampling effort confirmed previous RI/FS sampling results, which found that railroad yard soils exhibited arsenic concentrations exceeding 500 mg/kg. The Active Railroad yards will be addressed during the RDU 5 Railroad Beds RA.

1.4.1.2.4 Summary of the Remedial Design Railroad Bed Sampling Effort

Soil sampling results from Active Railroad beds and yards (compiled during the 1997/1998 RD sampling effort) are consistent with historical data, indicating that arsenic concentrations in these areas are generally above action levels. The 1997/1998 RD sampling effort met the overall objectives of the statement of work and the Sampling and Analysis Plan (SAP) to identify those areas that exceed action levels and require RA to provide adequate protection of human health and the environment. The RD sampling was completed under an Agency-approved SAP, which called for surficial (0 to 2-inch depth) sampling of all types of railroad area soils. Surface soil samples were collected based on the selected remedy, as stated in the CS OU ROD (EPA, 1996). The selected ROD remedy for railroad soils in the Anaconda community includes application of an Engineered Cover. Based on this selection, the approved railroad SAP focused on surface sampling only since areas exceeding land use action levels would be capped. Capping, as determined in the ROD, is an adequate RA for the protection of human health and the environment in these areas.

Generally, the 18-inch vegetated cover criterion has been used in the past for RA activities at the Anaconda Smelter NPL Site for establishing vegetative cover. However, railroad regulations on Active Railroad lines require a relative absence of vegetation, and the railroad owners are adverse to vegetation and the associated maintenance; therefore, unvegetated capping, consistent with the end land use, will be considered as the main component of the RD.

2.0 PERFORMANCE STANDARDS

As established in the CS OU ROD (EPA, 1996) and ARWW&S OU *Remedial Design Work Plan* (RDWP) (CDM, 2000), Table 2 presents the RDU 5 Anaconda Active Railroads site-specific performance standards.

3.0 PROJECT MANAGEMENT AND COMMUNICATIONS

The organizational chart and chain of communication for the RDU 5 Anaconda Active Railroad Beds RA is shown on Figure 9. The purpose of this section of the RAWP/FDR is to provide guidance to efficiently manage the RA, including defining lines of authority, communication,

project coordination, project meetings and submittal requirements. The roles and responsibilities of the organizations involved in the RA are described in Section 3.1.

3.1 Lines of Authority, Communication and Coordination

The organizations that will be involved in the RA include the following:

- EPA Region VIII;
- DEQ;
- Atlantic Richfield;
- RARUS;
- Burlington Northern Santa Fe (BNSF);
- Construction Manager (PRPs);
- Quality Assurance/Quality Control (QA/QC) Oversight Engineer; and
- Construction Contractor.

The EPA will have the authority for final approval of the RA based on their field observations and review of the construction QA/QC results. The project Construction Quality Assurance Plan (CQAP) is presented in Appendix C. The PRPs will periodically provide QA/QC results and other information to the Agencies to keep them informed of the progress of the RA. The Agencies will also be responsible for reviewing project schedules and submittals provided to them by the PRPs. The EPA will address all communications to the PRPs or to the designated PRPs project representative.

PRPs, or their project representative, will be responsible for providing construction management and verifying that the RA complies with the performance standards set forth in the ROD (EPA, 1996) and the UAO (see Section 2.0 of this RAWP/FDR). The PRPs will manage the project to focus on attaining the objectives listed in Section 1.3. The PRPs and EPA will coordinate to provide all project-related communications to Federal, State and local agencies, the public, and all other involved or interested parties. Remedial action activities will be coordinated by the PRPs to adhere to the milestone dates listed in the RA schedule.

The QA/QC Oversight Engineer will report directly to the PRPs and will provide the PRPs with technical assistance on the project by performing QA/QC oversight of the Construction Contractor's work. The QA/QC Oversight Engineer will evaluate the Contractor's compliance with this plan, and applicable site performance standards. Any deviations from this work plan will require the approval of the PRPs and EPA.

The Contractor will be responsible for performing the designated activities associated with the RA in accordance with this plan and other applicable documents. The Contractor will be responsible for communicating directly with the PRP project representative and/or QA/QC Oversight Engineer on all issues and concerns. The Contractor will be responsible for scheduling the project activities with its Subcontractors to complete certain work tasks by the associated milestone dates. The Contractor will designate a primary contact person as the Contractor's site representative. This person will have full authority to make all necessary field decisions and to direct the work.

The Design Engineer will report directly to the PRPs and will provide technical assistance throughout the duration of the project. The Design Engineer will verify the Contractor's compliance with the Construction Drawings (Appendix A) and Technical Specifications (Appendix B).

3.2 Project Meetings

A pre-construction conference involving representatives from Atlantic Richfield, RARUS, BNSF, DEQ, EPA, QA/QC Oversight Engineer, Design Engineer (as necessary), and the Contractor will be scheduled before initiating any work at the site. The purpose of the pre-construction meeting is to assure that all parties understand their respective responsibilities and the procedures that will be used to assure efficient completion of the work. The meeting will discuss scheduling (including critical milestone dates), submittal procedures, record keeping, use of premises, site security, health and safety procedures, and material and equipment delivery and storage procedures. . In addition to a pre-construction conference, an annual kick-off meeting will be scheduled involving representatives from Atlantic Richfield, RARUS, BNSF, DEQ, EPA, QA/QC Oversight Engineer, Design Engineer (as necessary), and the Contractor to discuss the anticipated RA for the upcoming year.

Progress meetings involving representatives from Atlantic Richfield, RARUS, BNSF, DEQ, EPA, QA/QC Oversight Engineer, Design Engineer (as necessary), and the Contractor's site representative will be held weekly at the job site. The progress meeting agenda's will include, at a minimum, the status of work items initiated to-date, scheduled work items for the following week, problems encountered and proposed solutions, and any health and safety or historical issues that have arisen in the past week or issues that are pertinent to the work scheduled for the following week.

4.0 DESIGN OF PROJECT COMPONENTS

The various areas associated with railroad beds that will receive RA under the RDU 5 Anaconda Active Railroad Beds RAWP/FDR have been divided into three distinct categories, based on the types of RA to be implemented. The three categories include the following: 1) West Valley; 2) Anaconda Mainline; and 3) Railroad Yards.

4.1 West Valley

The general design applicable to the West Valley Railroad Bed includes complete removal of the rails, ties and railroad bed materials including railroad bed materials beneath asphalt and dirt/gravel street crossings and access road spurs leading to residential driveways. At these crossings, the asphalt or dirt/gravel road surface materials, miscellaneous timbers, rails, ties, and underlying bed materials will be removed and disposed at the Opportunity Ponds WMA. Existing asphalt crossings will be replaced with crushed base course and asphalt per the Construction Drawings (Appendix A) and Technical Specifications (Appendix B), and existing dirt/gravel crossings will be replaced with crushed top surfacing material per the Construction Drawings and Technical Specifications. Where the West Valley Railroad Bed crosses Warm Springs Creek (approximately 0.3 mile west of Anaconda) via a small trestle, the rails, ties and bed material will be removed up to the edge of the trestle, not disturbing the trestle. BMPs will

be installed in this area prior to construction to prevent sedimentation and runoff from entering the creek.

The West Valley Railroad Bed primarily consists of waste rock and ballast approximately 1.5 feet in depth, on average. In addition to removal of the railroad bed, railroad bed materials adjacent to the railroad bed will be excavated to the existing vegetation line. Excavation of the waste materials will be based on visual inspection; sample data indicates that removal is required to the original ground interface; the underlying embankment soils are easily distinguishable from the railroad bed materials. The excavated materials will be hauled to the Opportunity Ponds WMA for disposal in such a manner to minimize the spillage and leakage of waste materials during transportation activities consistent with SSTOU Parcel 152 transportation activities.

Per agreement with the Montana Department of Transportation (MDT), the Agencies, and Anaconda-Deer Lodge County (ADLC), the excavated footprint resulting from the West Valley Railroad Bed RA will be rough graded to provide positive drainage and to eliminate voids/holes caused by the excavation activities and to eliminate overly steep slopes (maximum regraded slope steepness of approximately 3H:1V). The excavated and graded footprint will be left without further enhancement. Future enhancement for development as a trail, transportation and/or utility corridor within the current Right-of-Way will be addressed by MDT and/or ADLC. Prior to implementation of future construction activities on the West Valley Railroad Bed, approval will be required by the Surface Transportation Board (STB) through an abandonment procedure of the railroad bed. The PRPs will petition the STB for abandonment with concurrence from the EPA, DEQ, MDT, and ADLC.

4.2 Anaconda Mainline

In general, the Anaconda Mainline will be subject to cutting/excavating existing ballast located outside of the ties to a depth of six inches below the tops of the ties, and extending the excavation laterally approximately three feet beyond both ends of the ties. To maintain positive drainage and to avoid creating a topographic low adjacent to the railroad bed, the excavation will extend laterally in both directions at a minimum 0.5% slope to daylight on the shoulder of the railroad bed, as applicable. The excavated materials will be disposed of on the railroad bed (if adequate space is available) or hauled off-site and disposed in the designated disposal area (Opportunity Ponds WMA). The excavated ballast will be replaced with new ballast. Exposed railroad bed materials located outside of the three-foot dimension will be capped with ballast or coarse aggregate at a minimum depth of six inches to the existing vegetation line (where applicable) or toe of the slope.

To prohibit vehicular traffic from traveling or parking on the installed cap in these areas, a barrier will be installed between the street or alley and the railroad bed as shown on Detail 16, Sheet 24 of the Construction Drawings (Appendix A). Locations where the barrier will be installed along the Anaconda Mainline are shown on Sheets 11, 12, 13 and 14. In certain flat areas where the railroad bed is in close proximity to streets or alleys, a wooden post and rail fence will be installed. Locations for fence installation are shown on Sheets 12, 14 and 17; fence details are shown on Sheet 30.

4.2.1 AFFCO Spur

The AFFCO Spur branches off the Anaconda Mainline at the west end of the East Anaconda Yard and travels approximately 1,000 feet west to where it passes into the AFFCO Foundry yard under a chain-link fence. Inside the fence enclosure, the railroad bed is either removed or covered with soil. The spur outside the fence enclosure was sampled (with Agency oversight) in January 2003; results are included on Figure 8. The RA for this particular spur includes complete removal of the western half (approximately) of the spur, and capping of the eastern half (active line) consistent with the Anaconda Mainline. The rails and ties associated with the western half of the spur will be removed, and the railroad embankment materials (wastes/ballast) will be excavated to a depth corresponding with the underlying native soil. The excavated materials will be hauled to the Opportunity Ponds WMA for disposal. Excavation of the waste materials will be based on visual inspection. Based on recent sampling work conducted for the West Valley Railroad Bed, the underlying native soils are easily distinguishable from the waste materials. The excavated footprint associated with the west half of the AFFCO Spur will be ripped (bringing the native soils to a friable condition), graded and revegetated (fertilized, seeded and mulched).

The eastern half of the AFFCO Spur will be subject to cutting/excavating existing ballast located outside of the ties to a depth of six inches below the tops of the ties, and extending the excavation laterally approximately three feet beyond both ends of the ties. To maintain positive drainage and to avoid creating a topographic low adjacent to the railroad bed, the excavation will extend laterally in both directions at a minimum 0.5% slope to daylight on the shoulder of the railroad bed. The excavated material will be hauled off-site and disposed in the designated disposal area (Opportunity Ponds WMA). The excavated ballast will be replaced with clean ballast, and exposed railroad bed materials located outside of the three-foot dimension will be capped with ballast or coarse aggregate at a minimum depth of six inches to the existing vegetation line (where applicable) or toe of the slope to prevent/minimize vegetation.

4.3 Railroad Yards

The RA for the railroad yards will consist of cutting/excavating existing ballast located outside of the ties to a depth of six inches below the tops of the ties and extending the excavation laterally approximately three feet beyond the ends of the ties. The excavated material will be disposed in the designated disposal area (Opportunity Ponds WMA). The excavated ballast will be replaced with clean Size No. 5 ballast (furnace slag) meeting gradation specifications. Exposed railroad bed materials located between adjacent ballast sections will be capped with granular borrow or ballast at a minimum depth of six inches.

4.4 Engineered Covers/Surface Capping

Surface capping refers to the placement of a layer of uncontaminated media over areas where action levels are exceeded. Adequate surface capping minimizes direct contact by humans and inhibits generation of fugitive dust potentially containing elevated metals concentrations. The minimum design criteria for Engineered Covers applicable to RDU 5 railroad beds RA include the following: installation of a minimum of six inches of select materials that will provide a

permanent barrier to the waste materials for human health protection; promote surface flow without erosion; reduce infiltration; and provide a wearing surface durable for the operation of the anticipated rail service.

For the purpose of the RDU 5 Anaconda Active Railroad Beds RA, the term “surface cap” refers to engineered placement of uncontaminated media. The cap surface is usually sloped, as applicable, to promote positive drainage. Properly designed and constructed aggregate covers will be used in areas where vegetation is undesirable due to the land use. Sheets 9 through 24 in the Construction Drawings (Appendix A) show the typical cross-sections associated with each type of capping activity to be implemented for the RDU 5 Anaconda Active Railroad Beds RA. Per the Construction Drawings (Appendix A) and Technical Specifications (Appendix B), riprap will be placed on railroad bed side slopes steeper than 4H:1V. On railroad bed side slopes flatter than 4H:1V, ballast or Type 1 Aggregate will be placed as the cover over the side slopes.

4.4.1 Ballast Covers

Clean railroad ballast materials, meeting specific gradation requirements, will be installed along Active Railroad beds in areas where existing ballast is specified to be removed. In general, materials meeting railroad ballast specifications will only be installed along the crest of the railroad bed in close proximity to the active track, approximately three feet beyond the ends of the ties.

American Railway Engineering Association (AREA) Size No. 24 ballast (2½ to ¾-inch graded material) or alternate ballast material approved by RARUS will be installed along the Anaconda Mainline section of the railroad. American Railway Engineering Association Size No. 5 ballast (1 to ¾-inch graded material) will be installed in the West Anaconda Yard and East Anaconda Yard areas due to the slower train speeds typically encountered in yard areas. Each type of ballast will be placed at a minimum depth of six inches, corresponding to the elevation of the top of the ties. The Size No. 24 ballast will consist of crushed stone with the following gradation requirements:

**American Railway Engineering Association
Crushed Stone, Size No. 24 Ballast (2½” to ¾”)**

<u>Sieve Size</u>	<u>Percentage (by weight) Passing Square Mesh Sieves</u>
3”	100
2½”	90 - 100
1½”	25 - 60
¾”	0 - 10
½”	0 - 5

The Size No. 5 ballast will consist of furnace slag, obtained from the Smelter Hill area, with the following gradation requirements:

**American Railway Engineering Association
Crushed Stone, Size No. 5 Ballast (1" to 3/8")**

<u>Sieve Size</u>	<u>Percentage (by weight) Passing Square Mesh Sieves</u>
1 1/2"	100
1"	90 - 100
3/4"	40 - 75
1/2"	15 - 35
3/8"	0 - 15
No. 4	0 - 5

The Smelter Hill coarse furnace slag stockpile was sampled and analyzed in 1997 to investigate its suitability as railroad ballast (physical properties). The testing indicated that the slag material met all specifications except for gradation (see Appendix D of this RAWP/FDR); however, gradation specifications could be met through screening. The furnace slag stockpile was sampled again in 2002 to characterize its chemical properties, analyses included: Total Metals, Toxicity Characteristic Leaching Procedure (TCLP) Metals; Synthetic Precipitation Leaching Procedure (SPLP) Metals; pH; and Conductivity. Furnace slag data are presented in Appendix D of this RAWP/FDR.

The furnace slag material currently stored on Smelter Hill meets railroad ballast specifications and passes TCLP criteria; additionally, the ROD (EPA, 1996) allows the use of such material as a product. Moreover, the AREA indicates "*... a variety of materials may be processed into railroad ballast, however, quarried stone or slags generally are the most desirable when produced in a crushing-screening plant...*". AREA specifications further indicate that "*.. Processed ballast shall be crushed stone, crushed air-cooled blast furnace slag, crushed steel furnace slag, or crushed smelter slag, composed of hard, strong and durable particles, free from injurious amounts of deleterious substances...*". Available physical and chemical data indicate that the slag poses no risk to human health and the environment, as indicated in the *Anaconda Granulated Slag Pile Position Paper Supporting a No-Action Record of Decision* (ARCO, 1994). For the reasons listed above, the furnace slag material currently stored on Smelter Hill is proposed for use as Size No. 5 ballast (applicable to railroad yards only) as part of this RA.

4.4.1 . Coarse Aggregate Covers

Installation of coarse aggregate covers, including riprap, satisfy the design criteria applicable to RDU 5 Anaconda Active Railroad beds RA, including the following: installation of a minimum of six inches of a select material that will provide a permanent barrier to the waste materials for human health protection; promote surface flow without erosion; reduce infiltration; and provide a wearing surface durable for the operation of the anticipated rail service.

4.4.1.1 Type 1 Aggregate Cover

Type 1 Aggregate covers will be used as surface cap materials for flat areas associated with railroad beds including side slopes flatter than 4H:1V. Type 1 Aggregate materials will be relatively free of “fines” to inhibit growth of unwanted vegetation along the railroad beds, and will be installed at a minimum compacted depth of six inches. Type 1 Aggregate will consist of material with the following gradation requirements:

Type 1 Aggregate

<u>Sieve Size</u>	<u>Percentage (by weight) Passing Square Mesh Sieves</u>
3”	100
¾”	0 – 15

4.4.1.2 Riprap Cover

Specified railroad bed side slopes with final slopes steeper than 4H:1V (typically applicable to the eastern portion of the Anaconda Mainline as shown on the Construction Drawings [Appendix A]) will be covered with a coarse 4 to 8-inch D_{50} riprap. Riprap materials will be relatively free of “fines” to inhibit growth of unwanted vegetation along the railroad beds, and will be installed at a minimum depth of six inches. The existing side slopes associated with the railroad bed are very short in length (i.e., maximum slope length of approximately 15 feet in places along the Anaconda Mainline); are not excessively steep; and are currently quite stable. Some minor erosion rills are evident in places along the railroad bed side slopes. Installation of riprap on these side slopes is a standard engineering “hard armoring” practice used to reduce erosion of the underlying waste materials.

4.4.1.3 Granular Borrow Cover

Granular borrow covers may be used to construct surface caps on flat storage areas (primarily in Active Railroad yards). Granular borrow will be placed a minimum of 6 inches deep, and will consist of 3-inch minus pit run material.

4.5 Excavation and Disposal

Excavation of the West Valley Railroad Bed and the AFFCO Spur railroad bed materials will involve removal of the upper railroad bed embankment to a depth of approximately 1.5 feet (on average); additionally, railroad bed materials located adjacent to the railroad bed will be excavated to the existing vegetation line. Excavation of the waste materials will be based on the following: visual inspection; sample data indicates that removal is required to the original ground interface; and the underlying embankment materials constructed of natural soils are easily distinguishable from the railroad bed materials. The excavated materials will be hauled to the Opportunity Ponds WMA for disposal.

On Active Railroad beds and in railroad yards, excavation will be completed to a minimum depth of six inches below the top of the ties. Fugitive dust control measures, such as pre-soaking the soil, may be required during certain excavation activities. Excavation typically is used where site-specific conditions require localized soil removal to install a cap properly. For most of the Active Railroad beds within RDU 5 receiving RA, excavated material will be consolidated and graded on to the existing railroad bed side slopes or within existing surface depressions within the railroad bed footprint (i.e., within the sub-ballast embankment as shown on the Construction Drawings [Appendix A]). However, in some areas on Active Railroad beds within RDU 5 (i.e., where adequate space is not available to consolidate excavated materials within the existing non-vegetated footprint of the railroad bed) the excavated materials are specified for disposal in the designated disposal area (Opportunity Ponds WMA). Additionally, other materials may need to be completely excavated and disposed off-site as dictated by site-specific conditions. Precautions will be implemented, as necessary, to minimize fugitive dust emissions during excavation and transportation activities.

4.6 Borrow Areas

Borrow materials will be required under this RA to provide railroad ballast materials and coarse aggregates to implement the RA as designed. Materials sources are briefly described in the following sections.

4.6.1 Furnace Slag

Furnace slag will be used to replace excavated railroad ballast in railroad yard areas under this RA. An adequate supply of furnace slag material is available west of Smelter Hill (see Sheet 33 of the Construction Drawings provided in Appendix A). The furnace slag material will be monitored in accordance with the procedures described in the CQAP for the project (see Appendix C) to assure that it meets AREA Size No. 5 ballast gradation specifications or owner approval. QA/QC monitoring of the materials may not be required if the owner (RARUS) approves of the material as ballast.

4.6.2 Railroad Ballast/Aggregates

AREA Size No. 24 ballast (or alternate ballast approved by RARUS), Type 1 Aggregate, riprap, crushed base course, top surfacing material and granular borrow materials to be utilized during this RA will likely be acquired from a local sand and gravel or concrete supplier, at the discretion of the Contractor. The aggregate materials will be monitored in accordance with the procedures described in the CQAP for the project (see Appendix C) to assure that they meet associated gradation specifications. QA/QC monitoring of ballast materials may not be required if the owner (RARUS) approves of the material. Refer to Technical Specifications (Appendix B) Subsection 820 for aggregate materials specifications.

4.7 Disposal Area

Most of the contaminated materials that are excavated as a result of the RDU 5 Anaconda Active Railroad Beds RA will be redistributed/graded on to the adjacent railroad bed (within the

existing non-vegetated footprint of the railroad bed), followed by capping activities. However, materials that are removed due to inadequate space availability and cannot be disposed on the adjacent railroad bed will be hauled and disposed of at the Opportunity Ponds WMA.

4.8 Storm Water Controls

Due to the flat nature of railroad beds, significant storm water control measures are not anticipated to be applicable to this RA. However, where necessary, specific drainage controls will incorporate the natural topography of the site as well as additional engineering controls, as necessary. Actions will be taken, where required, to re-route or control run-on and/or runoff. Construction BMPs will be implemented where the West Valley Railroad Bed crosses Warm Springs Creek to prevent sedimentation and runoff from entering into the creek. Although not currently anticipated to be necessary, ditches may be field engineered and constructed using excavation/embankment, riprap, vegetation, geotextiles, or using any combination of these materials depending on site-specific conditions.

4.9 Erosion Control

Due to the location and physical characteristics of most of the railroad beds involved with this RA (flat areas, which generally are not in close proximity to surface water resources), significant temporary erosion control measures (BMPs) are not anticipated to be necessary during the construction phase of this RA. All proposed Engineered Covers consist of coarse aggregate materials and riprap, and minimal revegetation activities are anticipated. Installation of the proposed coarse aggregate and riprap covers represent standard engineering "hard armoring" practice used to reduce erosion of underlying materials, which is a primary objective and design requirement of this RA.

Appropriate soil erosion and sediment control measures will be constructed and maintained, as necessary, throughout the RA construction in compliance with applicable laws and regulations. These measures will be incorporated to assure that erosion of waste materials will be minimized; silting or muddying of drainage channels will be minimized; and impacts to adjacent lands will be limited.

Sediment barriers, where appropriate, may be installed to control the migration of waste and silt off-site. During construction, any installed silt fencing will be inspected daily and after significant precipitation events. Any damage noted will be repaired immediately. Accumulated sediment will be removed and replaced within the work area.

BMPs for control of erosion and sediment will be taken, where required, to re-route or control run-on. Any necessary ditches or swales for surface water management will be graded to match existing slopes or grades. Seeded areas will be straw mulched at a rate of approximately 3,000 pounds/acre. Additional erosion control measures that may be implemented in the field to minimize erosion and sediment runoff include:

- Mulch,
- Erosion control blankets;

- Straw bale erosion barrier;
- Silt fence;
- Riprap;
- Grading;
- Terracing;
- Removal of sediment sources;
- Swales; and/or
- Ditches.

These measures will protect surface waters within RDU 5 and the CS OU from degradation and are intended to meet the designated, action-specific storm water performance standards (see Section 2.0).

4.10 Traffic Control

Transportation of removed rails and ties, excavated materials, aggregates, and construction materials to and from RDU 5 will be required to facilitate implementation of the RA work. Transportation methods and routes will be at the discretion of the Contractor. However, significant quantities of material are expected to require road legal haul trucks traveling over local, State, and Federal highways. The mode of transport will depend on the anticipated volume of material required, projected impacts on traffic volume, construction timing, and the cost/benefit ratio for each mode of transport.

Although construction encroachment on major streets is not anticipated, several roads or streets may require temporary closure during the construction activities. Site access will be restricted to authorized personnel and on-site construction traffic patterns will be determined by the Contractor to maximize efficiency. The Contractor will coordinate any necessary local road closures with ADLC. The Contractor will be required to submit a Traffic Control Plan prior to initiating the construction work. Appropriate notice for all closures will be given to ADLC and published in the local newspaper(s) prior to any closures. Appropriate signage will be posted to route construction traffic and to inform and re-route the public.

Flaggers and/or signage will be utilized to assist with traffic directing and re-routing. Work on Active Railroad lines will be conducted in close coordination with RARUS personnel. All work conducted on or within 50 feet of Active Railroad lines will require direct coordination on a daily basis with the responsible railroad/landowner.

4.11 Utilities Location

Prior to beginning any construction activities, the Contractor will be required to contact all area utilities, including sewer and water services, telephone companies, cable TV services, gas lines, power services, etc. Notification will be made of intended activities so that any utilities can be identified and located that may be present within, or adjacent to, the project boundaries. All impacted utilities will be clearly marked to serve as protection from accidental damage by heavy equipment during construction activities.

4.12 Safety and Health

Before construction is initiated, a Site-Specific Health and Safety Plan (SSHSP) will be developed by the Contractor and submitted to the PRPs and Agencies.

4.13 Historic Preservation

Historic preservation requirements are addressed through the Programmatic Agreement (PA) that was signed by 8 parties in April 1992, and modified in the Second Programmatic Agreement (SPA) dated September 14, 1994. The PA requires that Atlantic Richfield develop responses in accordance with the National Historic Preservation Act (NHPA) for those sites in the Upper Clark Fork River Basin where response activities are performed under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). In carrying out this task, the original PA required that Atlantic Richfield develop a Regional Historic Preservation Plan (RHPP) in cooperation with the other parties in the agreement. Further actions to respond to the EPA's responsibilities pertaining to the NHPA are to be based on the RHPP and the SPA. The EPA, appropriate State agencies, ADLC and Atlantic Richfield have used the RHPP while developing and reviewing remedies for each individual site in the Upper Clark Fork River Basin.

A. In accordance with the RHPP, the ARWW&S OU design and RA will:

1. Avoid impact to verified historic resources whenever possible. No features eligible for listing on the National Register of Historic Places are identified in the geographic area of this design.
2. Coordinate the RA with the ADLC Historic Preservation Officer.

B. Construction oversight will be performed in accordance with the 1994 SPA.

4.14 Institutional Controls

Both public and private ICs will be incorporated into the final design of the RA for the subareas within the ARWW&S OU. These ICs will provide control over future land use, access to ground water, and disturbances to the soils through excavation or building activities. The ICs will be implemented by means of several measures that include the following: the ADLC Development Permit System (DPS); deed restrictions; Prospective Purchaser Agreement (PPA); Federal railroad regulations; and dedicated development. These ICs meet the requirements of the CS OU ROD (EPA, 1996) as described in the following subsections.

4.14.1 Public Controls

4.14.1.1 Development Permit System

The ADLC DPS comprises the public controls for land use and development within the county. For the subareas included in the ARWW&S OU, special requirements are imposed through the Superfund Planning Area Overlay District (SPAOD). Any applicant who intends to undertake

certain development activities must obtain a permit through the DPS. The DPS imposes limitations on the type of land use by subarea, and provides for an application process that assures the remedy at each subarea will be protected or replaced, or if a change in land use is proposed, that an appropriate remedy is implemented by the Developer. Under the DPS, a permit is required for any development or change in land use. The permit application allows the county to evaluate and assure that actions appropriate to the situation will occur as part of the development. Development in floodplains and drilling of new potable water wells are both subject to a permit and controls to ensure that present conditions are not exacerbated.

4.14.2 Private Controls

Deed restrictions may be implemented which provide for restrictions on land use, property maintenance, and proscription against activities that interfere with or degrade the remedy. The private controls may be implemented through legal deed restrictions. Under current State law, deed restrictions can impose restrictions on land use and certain property maintenance responsibilities of the subject properties.

4.14.3 Railroad Regulations

The implemented covers on Active Railroad lines would be inspected, monitored and maintained under Federal railroad regulations. The Active Railroads are subject to frequent internal inspections, as well as a multitude of Federal inspections including annual inspections by the Federal Railway Administration (FRA) (minimum inspection frequency of once per year). These inspections include rails, ties, ballast, side slopes, drainage, vegetation, etc.

Active Railroads have a dedicated use. Since their use and change in use is heavily regulated, no development can or will occur on a railroad bed without a significant regulatory process. In order to change the use of an Active Railroad bed, the owner would be required to petition the STB to abandon the Right-of-Way. Active Railroad beds currently have significant ICs in-place. Future ICs, if any, and development are the responsibility of the Developer/STB petitioner through the regulatory process.

4.14.3.1 Dedicated Development Controls

Requirements for ICs for dedicated developments are as follows:

- A long-term agreement between the PRPs and government or other entity accepting the dedicated development is required; otherwise, the PRPs remain responsible for maintenance and closure of the dedicated development.
- Restrictive covenants and/or easements restricting the properties' use as a dedicated development for public use should be documented in the appropriate RAWP/FDR.

4.15 Environmental Monitoring

4.15.1 Air Monitoring

Air monitoring will be conducted as required by the SSHASP prepared for the project. The SSHASP will be submitted under separate cover. The SSHASP addresses the responsibilities, health, safety, access restriction, site security and emergency response requirements for all RA operations. The SSHASP will be amended on an as-needed basis as site conditions change or as construction activities are completed.

4.15.2 Dust Control

BMPs will be utilized to minimize dust emissions from the work proposed in this design. Specifically, dust control will be primarily performed through proper watering of potential dust generation areas. Site activities will be visually monitored to assure dust is kept to a minimum and to meet the requirements of the project SSHASP. This monitoring will verify by visual observation that no significant quantities of contaminants become airborne and migrate from the site.

Meteorological conditions, such as temperature and wind, will also be informally evaluated. These conditions will factor into site operations so that dust generation and emissions are minimized. Water trucks will be utilized to suppress dust on temporary haul roads and excavation sites when conditions and access warrant. In addition, other techniques such as the controlled loading of trucks, minimizing the agitation of materials during excavation and loading, constructing wind breaks, etc., will be considered and utilized where appropriate. These measures are intended to comply with identified action-specific air quality performance standards (see Section 2.0).

4.15.3 Ground Water Performance Monitoring

Ground water performance monitoring will be required and incorporated into the Anaconda Smelter NPL Site Long-Term Ground Water Monitoring Plan whenever miscellaneous wastes are left in-place within a dedicated development, unless determined to be unnecessary through a site conceptual model. Ground water performance monitoring will likely be required for this action since wastes are being left in-place. Final monitoring requirements, including a site conceptual model that provides the basis of determining those requirements will be provided in the Long-Term Ground Water Monitoring Plan, as necessary.

5.0 REMEDIAL DESIGN ASSOCIATED WITH SPECIFIC RAILROAD AREAS

Within the community of Anaconda, the primary remedial alternative is capping of the Active Railroad with an Engineered Cover. Removal and replacement is also an acceptable alternative. Removal of the abandoned/historic lines (under the CS OU) may be preferable to closure and long-term management and maintenance requirements as well as the potential removal and/or closure in the event of future abandonment. Remedial alternatives include removal and treatment.

5.1 Design Requirements for Abandoned Railroad Materials

5.1.1 Dedicated Development

Abandoned rail lines are those that have been historically or officially abandoned and have no association with a railroad service. The remedial alternatives for abandoned railroad grades that contain wastes are removal and consolidation within a WMA, or closure in-place as a dedicated development for public use. Dedicated development requires approval from the Agencies, acceptance of inspection, maintenance, and closure responsibilities from entities receiving the development.

There are several design requirements for a dedicated development, as follows:

- A management plan specific for the dedicated development is required. This plan shall contain the following elements:
 - ICs (such as restrictive covenants, trespasser signs, etc.);
 - Plan maps showing the location of contaminated areas;
 - Monitoring requirements (if necessary);
 - Inspections and recordkeeping;
 - Maintenance frequencies; and
 - Responsible individuals for maintenance and management
- A contingency plan in the event that the development closes. The contingency plan will meet the design criteria listed for wastes and contaminated soils as developed under the final design for the ARWW&S OU. In the event the development is located in a historic district, the procedures outlined in the Mitigation Plan attached to the Site Management Plan will be followed. The contingency plan will be developed and included in the petition to the SIB upon closing of the development and change of use.
- A long-term agreement identifying maintenance, management, and contingency responsibilities will be completed and submitted to the Agencies for approval if those responsibilities will be an entity other than the PRPs. Financial assurance will be required of entities assuming responsibility of a dedicated development.

5.1.2 Non-Dedicated Development

The remedial requirements for railroad wastes in abandoned railroads that will not be closed as a dedicated development are the same as for Rogue Wastes, which can be restated as follows:

- Remove waste materials and consolidate within a WMA;
- Reconstruct the removal area to promote drainage as necessary, and
- Reclaim the underlying soils in conformance with the final design for contaminated soils as completed under the ARWW&S OU.

Requirements for final designs to accomplish the remedial requirements stated above are presented in the following sections. Because these wastes will be removed, there will be no

additional inspection and maintenance, performance and compliance monitoring, and ICs requirements.

5.1.2.1 Waste Excavation and Disposal

Remedial design requirements for waste excavation and disposal were established in the RDWP (CDM, 2000). The RAWP/FDRs for sites that include waste removal will include the following elements:

- A waste characterization, if unknown materials are encountered (as necessary), and disposal siting plan (if waste disposal is proposed outside of WMAs). This information may be necessary to determine appropriate disposal requirements.
- Estimated volumes of wastes to be removed
- A waste removal action plan. Components of this plan will include: construction equipment to be used during removal; haul routes; safety measures to be employed; dust control measures; storm water BMPs; etc.
- Sampling underlying soils, as necessary.
- A soils reclamation plan.
- A post-closure Monitoring and Maintenance Plan.

The criteria for determining the volume of soils to be excavated with the wastes is as follows:

- Wastes will be visually identified in the field, as appropriate.
- The underlying soils will be remediated *in-situ* to establish a minimum 18-inch plant hospitable root zone meeting the criteria established under the design for contaminated soils as determined in the final design for the ARWW&S OU.
- Post-RA growth media arsenic concentrations that exceed 1,000 mg/kg will not be permitted at waste removal sites. Consequently, post-excavation sampling will be required unless adequate characterization data exists

5.2 Design Requirements for Active Railroads

The minimum design criteria for Engineered Covers applicable to RDU 5 Railroad Beds RA include the following: installation of a minimum of six inches of select materials that will provide a permanent barrier to the waste materials for human health protection; promote surface flow without erosion; reduce infiltration; and provide a wearing surface durable for the operation of the anticipated rail service.

5.2.1 Active Railroad Design

As previously discussed, the various areas associated with railroad beds that will receive RA under the RDU 5 Anaconda Active Railroad Beds RAWP/FDR have been divided into three distinct categories based on land use and the types of RA to be implemented. The three categories include the following: 1) West Valley; 2) Anaconda Mainline; and 3) Railroad Yards. Each of these area types, including the RA to be implemented, is described in further detail in the following subsections.

5.2.1.1 West Valley

The West Valley section of the railroad line originates on the east shoulder of North Cable Road and extends eastward to the Pennsylvania Avenue intersection (Station 0+00 to 245+00 on Sheets 5 and 6 of the Construction Drawings provided in Appendix A). The relatively short portion of the railroad bed that extends west from the North Cable Road intersection toward the Lime Quarry has been covered by lime rock and is below any applicable action level (see Figure 10); therefore, this area will not be addressed during this RA.

The general design applicable to the West Valley Railroad Bed includes complete removal of the rails, ties and railroad bed materials including railroad bed materials beneath asphalt and dirt/gravel street crossings and access road spurs leading to residential driveways. At these crossings, the asphalt or dirt/gravel road surface materials, miscellaneous timbers, rails, ties, and underlying bed materials will be completely removed and disposed at the Opportunity Ponds WMA. Existing asphalt crossings will be replaced with crushed base course and asphalt per the Construction Drawings (Appendix A) and Technical Specifications (Appendix B), and existing dirt/gravel crossings will be replaced with crushed top surfacing material per the Construction Drawings and Technical Specifications. Where the West Valley Railroad Bed crosses Warm Springs Creek (approximately 0.3 mile west of Anaconda) via a small trestle, the rails, ties and bed materials will be removed up to the edge of the trestle, not disturbing the trestle. BMPs will be installed in this area prior to construction to prevent sedimentation and runoff from entering the creek.

The West Valley Railroad Bed primarily consists of waste rock and ballast approximately 1.5 feet in depth, on average. In addition to removal of the railroad bed, railroad bed materials adjacent to the railroad bed will be excavated to the existing vegetation line. Excavation of the waste materials will be based on the following: visual inspection; sample data indicates that removal is required to the original ground interface; and the underlying embankment soils are easily distinguishable from the railroad bed materials. The excavated materials will be hauled to the Opportunity Ponds WMA for disposal in such a manner to minimize the spillage and leakage of waste material during transportation activities consistent with SSTOU Parcel 152 transportation activities. Per agreement with the MDT, Agencies, and ADLC, the excavated footprint resulting from the West Valley Railroad Bed RA will be graded to provide positive drainage and to eliminate voids/holes caused by the excavation activities and to eliminate overly steep slopes (maximum regraded slope steepness of approximately 3H:1V). The excavated and graded footprint will be left without further enhancement. Future enhancement for development as a trail, transportation and/or utility corridor within the current Right-of-Way will be addressed

by the MDT and/or ADLC. Prior to implementation of future construction activities on the West Valley Railroad Bed, approval will be required by the STB through an abandonment procedure of the railroad bed. Property maintenance is the responsibility of the landowner under local and State ordinances and will continue following completion of the West Valley Railroad Bed removal.

5.2.1.2 West Anaconda Yard

The West Anaconda Yard is located in the north-central portion of the community of Anaconda and is bounded by the Sycamore Street intersection on the west end, by a perimeter fence on the north and south ends, and extends in an easterly direction to approximately directly south of the Montana Fish, Wildlife and Parks Fish Hatchery (Station 256+00 to 279+50 on Sheet 8 of the Construction Drawings provided in Appendix A). This section of the railroad consists of multiple sets of parallel tracks running along an east-west alignment. The West Anaconda Yard is completely enclosed by an eight-foot tall chain-link perimeter fence and contains the RARUS roundhouse as well as several maintenance and shop buildings. Additionally, a significant amount of equipment and construction materials are currently stored throughout the area. The area is generally flat. The EPA and DEQ have determined that the West Anaconda Yard is a dedicated development.

The RA in this area will consist of cutting/excavating existing ballast located outside of the ties to a depth of 6 inches below the tops of the ties and extending the excavation laterally approximately 3 feet beyond the ends of the ties. The excavated materials will be disposed of in the designated disposal area (Opportunity Ponds WMA). The excavated ballast will be replaced with new Size No. 5 ballast (furnace slag) meeting gradation specifications, and exposed railroad bed materials located between adjacent ballast sections will be capped with granular borrow or ballast at a minimum depth of 6 inches. Refer to Detail 10 on Sheet 21 of the Construction Drawings (Appendix A). Additionally, storage areas within Active Railroad yards exceeding action levels will be capped with 6 inches of granular borrow.

Where adjacent tracks converge towards switches in railroad yards, excavation of material becomes difficult to implement where the ends of the railroad ties are closer than four feet (the width of a bobcat bucket). In areas where the ties converge to less than four feet, excavation will be conducted using a narrow backhoe bucket to the maximum extent possible without damaging the railroad track structure due to placement of stabilization pads or the need for equipment to cross rails. This is especially important near the functional portions of track switches such as guardrails and switchblades. Excavation using a backhoe bucket should usually be implemented at a spacing of 24 inches or less between the ends of the ties, and should normally leave 20 linear feet or less of unexcavated space to the point of convergence.

5.2.1.3 Anaconda Mainline

The Anaconda Mainline section runs east from the railroad intersection at Pennsylvania Avenue to the Fourth Street intersection near the east end of the community of Anaconda (Station 245+00 to 352+00 on Sheet 8 of the Construction Drawings provided in Appendix A). The RA in this area will consist of cutting/excavating existing ballast located outside of the ties to a depth

of six inches below the tops of the ties, and extending the excavation laterally approximately three feet beyond the ends of the ties. To maintain positive drainage and to avoid creating a topographic low adjacent to the Active Railroad, the excavation will extend laterally in both directions at a minimum 0.5% slope to daylight on the shoulder of the railroad bed, as applicable. Consequently, in some areas it is anticipated that the excavation may extend beyond the minimum three-foot dimension.

The excavated materials will be disposed of on the railroad bed (within the existing non-vegetated footprint) or hauled off-site and disposed in the designated disposal area (Opportunity Ponds WMA) if adequate space is not available. The excavated ballast will be replaced with new Size No. 24 ballast meeting gradation specifications (approximately 3 feet beyond the ends of the ties). Exposed railroad bed materials located outside of the 3-foot dimension may be capped with Type 1 Aggregate or ballast at a minimum depth of 6 inches to the existing vegetation line (where applicable) or toe of the slope (refer to Detail 10 on Sheet 21 of the Construction Drawings [Appendix A of this RAWP/FDR]). Specified railroad bed side slopes with final slopes steeper than 4H:1V (typically applicable to the eastern portion of the Anaconda Mainline) will be covered with a coarse 4 to 8-inch D_{50} riprap to minimize erosion in these areas (see Detail 16 on Sheet 24 of the Construction Drawings).

The Anaconda Mainline section of the railroad runs directly adjacent to several city streets and alleys. To prohibit vehicular traffic from traveling or parking on the installed cap in these areas, a barrier will be installed between the street or alley and the railroad bed as shown on Detail 22, Sheet 27 of the Construction Drawings (Appendix A). Locations where the barrier will be installed along the Anaconda Mainline are shown on Sheets 11 through 14. The barriers will be placed on railroad property along the railroad Right-of-Way or along easement lines established through existing railroad agreements. This will provide several functions as part of the design, including:

1. Prohibit vehicular traffic from traveling or parking on the installed caps located adjacent to streets or alleys;
2. Physically separate the railroad bed from residential areas; and
3. Aid in controlling surface water runoff.

5.2.1.3.1 AFFCO Spur

A short railroad spur (AFFCO Spur) branches off the Anaconda Mainline at the west end of the East Anaconda Yard and travels approximately 1,000 feet west to where it passes into the AFFCO Foundry yard under a chain-link fence. The RA for this particular spur includes complete removal of the western half (approximately) of the spur, and treatment of the eastern half (active line) consistent with the Anaconda Mainline. The rails and ties associated with the western half of the spur will be removed, and the railroad embankment materials (wastes/ballast) will be excavated to a depth corresponding with the underlying native soil. The excavated materials will be hauled to the Opportunity Ponds WMA for disposal. Excavation of the waste materials will be based on visual inspection. Based on recent sampling work conducted for the West Valley Railroad Bed, the underlying native soils are easily distinguishable from the waste materials. The excavated footprint associated with the west half of the AFFCO Spur will be

ripped (bringing the native soils to a friable condition), graded and revegetated (fertilized, seeded and mulched).

5.2.1.4 East Anaconda Yard

The East Anaconda Yard is the easternmost section of railroad to be addressed under this RA. The East Anaconda Yard is located east of the Fourth Street intersection and west of the Smelter Hill access road (Station 351+50 to 397+58) on Sheet 8 of the Construction Drawings (Appendix A of this RAWP/FDR). This section of the railroad consists of multiple sets of parallel tracks running along an east-west alignment. The area is generally flat. The EPA and DEQ have determined that the East Anaconda Yard is a dedicated development.

The RA in this area consists of cutting/excavating existing ballast located outside of the ties to a depth of six inches below the tops of the ties and extending the excavation laterally approximately three feet beyond the ends of the ties. The excavated material will be deposited in the designated disposal area (Opportunity Ponds WMA). The excavated ballast will be replaced with clean Size No. 5 ballast (furnace slag) meeting gradation specifications, and exposed railroad bed materials located between adjacent ballast sections will be capped with granular borrow or ballast at a minimum depth of 6 inches. Refer to Detail 10 on Sheet 21 of the Construction Drawings (Appendix A). Additionally, storage areas within Active Railroad yards exceeding action levels will be capped with 6 inches of granular borrow.

Where adjacent tracks converge towards switches in railroad yards, excavation of material becomes difficult to implement where the ends of the railroad ties are closer than four feet (the width of a bobcat bucket). In areas where the ties converge to less than four feet, excavation will be conducted using a narrow backhoe bucket to the maximum extent possible without damaging the railroad track structure due to placement of stabilization pads or the need for equipment to cross rails. This is especially important near the functional portions of track switches such as guardrails and switchblades. Excavation using a backhoe bucket should usually be implemented at a spacing of 24 inches or less between the ends of the ties, and should normally leave 20 linear feet or less of unexcavated space to the point of convergence.

6.0 MONITORING AND MAINTENANCE PROCEDURES

6.1 West Valley Railroad Bed

The railroad bed material associated with the West Valley railroad will be removed as part of RA activities. Per agreement with the MDT, Agencies, and ADLC, the excavated footprint resulting from the West Valley Railroad Bed RA will be rough-graded to provide positive drainage and to eliminate voids/holes caused by the excavation activities and to eliminate overly steep slopes (maximum regraded slope steepness of approximately 3H:1V). The excavated and graded footprint will be left without further enhancement. Future enhancement for development as a trail, transportation and/or utility corridor within the current Right-of-Way will be addressed by MDT and/or ADLC.

The EPA acknowledges that certain property maintenance activities are the responsibility of each landowner for property owned or controlled within the ARWW&S OU either under independent State or local law. The current landowner and any subsequent landowners of the West Valley Railroad Bed will be responsible for any monitoring and maintenance under independent State and local laws.

6.2 Active Railroads

Monitoring and maintenance will be required to maintain the effectiveness of the remedy and to properly manage the site in the future. The PRPs will submit an Active Railroad Beds Monitoring and Maintenance Plan to the EPA for approval. The Active Railroad Beds Monitoring and Maintenance Plan will present future monitoring and maintenance activities required on all RDU 5 Active Railroad beds to maintain the integrity of the implemented RA. A regular inspection schedule will be incorporated into the Active Railroad Beds Monitoring and Maintenance Plan. The inspection and monitoring and maintenance program outlined in the Active Railroad Monitoring and Maintenance Plan will be designed to follow FRA regulations which require frequent internal inspections, as well as a multitude of Federal inspections including annual inspections by the FRA (minimum inspection frequency of once per year). These inspections will include rails, ties, ballast, side slopes, drainage, vegetation, etc.

6.2.1 Abandonment

In the event the Active Railroad becomes formally abandoned under the authority of the STB during monitoring and maintenance, closure is required. The petitioner will identify a conceptual closure plan that will be developed under STB guidance with input from appropriate regulatory agencies. The closure requirements will be as follows:

- Miscellaneous wastes may be left in-place as part of a dedicated development; or
- Remove waste materials and consolidate within a WMA;
- Reconstruct the removal area to promote drainage as necessary; and
- Reclaim the underlying soils in conformance with the final design for contaminated soils as completed under the ARWW&S OU.

7.0 REMEDIAL ACTION REPORTING AND RECORD KEEPING

The PRPs or their designee will record the following information on a daily basis during the RA activities:

1. Accidents;
2. Product delivery and usage;
3. QA/QC on required products; and
4. Laboratory analytical tests performed and results

The QA/QC Oversight Engineer will record the following information on a daily basis during the RA activities:

1. Field observations; and
2. Geotechnical and chemical test frequencies and results.

The PRPs will submit a monthly report summarizing construction activities during performance of the RA. The monthly report will generally outline upcoming RA activities, RA activities completed the previous month, RA coordination activities and will be submitted to the Agencies as outlined in the UAO. Upon completion of all RA activities, a Remedial Action Completion Report (RACR), which describes the RA work in detail, will be submitted to the Agencies as outlined in the UAO.

8.0 REMEDIAL ACTION SCHEDULE

Commencement of RA will be in accordance with the Site Management Plan. RA is anticipated to be coordinated with normal railroad operations using railroad operation crews. Therefore, RA will be implemented over a period of time, rather than a typical construction season. RA associated with the Anaconda Mainline will be completed within a 3 to 5-year time frame of issuance of an Order. The East Anaconda Yard and West Anaconda Yard will be addressed within 10 years of issuance of an Order. Removal of the West Valley Railroad Bed will commence as soon as reasonably possible after abandonment proceedings are complete.

9.0 REFERENCES

- AERL, 1999a. Anaconda Smelter NPL Site Community Soils Operable Unit, Anaconda Residential Soils and Railroad Areas – Remedial Design Data Summary Report.**
- AERL, 1999b. Anaconda Residential Soils, Regional Soils, and Railroad Areas, Data Interpretive Report.**
- ARCO, 1994. Anaconda Granulated Slag Pile Position Paper Supporting a No-Action Record of Decision.**
- Atlantic Richfield Company, 2003. Anaconda Smelter NPL Site, Anaconda Regional Water, Waste and Soils Operable Unit Remedial Design Unit (RDU) 5 Active Railroad/Blue Lagoons Remedial Action Work Plan/Final Design Report (RAWP/FDR) August 2003.**
- CDM, 2000. Final Remedial Design Work Plan. Anaconda Smelter NPL Site, Anaconda Regional Water, Waste, and Soils Operable Unit. June 2000.**
- EPA, 1996. Record of Decision, Community Soils Operable Unit, Anaconda Smelter NPL Site, Anaconda, Montana.**
- EPA, 1998. Anaconda Smelter NPL Site, Anaconda Regional Water, Waste and Soils Operable Unit, Record of Decision. September 1998.**

FIGURES

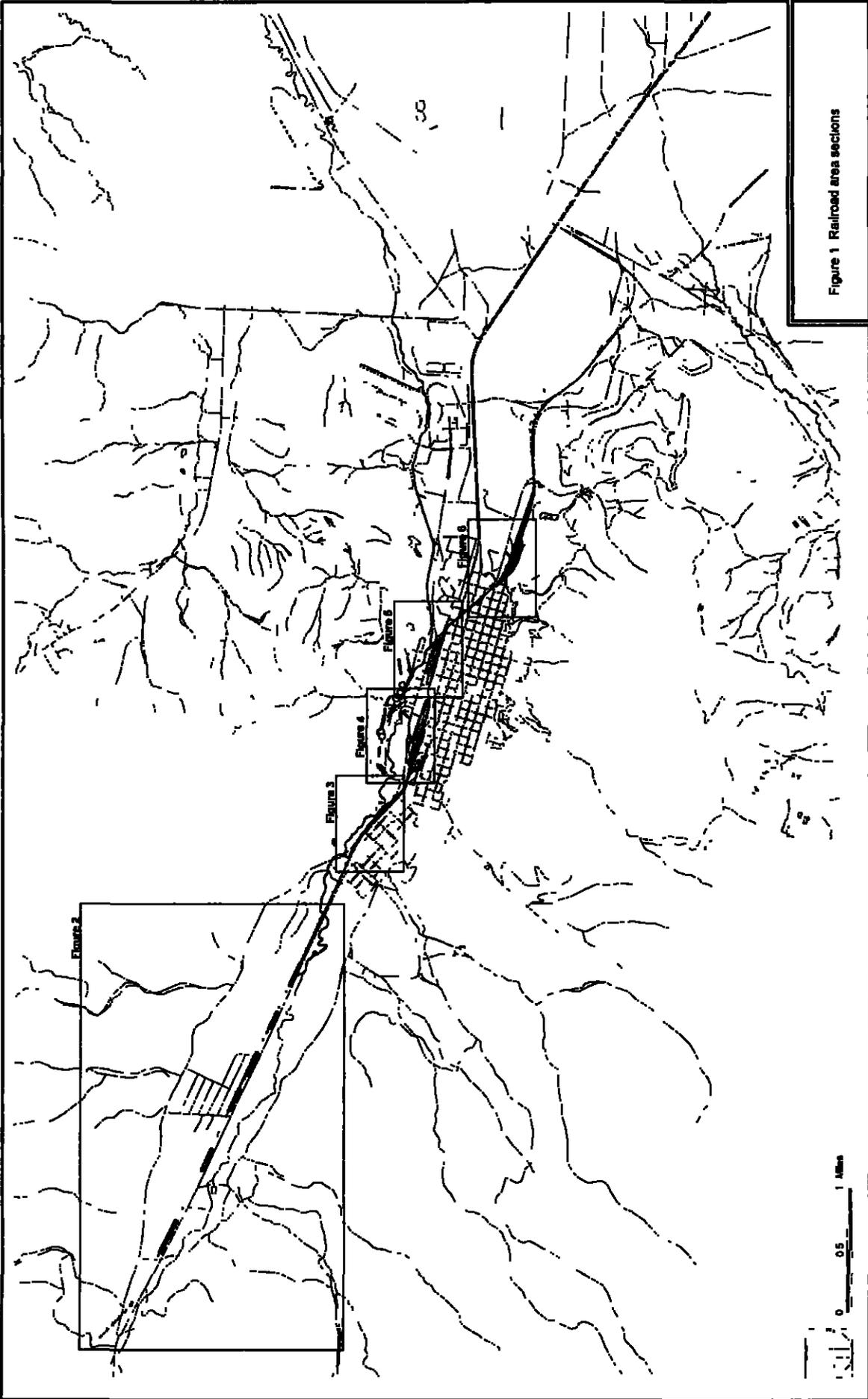
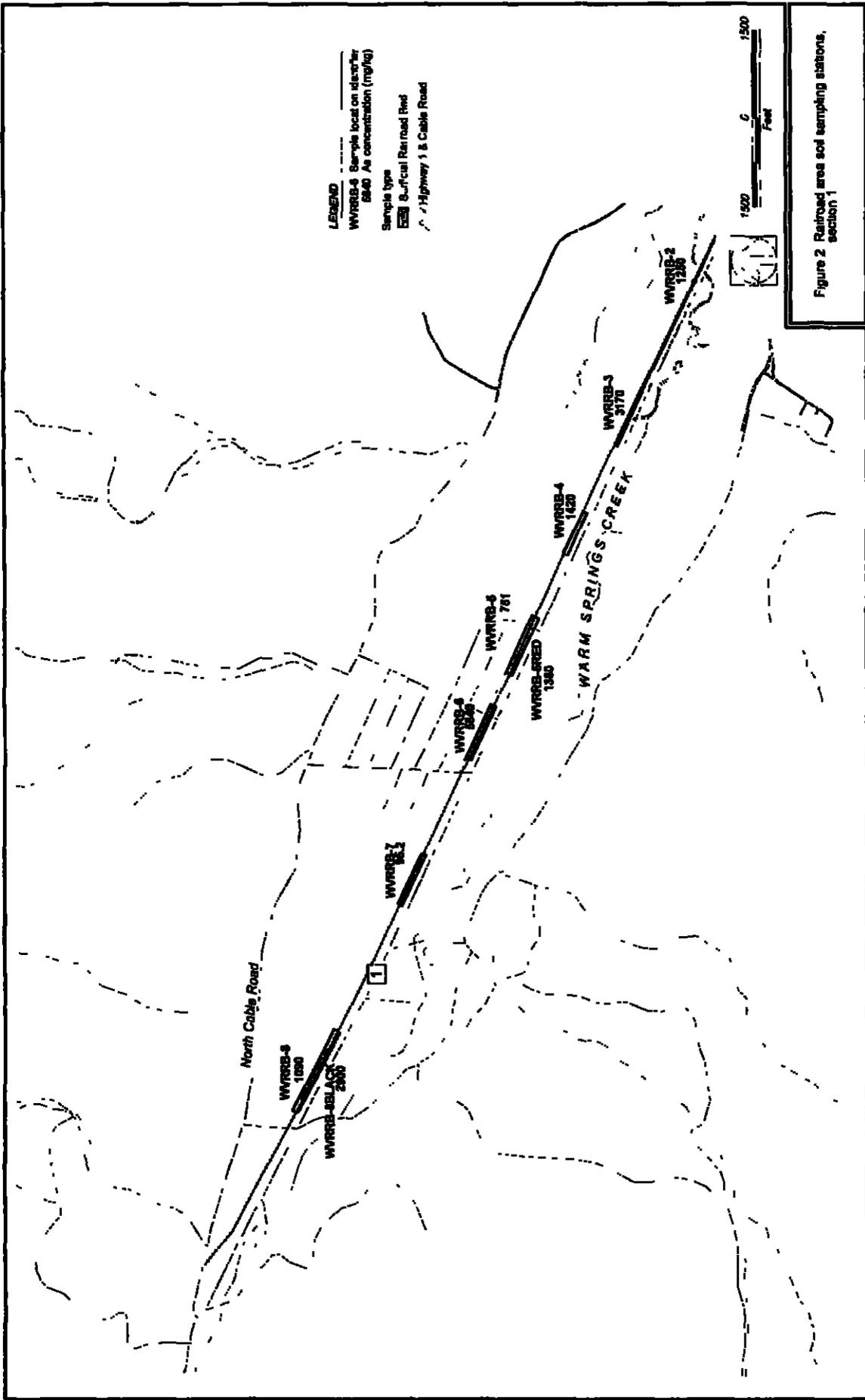


Figure 1 Railroad area sections



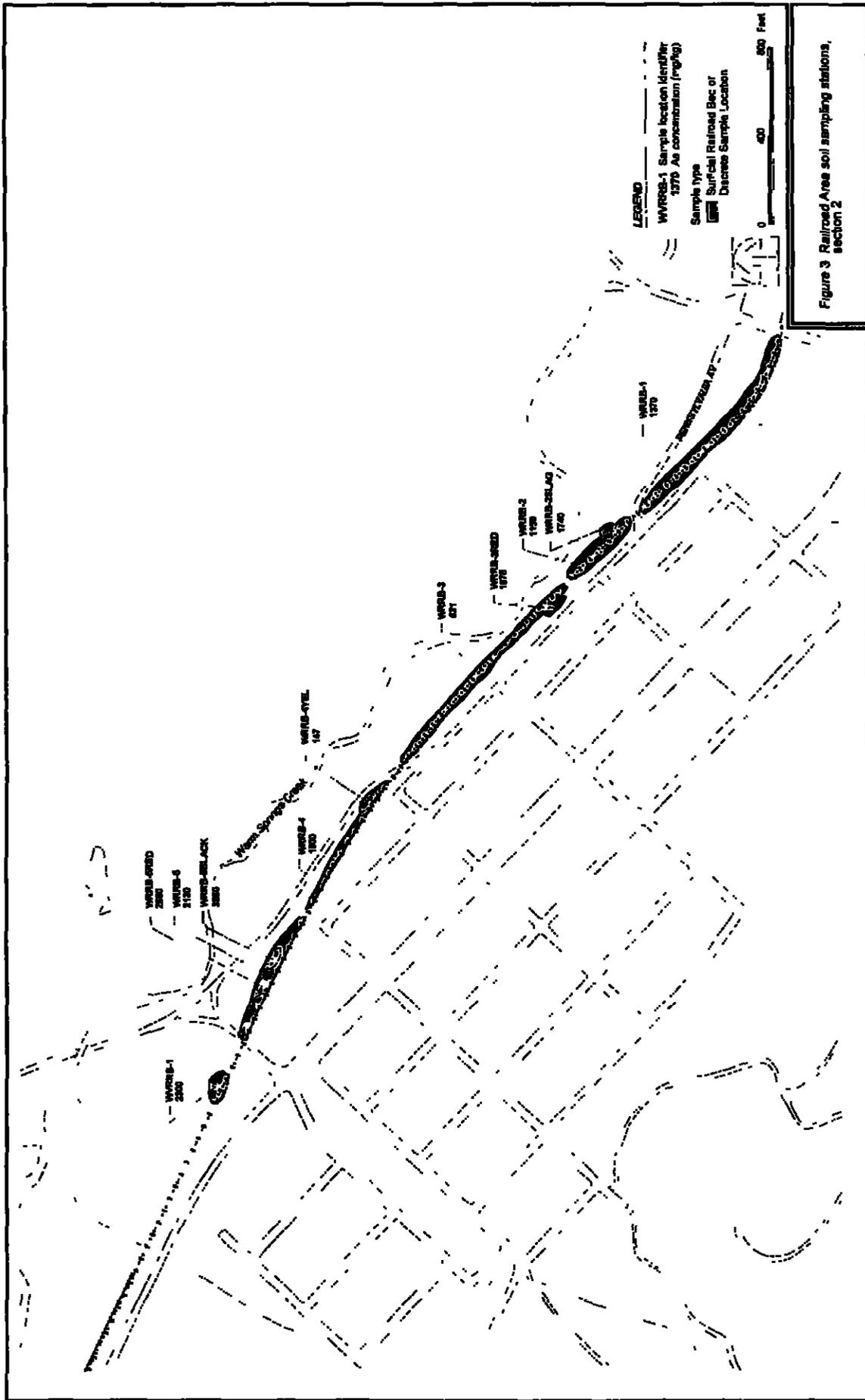


Figure 3 Railroad Area soil sampling stations, section 2

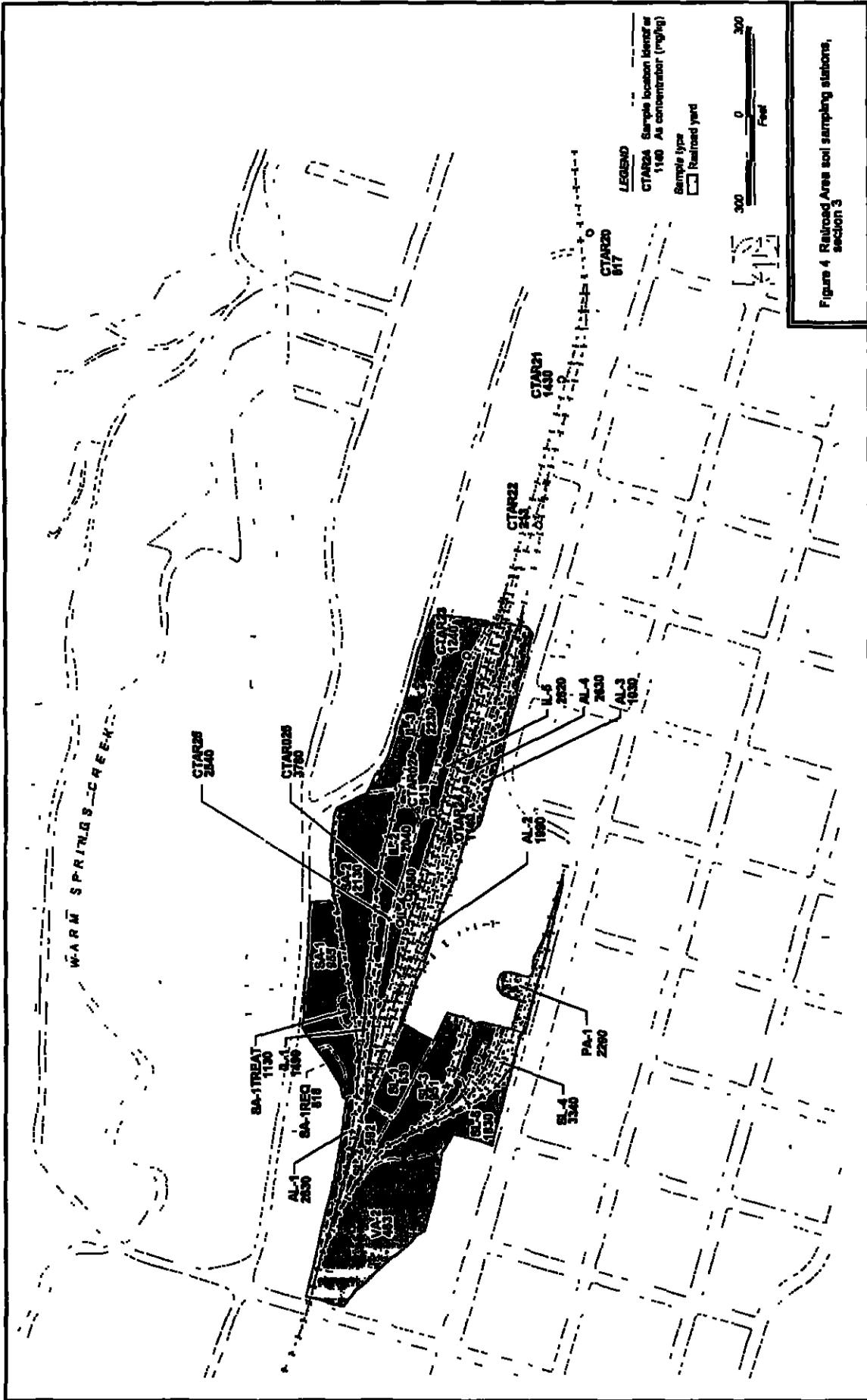


Figure 4 Railroad Area soil sampling stations, section 3

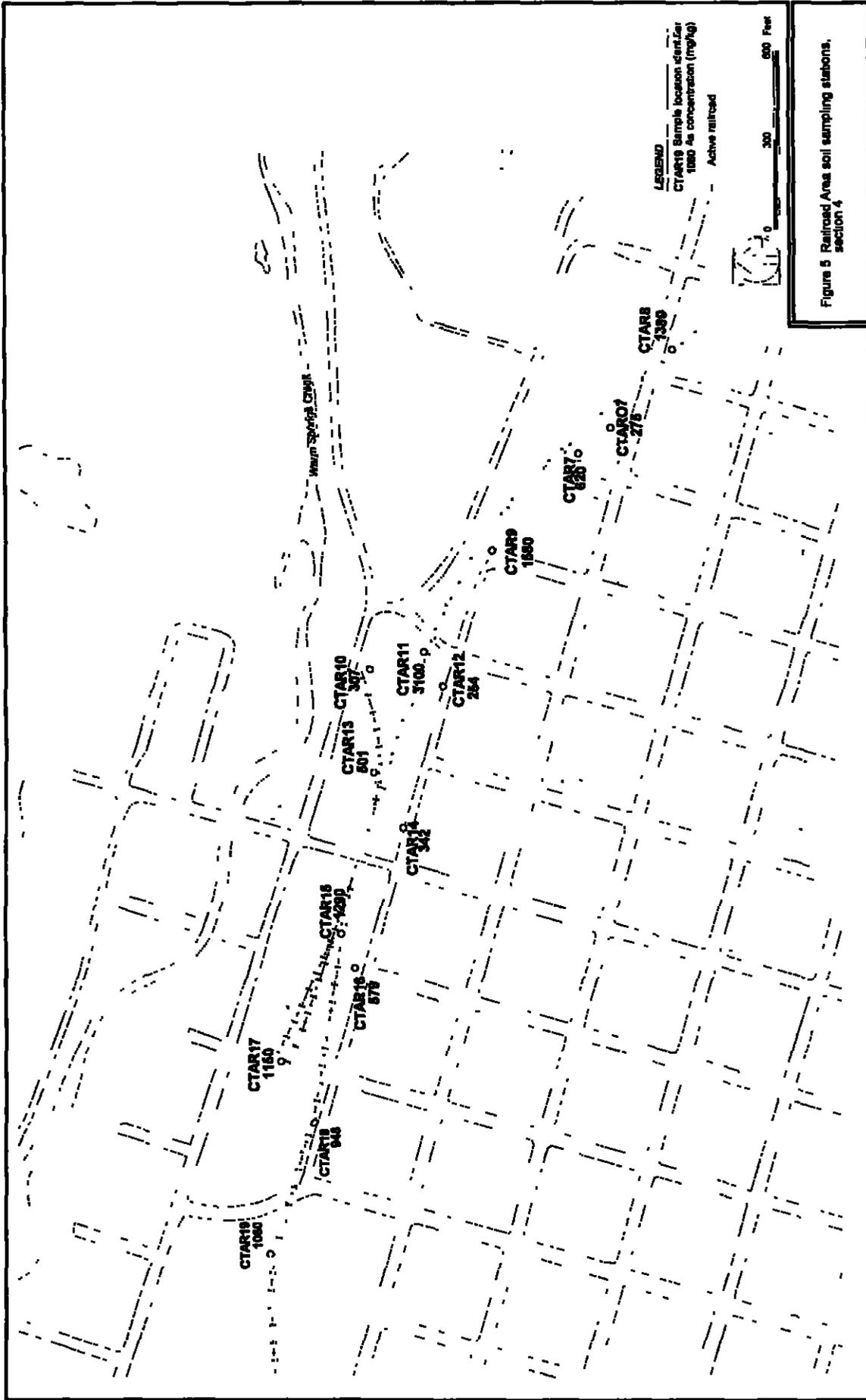


Figure 5 Railroad Area soil sampling stations, section 4

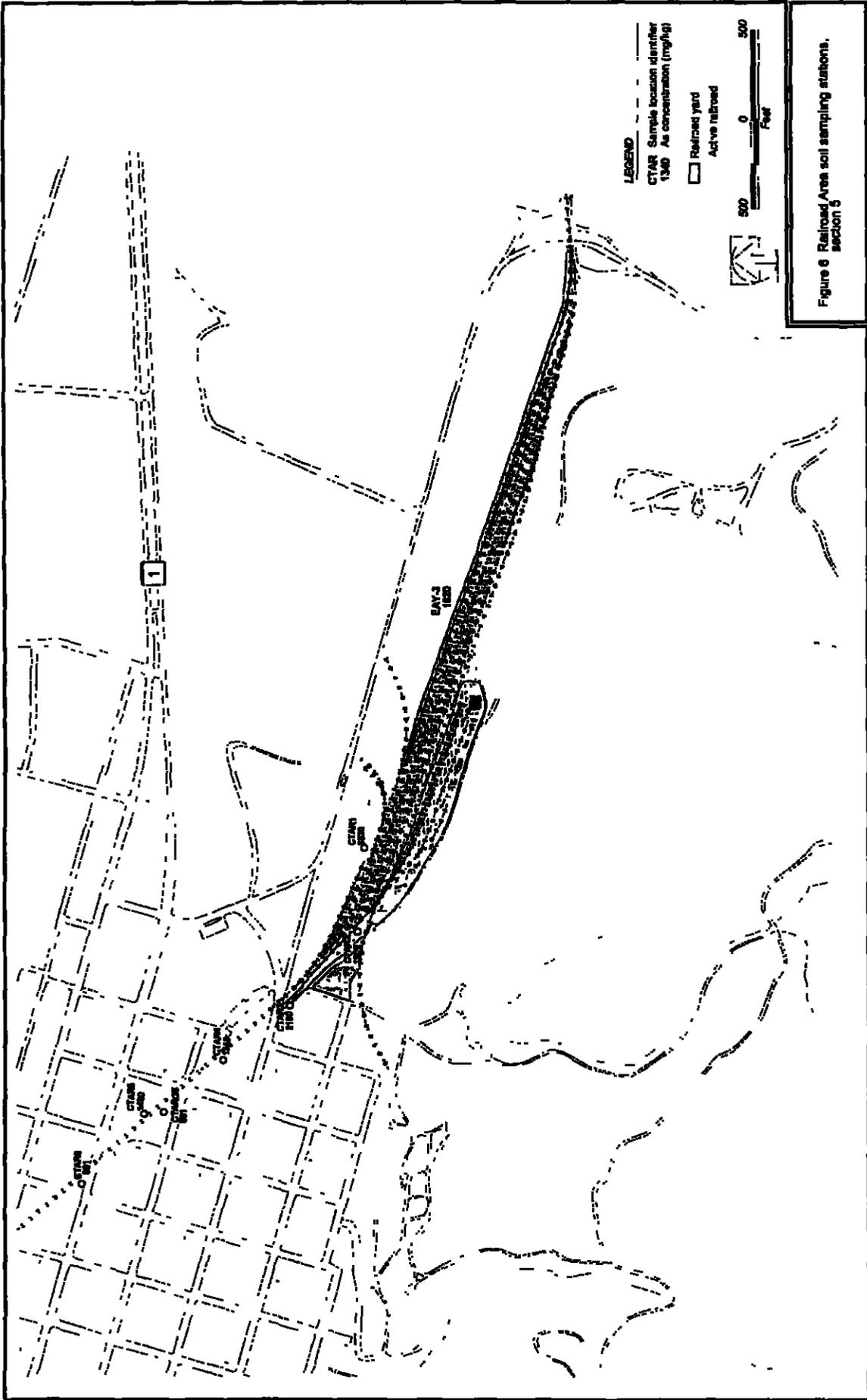
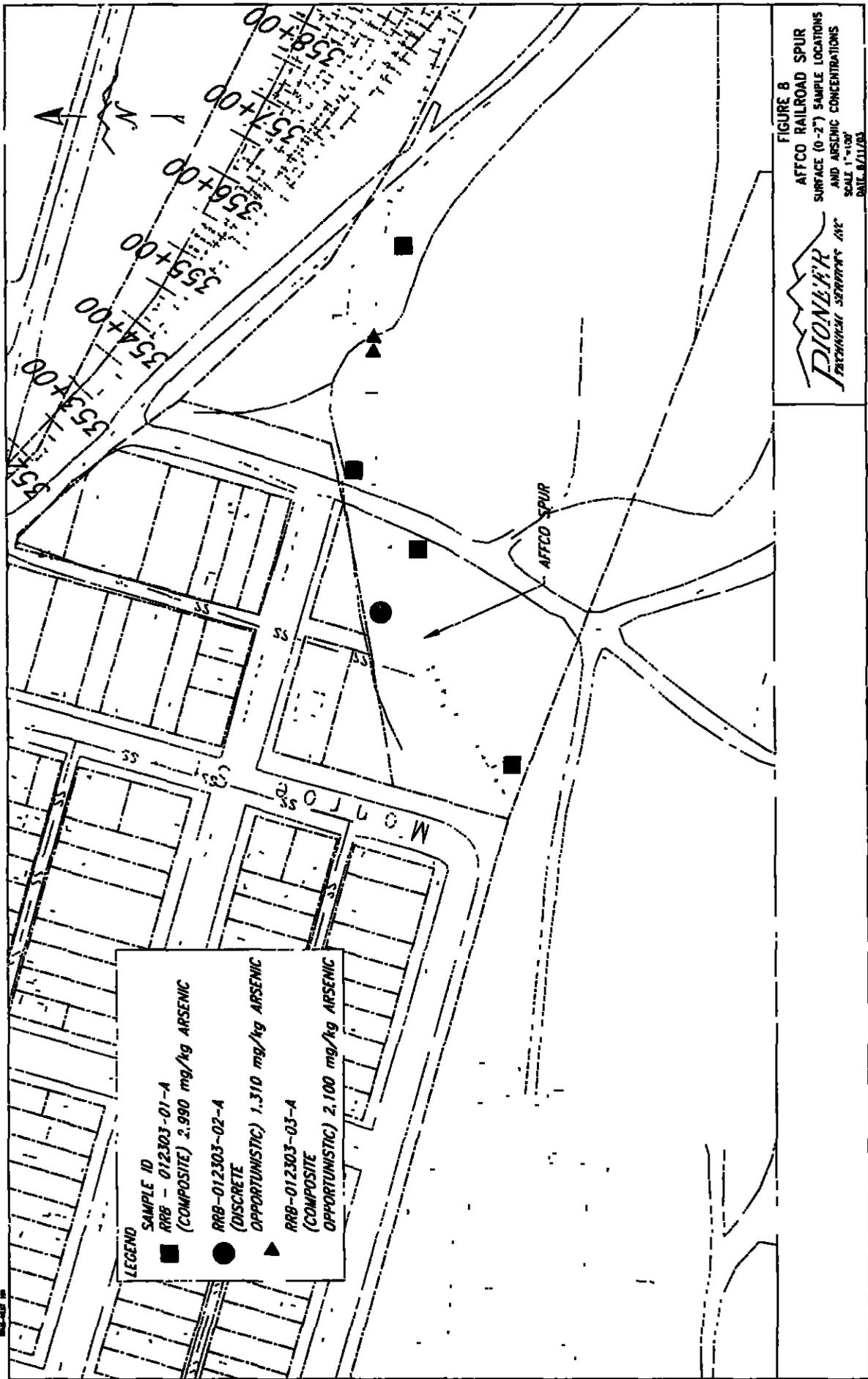


Figure 6 Railroad Area soil sampling stations, Section 3



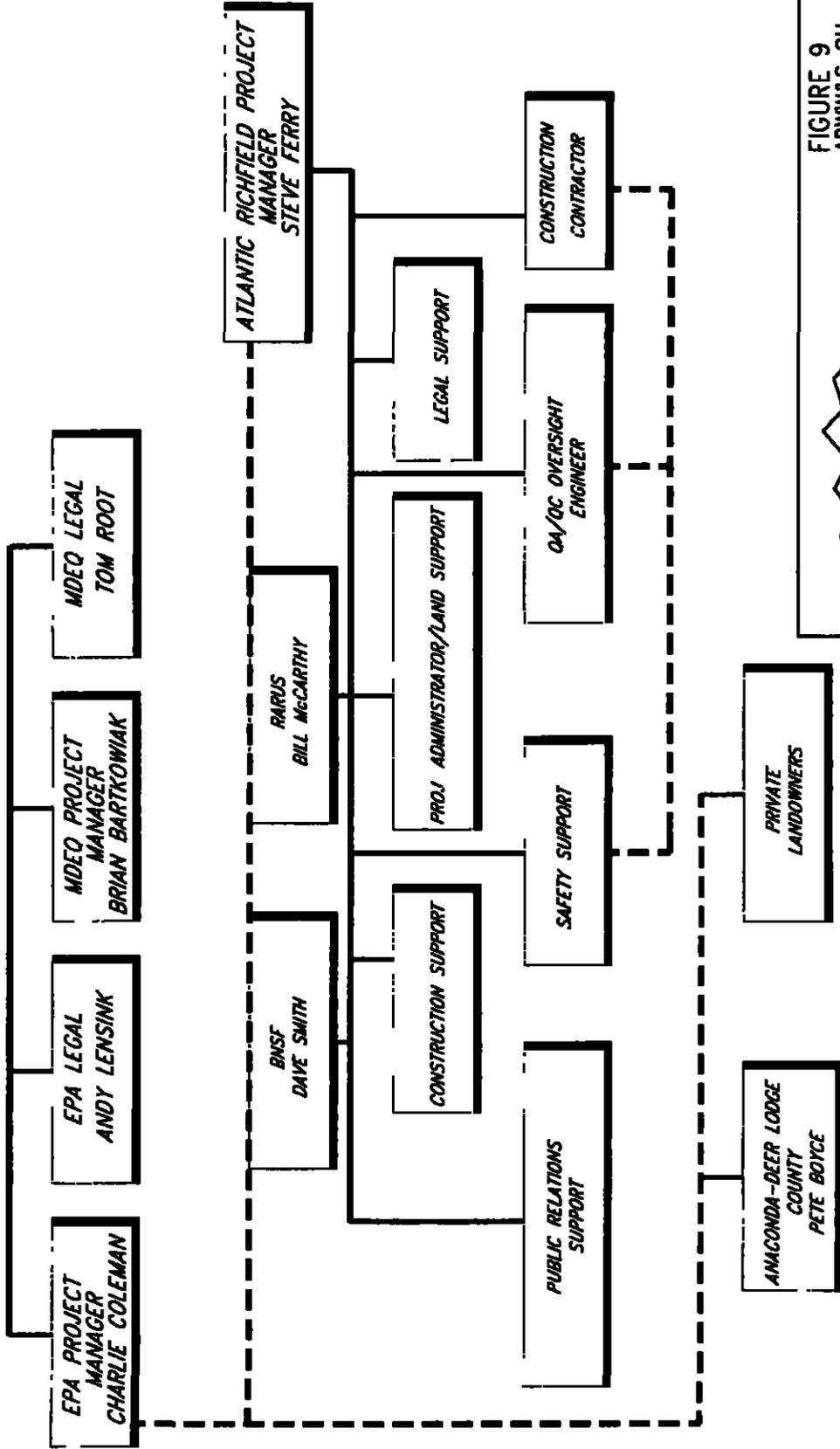


FIGURE 9
ARW&S OU
RDU 5
RAILROAD BEDS RA
ORGANIZATION CHART
SCALE NA
DATE, AUGUST, 2003



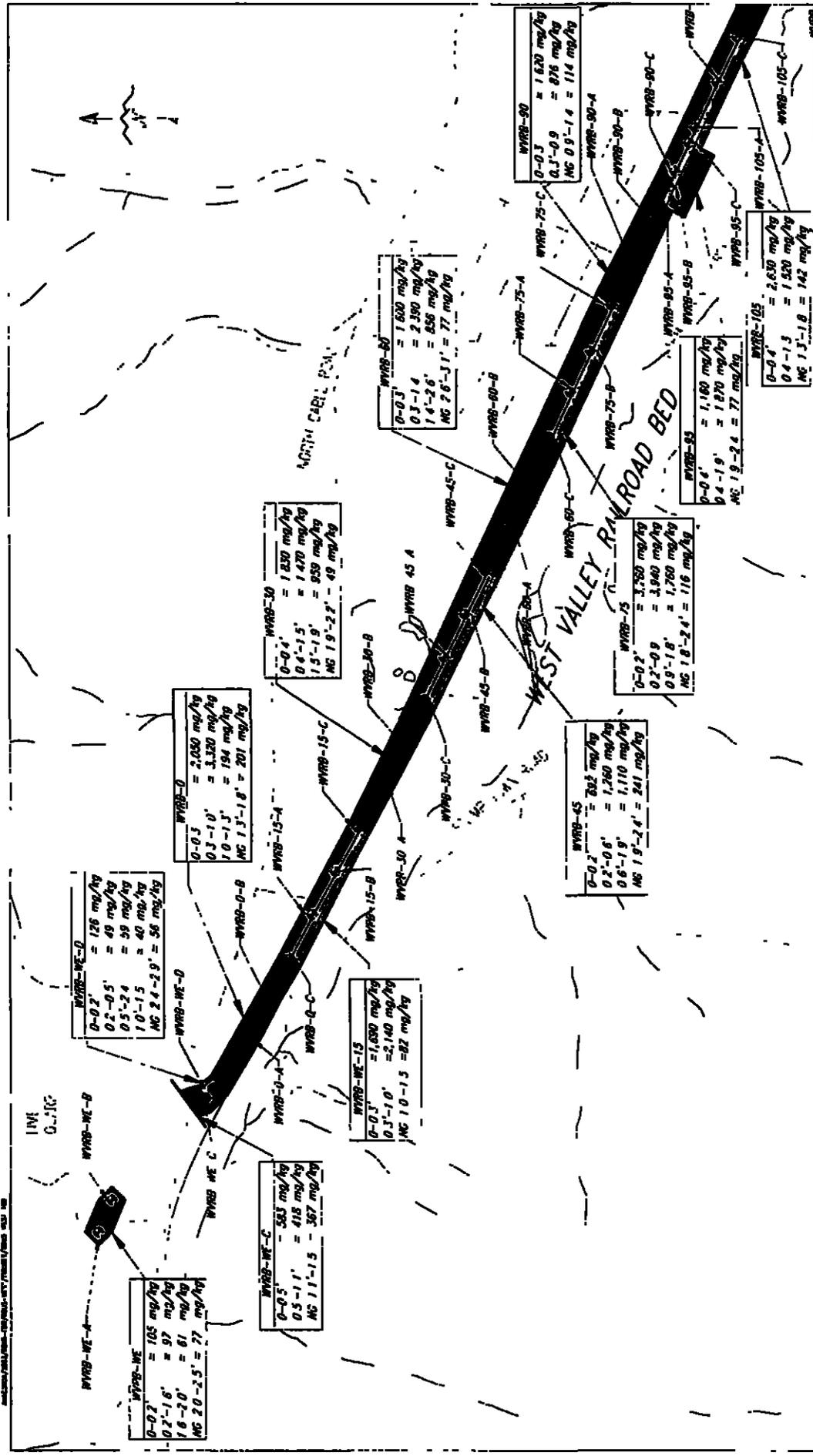


FIGURE 10
2003 ARSENIC SAMPLE RESULTS FOR THE WEST VALLEY RAILROAD BED
 SCALE 1"=100'
 DATE 8/20/03

PIONEER
 TECHNICAL SERVICES, INC.

COMPOSITE SAMPLE ID AND ARSENIC CONCENTRATION AT CORRESPONDING DEPTH INTERVAL

AG = NATIVE GROUND

⊕ = TEST PIT LOCATION AND DISCRETE/SUBSAMPLE ID

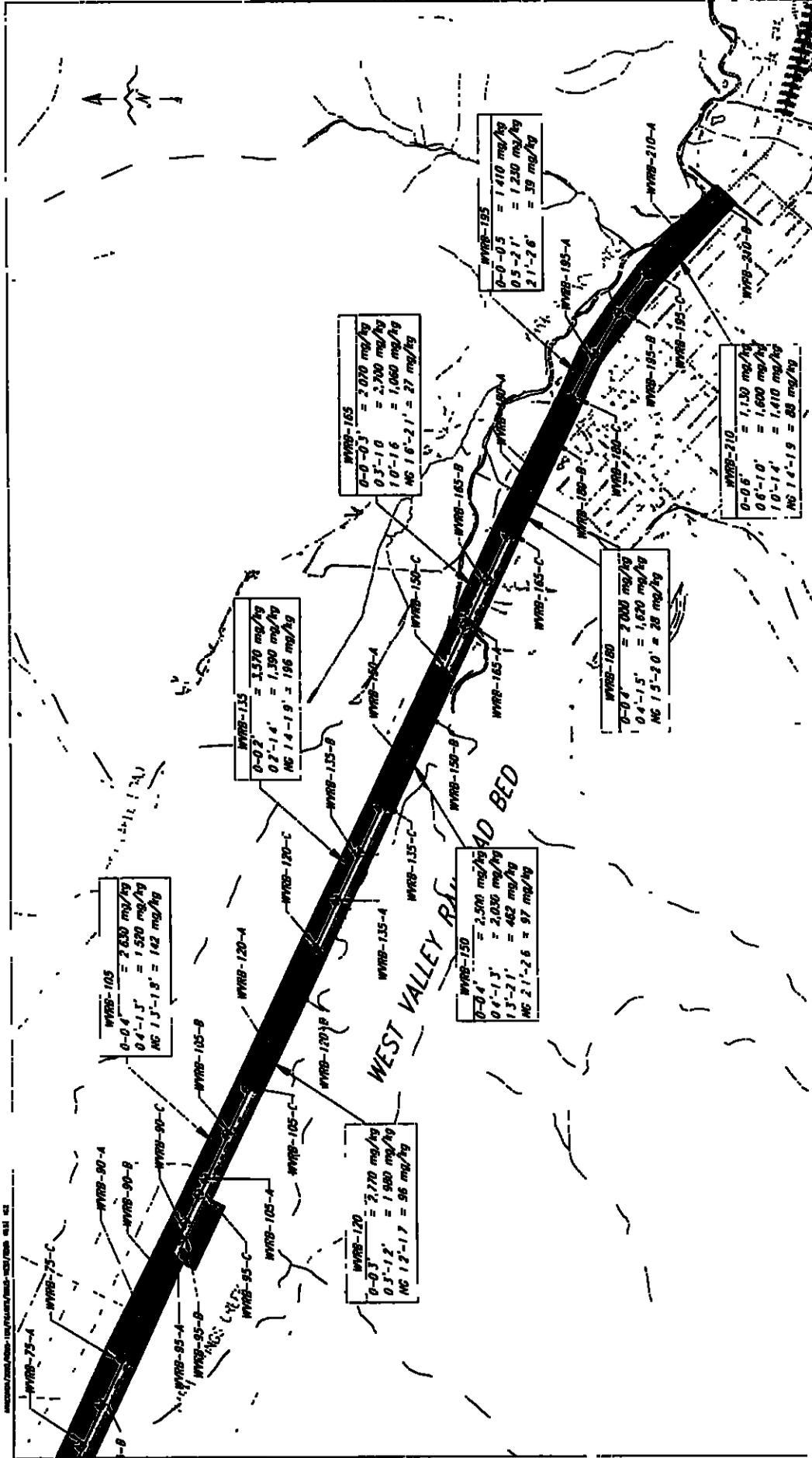


FIGURE 11
 2003 ARSENIC SAMPLE
 RESULTS FOR THE WEST
 VALLEY RAILROAD BED
 SCALE 1"=100'
 DATE 8/2/03



WVRB-170 = 9,770 mg/kg
 0.3'-1.2' = 1,980 mg/kg
 NG 1.2'-1.7' = 96 mg/kg

COMPOSITE SAMPLE ID AND ARSENIC CONCENTRATION AT CORRESPONDING DEPTH INTERVAL
 NG = NATIVE GROUND
 * = TEST PIT LOCATION AND DISCRETE/SUBSAMPLE ID

TABLES

TABLE 1
STATISTICAL SUMMARY OF ANALYTICAL RESULTS
FOR ANACONDA RAILROAD BEDS
(COMPILED DURING THE RI/FS)

Railroad Beds Surface Soil Samples (29 samples)	Arsenic (mg/kg)	Cadmium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)
Minimum	213	3.0	1,200	152	2.6
Maximum	3,780	101	139,000	2,760	7.5
Average	1,285	22.3	11,482	959	6.0

mg/kg – milligrams per kilogram

**Table 2. Anaconda Regional Water, Waste Soils Operable Unit
Performance Standards/Compliance
Anaconda Active Railroads
Remedial Design Unit 5**

PERFORMANCE REQUIREMENTS CATEGORY 1	RDU Design Reference	Method of Compliance (How design achieves compliance)	Point of Compliance	Time of Compliance
CONTAMINANT SPECIFIC REQUIREMENTS				
Ground Water Standards	4, 4, 5, 0	Implementation of remedial action will reduce infiltration thus improve ground water quality to satisfy these requirements	The RD and the LTGWMP identify long term ground water monitoring requirements	After completion of RD/RA activities, and during subsequent Long-Term Ground Water Monitoring
Montana Requirements, MCA § 75-5-303, ARM § 17 30 1002, -1003, and -1011				
Surface Water Standards	4, 8, 4, 9			
Federal Surface Water Quality Requirements, Clean Water Act, 33 U.S.C. §§ 1251, et seq., State of Montana Surface Water Quality Requirements, Montana Quality Act, MCA § 75-5-101, et seq., and implementing regulations		Implementation of storm water management, remedial actions at railroad/creek crossings, and capping/vegetative cover of certain areas will attain these requirements	Compliance points will be identified in the ARWWAS Surface Water Management Plan	After completion of RA activities, and during subsequent Long-Term Surface Water Monitoring
ARM § 17 30 623 - B-1				
ARM § 17 24 633 - Storm Water				
ARM § 17 30 637 - Odor, etc				
ARM § 17 30 705 - Mainstem Stream				
ARM § 17 30 708 - Nondischarge				
Air Quality Standards	4, 15, COAP			
National Ambient Air Quality Standards, 40 CFR § 50 12 (lead), 40 CFR § 50 6 (PM-10); Montana Ambient Air Quality Regulations, ARM § 17 8 222 (lead), ARM § 17 8 223 (PM-10)		Part monitoring has demonstrated the effectiveness of construction BMP's. Dust suppression methods during construction will achieve these requirements	Construction Boundary	During RA
Soil Standards	1, 2, 5, 1, 5, 2, 5, 3, 5, 4	The remedial action will achieve the appropriate land use arsenic standard through soil capping, removal, and/or in-situ treatment	RDU Boundary	Immediately after completion of RA Activities
Arsenic concentration action levels based on land use				
LOCATION SPECIFIC REQUIREMENTS				
Floodplains	4, 8, 4, 9			
Floodplain Management, 40 CFR § 6 302(b), and Executive Order No. 11988		BMP's will be used to minimize impacts during RA. No changes to the base flood plain are expected as a result of RA	RDU Boundary	During RA
Montana Floodplain and Floodway Management Act and Regulations, MCA § 75-5-401, et seq., ARM § 36 15 601 et seq		BMP's will be used to minimize impacts during RA. No changes to the base flood plain are expected as a result of RA	RDU Boundary	During RA
Montana Natural Streambed and Land Preservation Act and Regulations, MCA § 75-7-101 and ARM §§ 36 2 404, 405, and 406		RA is not expected to alter or affect the streambed and will improve the stabilization of the creek transect streambanks	RDU Boundary	During RA
Endangered Species Act and Fish and Wildlife Coordination Act				
Endangered Species Act, 16 U.S.C. § 1531, 40 CFR § 6 302(f), 50 CFR Parts 17 and 402, Fish and Wildlife Coordination Act, 16 U.S.C. §§ 1531, et seq., 40 CFR § 6 302(g)		Threatened or endangered species have been identified in the RDU 5; however, the RA is not anticipated to adversely impact these species. EPA shall consult with the USFWS, as appropriate, to determine mitigative measures to be taken during RA if endangered species are observed	RDU Boundary	During RA

Table 2. Anaconda Regional Water, Waste Solis Operable Unit
 Performance Standards/Compliance
 Anaconda Active Railroads
 Remedial Design Unit 5

PERFORMANCE REQUIREMENTS CATEGORY ¹	RDU Design Reference	Method of Compliance (How design achieves compliance)	Point of Compliance	Time of Compliance
National Historic Preservation Act	4 13	The Second Programmatic Agreement which includes ARWW&S OU, has on-site and off-site mitigation requirements of existing and historic features. The Second Programmatic Agreement has been satisfied	RDU Boundary	Completed
National Historic Preservation Act, 16 U.S.C. § 470, 40 CFR § 6 301(b), 36 CFR Part 800 (NHPA)	4 13	The Second Programmatic Agreement which includes ARWW&S OU, has on-site and off-site mitigation requirements of existing and historic features. The Second Programmatic Agreement has been satisfied	RDU Boundary	Completed
Archaeological and Historic Preservation Act	4 13	The Second Programmatic Agreement which includes ARWW&S OU, has on-site and off-site mitigation requirements of existing and historic features. The Second Programmatic Agreement has been satisfied	RDU Boundary	Completed
Archaeological and Historic Preservation Act, 16 U.S.C. § 469, 40 CFR 6 301(c)	4 13	The Second Programmatic Agreement which includes ARWW&S OU, has on-site and off-site mitigation requirements of existing and historic features. The Second Programmatic Agreement has been satisfied	RDU Boundary	Completed
Historic Sites, Buildings and Antiquities Act	NA	The Second Programmatic Agreement which includes ARWW&S OU, has on-site and off-site mitigation requirements of existing and historic features. The Second Programmatic Agreement has been satisfied	RDU Boundary	During RA
Historic Sites, Buildings and Antiquities Act, 16 U.S.C. § 461, et seq., 40 CFR § 6 301(a)	NA	The Second Programmatic Agreement which includes ARWW&S OU, has on-site and off-site mitigation requirements of existing and historic features. The Second Programmatic Agreement has been satisfied	RDU Boundary	During RA
Protection of Wetlands	Table 2	Wetlands will be addressed by the Upper Clark-Fork River 4-Step Wetlands Mitigation Process	Upper Clark Fork River Basin	Final Clark Fork River FEWA Assessment
Appendix A, Executive Order No. 11990	Table 2	Wetlands will be addressed by the Upper Clark-Fork River 4-Step Wetlands Mitigation Process	Upper Clark Fork River Basin	Final Clark Fork River FEWA Assessment
Migratory Bird Treaty Act	Table 2	Migratory bird may be present in the RDU 5, however, the RA is not anticipated to adversely impact these species	RDU Boundary	During RA
Migratory Bird Treaty Act, 16 U.S.C. §§ 703, et seq	Table 2	Migratory bird may be present in the RDU 5, however, the RA is not anticipated to adversely impact these species	RDU Boundary	During RA
Bald Eagle Protection Act	Table 2	Bald Eagles may be present in the RDU 5, however, the RA is not anticipated to adversely impact these species. EPA shall consult with the USFWS, as appropriate, to determine mitigative measures to be taken during RA if an endangered species is observed	RDU Boundary	During RA
Bald Eagle Protection Act, 16 U.S.C. §§ 668, et seq	Table 2	Bald Eagles may be present in the RDU 5, however, the RA is not anticipated to adversely impact these species. EPA shall consult with the USFWS, as appropriate, to determine mitigative measures to be taken during RA if an endangered species is observed	RDU Boundary	During RA
American Indian Religious Freedom Act	Table 2	EPA and MDEQ will consult with the tribes as appropriate	RDU Boundary	During RA
American Indian Religious Freedom Act, 42 U.S.C. § 1996, et seq	Table 2	EPA and MDEQ will consult with the tribes as appropriate	RDU Boundary	During RA
Native American Graves and Repatriation Act	Table 2	EPA and MDEQ will consult with the tribes as appropriate	RDU Boundary	During RA
Native American Graves and Repatriation Act, 25 U.S.C. § 3001, et seq	Table 2	EPA and MDEQ will consult with the tribes as appropriate	RDU Boundary	During RA
ACTION SPECIFIC REQUIREMENTS	4 15 1, 4 15 2, COAP	Standard construction practices, such as periodic dust suppression will satisfy these requirements. Post monitoring has demonstrated the effectiveness of construction BMPs	RDU Boundary	During RA
Air Requirements	4 15 1, 4 15 2, COAP	Standard construction practices, such as periodic dust suppression will satisfy these requirements. Post monitoring has demonstrated the effectiveness of construction BMPs	RDU Boundary	During RA
Montana Air Quality Regulations, ARM § 17 8 220, -308, -304, -315, and -761	4 8, 4 9, COAP	Standard construction practices, such as periodic dust suppression will satisfy these requirements. Post monitoring has demonstrated the effectiveness of construction BMPs	RDU Boundary	During RA
ARM § 17 8 220	4 8, 4 9, COAP	Standard construction practices, such as periodic dust suppression will satisfy these requirements. Post monitoring has demonstrated the effectiveness of construction BMPs	RDU Boundary	During RA
ARM § 17 8 308(2), and (3), and (4)	4 8, 4 9, COAP	Standard construction practices, such as periodic dust suppression will satisfy these requirements. Post monitoring has demonstrated the effectiveness of construction BMPs	RDU Boundary	During RA
ARM § 17 8 304(2)	4 8, 4 9, COAP	Standard construction practices, such as periodic dust suppression will satisfy these requirements. Post monitoring has demonstrated the effectiveness of construction BMPs	RDU Boundary	During RA
ARM § 17 8 315 (1)	4 8, 4 9, COAP	Standard construction practices, such as periodic dust suppression will satisfy these requirements. Post monitoring has demonstrated the effectiveness of construction BMPs	RDU Boundary	During RA
ARM § 17 24 761(2)(a), (b), (j), and (k)	4 8, 4 9, COAP	Standard construction practices, such as periodic dust suppression will satisfy these requirements. Post monitoring has demonstrated the effectiveness of construction BMPs	RDU Boundary	During RA
Water Requirements - Causing of Pollution	4 8, 4 9, COAP	Standard construction practices, such as periodic dust suppression will satisfy these requirements. Post monitoring has demonstrated the effectiveness of construction BMPs	RDU Boundary	During RA
MCA § 75-5-805	4 8, 4 9, COAP	Implementation of storm water management, remedial actions at railroad/creek crossings, and capping/vogeltrape cover of certain areas will attain these requirements	Compliance points will be identified in the ARWW&S Surface Water Management Plan	After completion of RA activities, and during subsequent Long-Term Surface Water Monitoring

**Table 2. Anaconda Regional Water, Waste Solids Operable Unit
Performance Standards/Compliance
Anaconda Active Railroads
Remedial Design Unit 5**

PERFORMANCE REQUIREMENTS CATEGORY ¹	RDU Design Reference	Method of Compliance (How design achieves compliance)	Point of Compliance	Time of Compliance
<u>Storm Water Runoff</u>	4 B			
ARM § 17 24 633 <u>Montana Noxious Weed Control Requirements</u>	5 4, Tech Specs	Storm water BMP's will be implemented to ensure surface water impacts are minimized. During construction, erosion controls in disturbed areas will be used to control run-on and runoff.	Construction Boundary	During RA
Noxious Weeds, MCA 7-22-2101(7)(a) and ARM 4 5 201, et seq		Noxious weeds will be controlled as outlined in the Vegetation Management Plan or Federal Railroad Administration regulations, as appropriate.	RDU Boundary	During RA and M&M
<u>Hazardous Waste Requirements</u>	Table 2			
Federal RCRA Subtitle C Requirements, 42 U S C Section 6921, et seq, and regulations thereunder, incorporated by reference in the State of Montana under ARM § 17 54 112(6)		No hazardous wastes are being generated, actively managed or disposed as part of the RDU 5 RA, no further action is anticipated to comply with these requirements.	NA	NA
<u>Federal RCRA Subtitle D Solid Waste Requirements</u>	4 B, 4 9, Table 4			
40 CFR 257 3-1 (e), Floodplains		BMP's will be used to minimize impacts during RA. No changes to the base flood plain are expected as a result of RA.	RDU Boundary	During RA
40 CFR 257 3-2, Endangered Species		Threatened or endangered species have been identified in the RDU 5, however, the RA is not anticipated to adversely impact these species. EPA shall consult with the USFWS, as appropriate, to determine mitigative measures to be taken during RA if an endangered species is observed.	RDU Boundary	During RA
40 CFR 257 3-3, Surface Water		Implementation of storm water management, remedial actions at railroad/creek crossings, and cepping/vegetative cover of certain areas will attain these requirements.		After completion of RA activities, and during subsequent Long-Term Surface Water Monitoring.
<u>Montana Solid Waste Management Act</u>	5 0			
ARM 17 50 505 (Facility Standards)		Waste materials will be consolidated within dedicated developments or in the B2 12 Mine Waste Repository located in the Opportunity ponds RDU 8 Waste Management Area.	RDU Boundary and B2 12 Cell of the Opportunity Ponds WMA	During RA
ARM 17 50 510 (O&M and Design)		Repository Management will be in accordance with the B2 12 Repository Management Plan. Provided with the RDU 8 FDR.	B2 12 Cell	During RA and M&M
MCA § 75-10-212 and ARM 17 50 523 (Transportation)		Construction practices will ensure material will be transported in such a manner as to prohibit dumping and discharge.	Transportation Pattern	During RA
<u>Surface Mining Control and Reclamation Act</u>	5 0			
Surface Mining Control and Reclamation Act (SMCRA), 30 U S C §§ 1201 1326				
30 CFR 816 41, Hydrologic-balance Protection		The RDU 5 will be reclaimed consistent with adjacent areas, therefore, disturbance to the hydrologic balance will be minimized.	RDU Boundary	At Completion of RA

**Table 2. Anaconda Regional Water, Waste Solids Operable Unit
Performance Standards/Compliance
Anaconda Active Railroads
Remedial Design Unit 5**

PERFORMANCE REQUIREMENTS CATEGORY ¹ Montana Site and Underground Mine Reclamation Act	RDU Design Reference	Method of Compliance (How design achieves compliance)	Point of Compliance	Time of Compliance
MCA 82-4-231 Grading, Backfilling, and Erosion Control	5.0, COAP	Implementation of the RDU 5 RA will use revegetation, grading, capping in limited areas, and BMPs to minimize erosion and control sedimentation	RDU Boundary	During RA and M&M
MCA 82-4-233 Diverse Vegetative Cover		A diverse vegetative seed mix, as outlined in the RDU 5 RAWP/FDR, will be utilized during revegetation activities	Areas of Revegetation within RDU Boundary	During RA
ARM 17 24 501A(1)a and (2) Final Grading		Slope reduction of naturally steep lands will not occur. Graded areas will be contoured to match existing topography and blonod with undisturbed ground to provide a smooth transition	Areas of RA Activities	During RA
ARM 17 24 501(3)(a) and (c) and (4) Backfilling		No backfilling using acid or toxic materials will be completed in areas where ground water and surface water are present. Backfilling, when applicable, will be completed in a manner to minimize and control sedimentation and erosion	Areas of RA Activities	During RA
ARM 17 24 631(1), (2), (3)(a) and (b) General Hydrology Requirements		The RDU 5 will be reclaimed consistent with adjacent areas, therefore, disturbances to the hydrologic balance will be minimized	Areas of RA Activities	At Completion of RA
ARM 17 24 636 Sediment Control Measures		Sediment control BMPs will be employed to minimize erosion	Areas of RA Activities	During RA and M&M
ARM 17 24 641 Acid- and Toxic-Forming Spoils		The RDU 5 RAWP/FDR requires capping, or treatment and revegetation of waste materials	Areas of RA Activities	During RA
ARM 17 24 643 through 17 24 646 Ground Water Protection, Protection of Ground Water Recharge, Ground Water Monitoring, Surface Water Monitoring		Implementation of remedial action will minimize infiltration thus improve ground water quality to satisfy those requirements	The RD and the LTGWMP identify long term ground water monitoring requirements	After completion of RD/RA activities, and during subsequent Long-Term Ground Water Monitoring
ARM 17 24 761 Fugitive Dust Control Measures		Standard construction practices will minimize fugitive dust	Areas of RA Activities	During RA
ARM 17 24 701 and 702 Removal of Soil, Redistribution and Stockpiling of Soil		Borrow area management will satisfy these requirements as part of RDU 14 RA	Within borrow areas	During RA
ARM 17 24 703 Substitution of Other Materials for Soil		The materials used for revegetation of the RDU 5 is anticipated to meet this suitability criteria	Areas of Revegetation within RDU Boundary	During RA
ARM 17 24 711 Establishment of Vegetation		A diverse vegetative seed mix, as outlined in the RDU 5 RAWP/FDR, will be utilized during revegetation activities	Areas of Revegetation within RDU Boundary	During RA
ARM 17 24 713 Timing of Seeding and Planting		Seeding will occur during the first appropriate period after final seed bed preparation	Areas of Revegetation within RDU Boundary	During RA
ARM 17 24 714 Cover Crops and Mulching		All revegetated areas of the RDU 5 will be planted with a cover crop, as necessary to minimize erosion.	Areas of Revegetation within RDU Boundary	During RA
ARM 17 24 716 Method of Revegetation		The seed mix and establishment of a vegetative cover described in the RDU 5 RAWP/FDR meet the requirement	Areas of Revegetation within RDU Boundary	During RA
ARM 17 24 718 Soil Amendments and Other Management Techniques		Soil amendments as described in the RDU 5 RAWP/FDR will be used as necessary to reestablish vegetation cover	Areas of Revegetation within RDU Boundary	During RA
ARM 17 24 721 Eradication of Rills and Gullies		Monitoring and maintenance as outlined in the Vegetation Management Plan will satisfy this requirement or monitoring and maintenance per Federal Railroad Administration regulations	Areas of Revegetation within RDU Boundary	During M&M

**Table 2. Anaconda Regional Water, Waste Soils Operable Unit
Performance Standards/Compliance
Anaconda Active Railroads
Remedial Design Unit 5**

PERFORMANCE REQUIREMENTS CATEGORY ¹	RDU Design Reference	Method of Compliance (How design achieves compliance)	Point of Compliance	Time of Compliance
ARM 17 24 723 Monitoring				
ARM 17 24 726 Vegetation Production, Cover, Diversity, Density, and Utility Requirements				
ARM 17 24 728 Composition of Vegetation				
ARM 17 24 730 and 17 24 731 Analysis for Toxicity				
ARM 17 24 733 Measurement Standards of Trees, Shrubs, and Half-Shrubs		Monitoring and maintenance as outlined in the Vegetation Management Plan will satisfy this requirement.	Areas of Revegetation within RDU Boundary	During M&M
ARM 17 24 751 Protection and Enhancement of Fish, Wildlife, and Related Environmental Values		It is anticipated that the wildlife habitat will be improved by the reclamation at the RDU 5 and will therefore satisfy this requirement.	RDU Boundary	During RA
ARM 17 24 824 Alternate closure/reclamation Alternates Post Mining Land Use		The RDU 5 will be reclaimed consistent with adjacent areas outside of dedicated developments.	RDU Boundary	At Completion of RA
Montana Metal Mine Reclamation Act	50			
MCA 82-4-336 (7) versus (9) in Slag Perf Sids		The RDU 5 will be reclaimed consistent with adjacent areas	Areas of Revegetation within RDU Boundary	At Completion of RA
MCA 82-4-336 (10)		The reclamation of the RDU 5 will satisfy these requirements as one of its objectives is to minimize infiltration of precipitation	Areas of Revegetation within RDU Boundary	At Completion of RA

Notes 1 Standards are from ARWW&S OU Remedial Design Work Plan, CDM Junco 2000

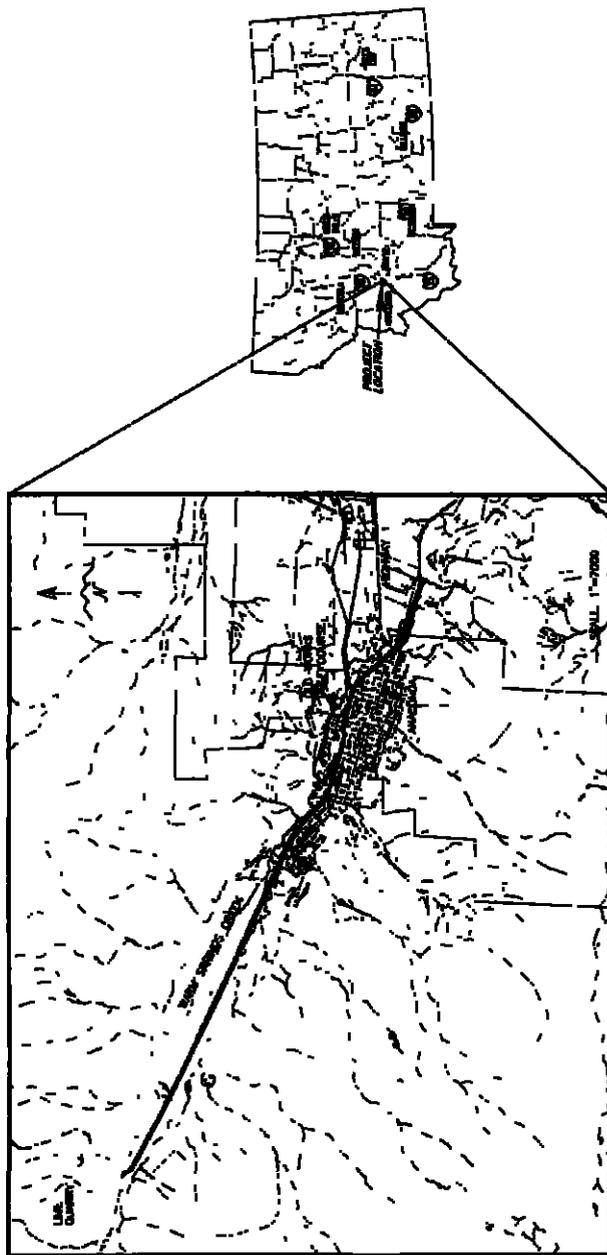
APPENDIX A

CONSTRUCTION DRAWINGS

**FINAL CONSTRUCTION PLANS FOR
ANACONDA REGIONAL WATER, WASTE AND SOILS OPERABLE UNIT
REMEDIAL DESIGN UNIT 5
ANACONDA ACTIVE RAILROAD BEDS
RA CONSTRUCTION**



PREPARED BY
PIONEER TECHNICAL SERVICES, INC.
SEPTEMBER 19, 2003



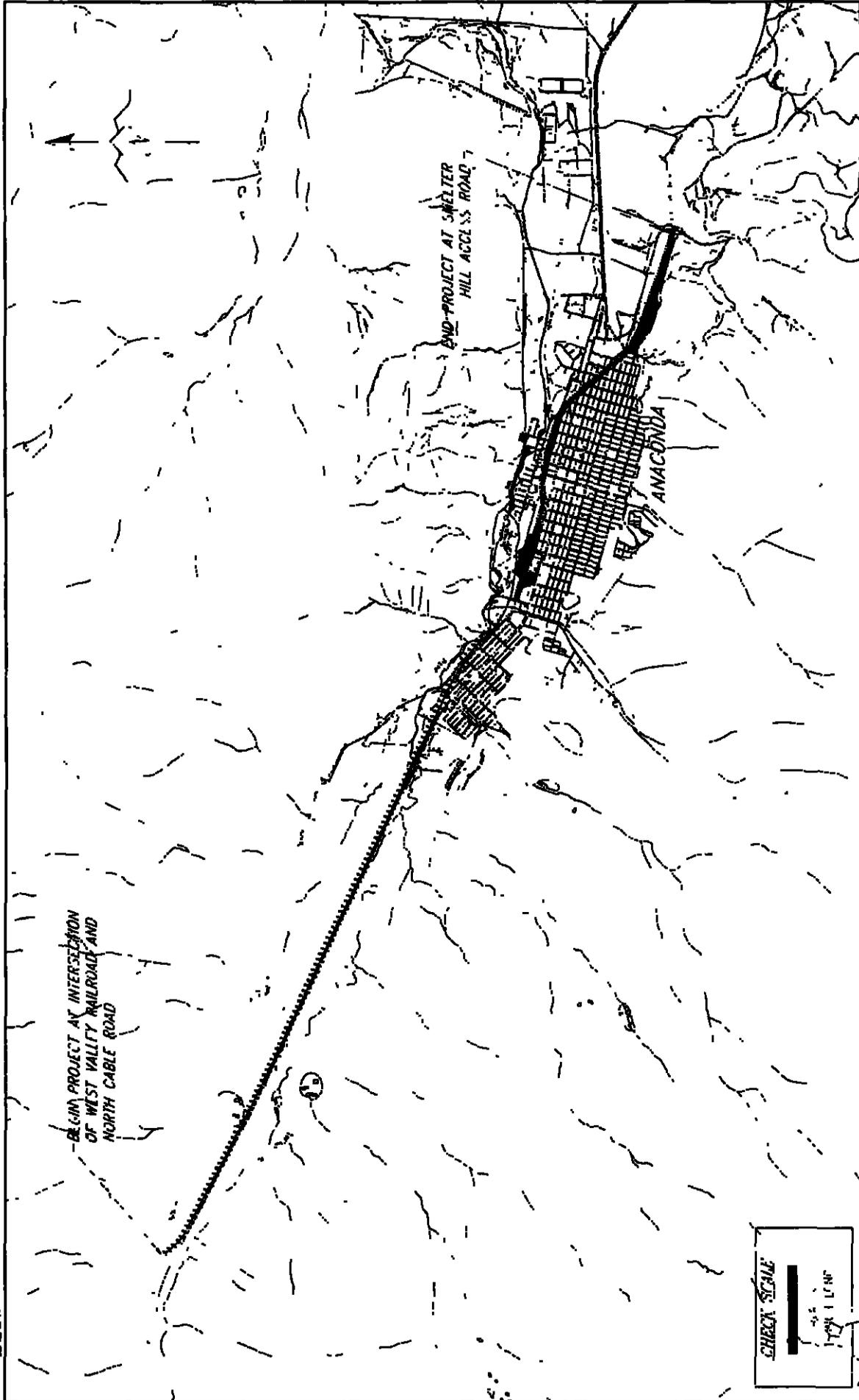
SITE VICINITY MAP

GENERAL NOTES

- 1 CONTRACTOR SHALL NOTIFY IN WRITING ALL UTILITY COMPANIES AND UTILITY OWNERS AND OBTAINING EXACT LOCATION OF ALL UNDERGROUND UTILITIES BEFORE COMMENCING WORK. NOTICE TO UTILITIES SHALL BE SUBMITTED TO OWNER 48-HOUR NOTICE IS REQUIRED. CONTRACTOR IS RESPONSIBLE FOR PROTECTING AND REPAIRING ANY DAMAGED UTILITIES. CONTRACTOR SHALL NOTIFY ONE-CALL UTILITY LOCATE AT (800) 481-5555 AT LEAST 48-HOURS PRIOR TO CONSTRUCTION.
- 2 CONTRACTOR SHALL NOTIFY THE POTENTIALLY RESPONSIBLE PARTY (PRP) REPRESENTATIVE OF ALL UTILITIES ENCOUNTERED DURING CONSTRUCTION AND SHALL NOT BACKFILL UNTIL THE CONTRACTOR HAS MADE A RECORD OF ITS TYPE, SIZE AND LOCATION.
- 3 CONTRACTOR SHALL RESPECT ALL RIGHT-OF-WAY BOUNDARIES. CONTRACTOR IS TO PROTECT FROM DAMAGE BARRIERS, WALLS, MONUMENTS, TREES AND OTHER LANDSCAPING, UTILITY POLES, AND OTHER FEATURES INSIDE AND OUTSIDE ANY RIGHTS-OF-WAY.
- 4 EXCAVATION
 - A. GENERAL: THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DESIGNING AND CONSTRUCTING STABLE, TEMPORARY EXCAVATIONS AND SHALL SHOW SLOPE OR BENT-TO-SIDES OF THE EXCAVATIONS AS REQUIRED TO MAINTAIN STABILITY OF THE EXCAVATION SIDES AND BOTTOM. ALL EXCAVATIONS SHALL COMPLY WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS INCLUDING THE CURRENT OSHA EXCAVATION AND TRENCH SAFETY STANDARDS. CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR WHO SHALL ALSO BE SOLELY RESPONSIBLE FOR THE METHODS, METHODS, AND SEQUENCING OF CONSTRUCTION OPERATIONS UNDER ANY CIRCUMSTANCES SHOULD THE INFORMATION PROVIDED BE INTERPRETED TO MEAN THAT THE PRP IS ASSIGNING RESPONSIBILITY FOR CONSTRUCTION SITE SAFETY OR THE CONTRACTOR'S ACTIVITIES SUCH RESPONSIBILITY IS NOT BEING WAIVED AND SHALL NOT BE IMPLIED.
 - B. EXCAVATION AND SLOPES: IN NO CASE SHOULD SLOPE HEIGHT INCLUDING UTILITY TRENCH EXCAVATION EXCEED THAT SPECIFIED IN LOCAL, STATE, AND FEDERAL SAFETY REGULATIONS. SPECIFICALLY THE CURRENT OSHA HEALTH AND SAFETY STANDARDS FOR EXCAVATIONS, 29 CFR PART 1926, SHALL BE FOLLOWED.
 - C. CONTRACTOR SHALL REMOVE AND REFACE ALL EXISTING FEATURES DISTURBED DURING CONSTRUCTION TO ORIGINAL CONDITION, AND AS OTHERWISE DIRECTED, INCLUDING BUT NOT LIMITED TO, SIGNS, MAILBOXES, ENTRANCE STRUCTURES, DRAINAGE FEATURES, APPROACHES, DETAILERS, GRAVEL SURFACES, CONCRETE STRUCTURES INCLUDING CURBS AND SIDEWALKS, ASPHALT PAVEMENT, AND FENCES. CONTRACTOR SHALL FIELD VERIFY EXISTENCE OF THIS WORK PRIOR TO BID AND INCLUDE THE COST OF THIS WORK IN THE UNIT PRICES.
 - D. ALL FENCES REMOVED TO ALLOW FOR CONSTRUCTION SHALL ONLY BE REMOVED AFTER RECEIVING PERMISSION FROM OWNER. REMOVED FENCES SHALL BE REINSTALLED TO A CONDITION THAT IS EQUAL TO OR BETTER THAN THE ORIGINAL, UNLESS OTHERWISE INDICATED BY THE PRP.
- 5 TRAFFIC CONTROL
 - A. GENERAL: CONSTRUCTION SHALL NOT COMMENCE ON THE PROJECT UNTIL NECESSARY CONSTRUCTION WARNING SIGNS AND TRAFFIC CONTROL ARE IN PLACE AND APPROVED BY THE PRP.
 - B. TRAFFIC PLAN: CONTRACTOR SHALL PREPARE AND SUBMIT FOR REVIEW BY OWNER A TRAFFIC CONTROL PLAN. ALL TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
 - C. LOAD LIMITS: LEGAL LOAD LIMIT REQUIREMENTS SHALL BE ENFORCED ON ALL STATE HIGHWAYS, CITY STREETS, AND COUNTY ROADS.
 - D. THE MONTANA DEPARTMENT OF TRANSPORTATION SHALL REVIEW AND APPROVE ALL TRAFFIC CONTROL REQUIREMENTS ALONG HIGHWAY 1.
 - E. ANACONDA DEERLODGE COUNTY SHALL REVIEW AND APPROVE TRAFFIC CONTROL PLANS FOR NORTH CABLE ROAD AND THE STREETS PASSING THROUGH THE COMMUNITY OF ANACONDA.
- 6 CONTRACTOR SHALL PROVIDE THEIR OWN WATER FOR DUST CONTROL AND COMPACTED ATLANTIC RICHFIELD HAS PERMITTED WATER SOURCE ON WARM SPRINGS CREEK, AT THE GALEY ROAD, THAT MAY BE USED BY THE CONTRACTOR. OTHER SOURCES ARE AVAILABLE AND MAY BE UTILIZED AT THE DISCRETION AND COST OF THE CONTRACTOR.
- 7 ANY DISTURBED PROPERTY, SECTION CORNERS, OR HIGHWAY ADJACEMENTS, PROPERTY PINS, OR OTHER NOT HIGHWAY CONTROL ARE TO BE RESET BY A PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF MONTANA AT THE CONTRACTOR'S EXPENSE. THESE ITEMS ARE NOT SHOWN ON THE DRAWINGS.
- 8 ALL PERMITS REQUIRED TO PERFORM THE WORK SHALL BE OBTAINED BY THE CONTRACTOR.
- 9 THE PRP RESERVES THE RIGHT TO ADJUST THE SIZED MATERIAL LISTED IN THE SPECIFICATIONS IF A DIFFERENT MATERIAL IS DETERMINED TO BE REQUIRED. THE PRP ALSO RESERVES THE RIGHT TO DIRECT THE CONTRACTOR TO NOT INSTALL COVER SOIL, SIZED FERTILIZER AND MULCH ON CERTAIN AREAS, AS WELL AS ADD ADDITIONAL AREAS.
- 10 ALL EXISTING DRAINAGE PATTERNS SHALL BE MAINTAINED UNLESS OTHERWISE SPECIFIED ON THE DRAWINGS. ADDITIONAL TEMPORARY DRAINAGE PATTERNS MAY BE REQUIRED TO FACILITATE CONSTRUCTION OF THE REMEDIY THESE ELEMENTS ARE NOT SHOWN ON THE DRAWINGS AND ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. SUCH ELEMENTS SHALL BE REMOVED AT NO ADDITIONAL EXPENSE TO OWNER WHEN THE WORK IS COMPLETED.
- 11 CONTRACTOR SHALL COORDINATE WITH, AND RECEIVE APPROVAL FROM PARKS DEPARTMENT, THE RAILROAD OWNER FOR ALL WORK WITHIN THE RAILROAD RIGHT OF WAY. CONTRACTOR SHALL NOT DAMAGE THE ACTIVE RAILROAD IN ANY WAY DURING IMPLEMENTATION OF THE WORK.

SHEET INDEX

- | | |
|----|---|
| 1 | COVER SHEET |
| 2 | GENERAL NOTES AND SHEET INDEX |
| 3 | LEGEND AND ABBREVIATIONS |
| 4 | SITE MAP AND PROJECT LIMITS |
| 5 | WEST VALLEY RAILROAD RA PLAN (STA 0+00 TO 118+00) |
| 6 | WEST VALLEY RAILROAD RA PLAN (STA 118+00 TO 244+00) |
| 7 | WEST VALLEY RAILROAD TRESTLE BMPs INSTALLATION PLAN |
| 8 | ANACONDA MAINLINE PORTION OF RDV 5 - SITE MAP |
| 9 | RDV 5 RAILROAD RA PLAN (STA 244+00 TO 256+00) ANACONDA MAINLINE |
| 10 | RDV 5 RAILROAD RA PLAN (STA 256+00 TO 295+00) ANACONDA MAINLINE |
| 11 | RDV 5 RAILROAD RA PLAN (STA 295+00 TO 311+50) ANACONDA MAINLINE |
| 12 | RDV 5 RAILROAD RA PLAN (STA 311+50 TO 328+50) ANACONDA MAINLINE |
| 13 | RDV 5 RAILROAD RA PLAN (STA 328+50 TO 341+00) ANACONDA MAINLINE |
| 14 | RDV 5 RAILROAD RA PLAN (STA 341+00 TO 352+00) ANACONDA MAINLINE |
| 15 | AFTED SPUR REMEDIAL ACTION PLAN |
| 16 | WEST ANACONDA YARD RA PLAN |
| 17 | EAST ANACONDA YARD RA PLAN |
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| 28 | DETAILS |
| 29 | DETAILS |
| 30 | DETAILS |
| 31 | DETAILS |
| 32 | OPPORTUNITY FONDS CELL B2-12 DISPOSAL AREA |
| 33 | FURNACE SLAG STORAGE AREA NEAR SHELTER HILL |



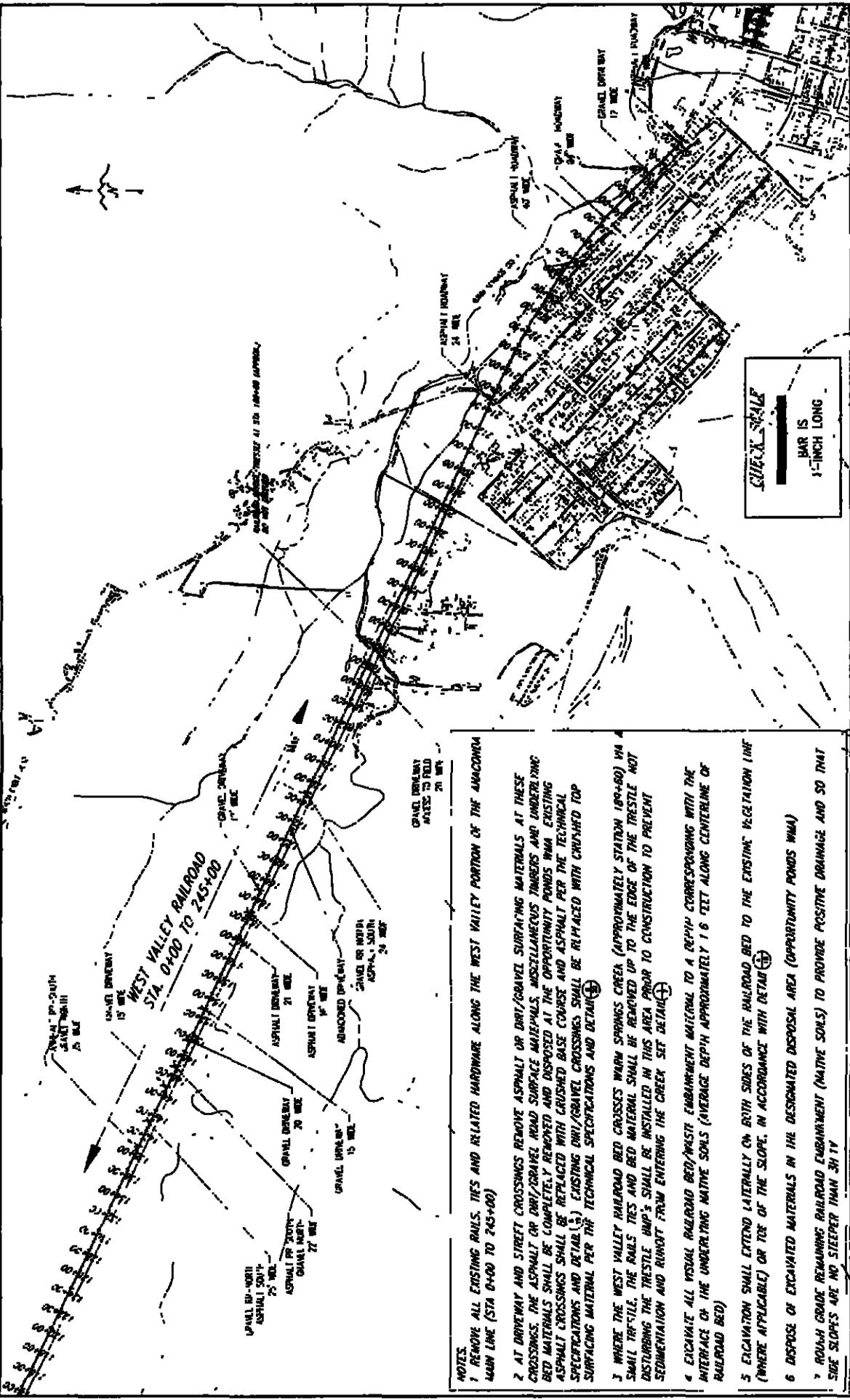
BEGIN PROJECT AT INTERSECTION
OF WEST VALLEY RAILROAD AND
NORTH CABLE ROAD

END PROJECT AT SHELTER
HILL ACCESS ROAD

ANACONDA

CHECK SCALE
1" = 1/4" MILE
1" = 1/2" MILE

PIONEER ENGINEERING SERVICES, INC. 100 N. 10TH ST. BUTTE, MT 59701	SHEET NO. 4
	SITE MAP AND PROJECT LIMITS
ARW&S OPERABLE UNIT ROU 5 ANACONDA ACTIVE MAINTENANCE BRGS RA	DATE: 10/1/88 DRAWN BY: J. J. [unclear] CHECKED BY: [unclear] SCALE: 1" = 1/4" MILE PROJECT NO.: [unclear]



EOU 5 RAILROAD RA PLAN
 STA 118+00 TO 245+00

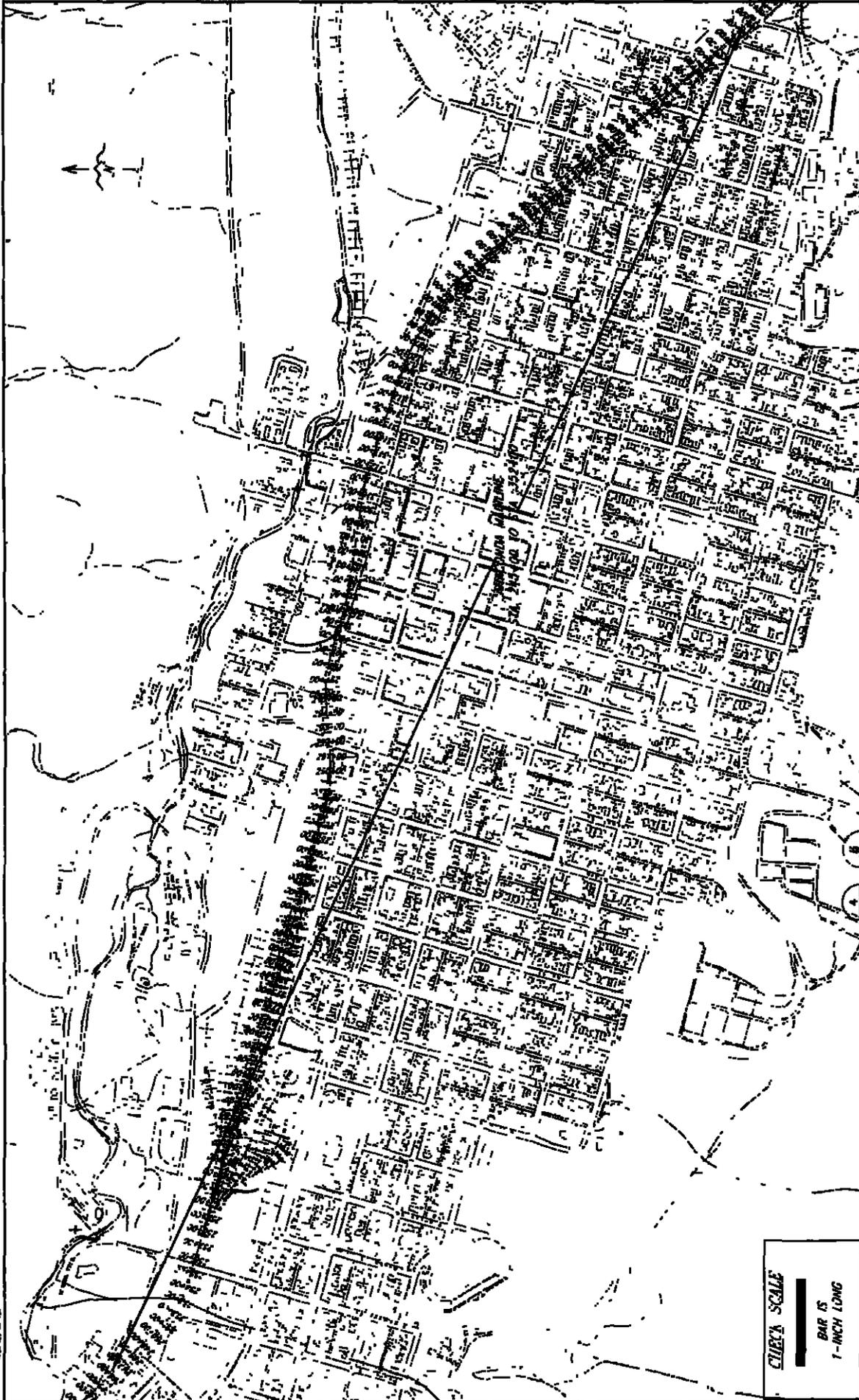
ARRWAS OPERABLE UNIT
 EOU 5 AMACONRA ACTIVE RAILROAD CROSS BA

6

- NOTES.**
- 1 REMOVE ALL EXISTING RAILS, TIES AND RELATED HARDWARE ALONG THE WEST VALLEY PORTION OF THE AMACONRA MAIN LINE (STA 0+00 TO 2+54+00)
 - 2 AT DRIVEWAY AND STREET CROSSINGS REMOVE ASPHALT OR DIRT/GRAVEL SURFACING MATERIALS AT THESE CROSSINGS. THE ASPHALT OR DIRT/GRAVEL ROAD SURFACE MATERIALS, MISCELLANEOUS TIMBERS AND UNDERBED BED MATERIALS SHALL BE COMPLETELY REMOVED AND DISPOSED AT THE OPPORTUNITY PONDS WMAA EXISTING ASPHALT CROSSINGS SHALL BE REPLACED WITH CRUSHED BASE COURSE AND ASPHALT PER THE TECHNICAL SPECIFICATIONS AND DETAIL(S). EXISTING DIRT/GRAVEL CROSSINGS SHALL BE REPLACED WITH CRUSHED TOP SURFACING MATERIAL PER THE TECHNICAL SPECIFICATIONS AND DETAIL(S).
 - 3 WHERE THE WEST VALLEY RAILROAD BED CROSSES WARM SPRINGS CREEK (APPROXIMATELY STATION 189+60) VIA SMALL TRESTLE, THE RAILS TIES AND BED MATERIAL SHALL BE REMOVED UP TO THE EDGE OF THE TRESTLE NOT DISTURBING THE TRESTLE BMP'S SHALL BE INSTALLED IN THIS AREA PRIOR TO CONSTRUCTION TO PREVENT SEDIMENTATION AND RUNOFF FROM ENTERING THE CREEK. SEE DETAIL(S).
 - 4 EXCAVATE ALL VISUAL RAILROAD BED/WASTE EMBANKMENT MATERIAL TO A DEPTH CORRESPONDING WITH THE INTERFACE OF THE UNDERLYING NATIVE SOILS (AVERAGE DEPTH APPROXIMATELY 1.6 FEET ALONG CENTERLINE OF RAILROAD BED)
 - 5 EXCAVATION SHALL EXTEND Laterally ON BOTH SIDES OF THE RAILROAD BED TO THE EXISTING VEGETATION LINE (WHERE APPLICABLE) OR TOP OF THE SLOPE, IN ACCORDANCE WITH DETAIL(S).
 - 6 DISPOSE OF EXCAVATED MATERIALS IN THE DESIGNATED DISPOSAL AREA (OPPORTUNITY PONDS WMAA)
 - 7 ROUGH GRADE REMAINING RAILROAD EMBANKMENT (NATIVE SOILS) TO PROVIDE POSITIVE DRAINAGE AND SO THAT SIDE SLOPES ARE NO STEEPER THAN 3H:1V

TECHNICAL SERVICES, INC.
 P.O. BOX 2446
 WYOMING, WY 84002

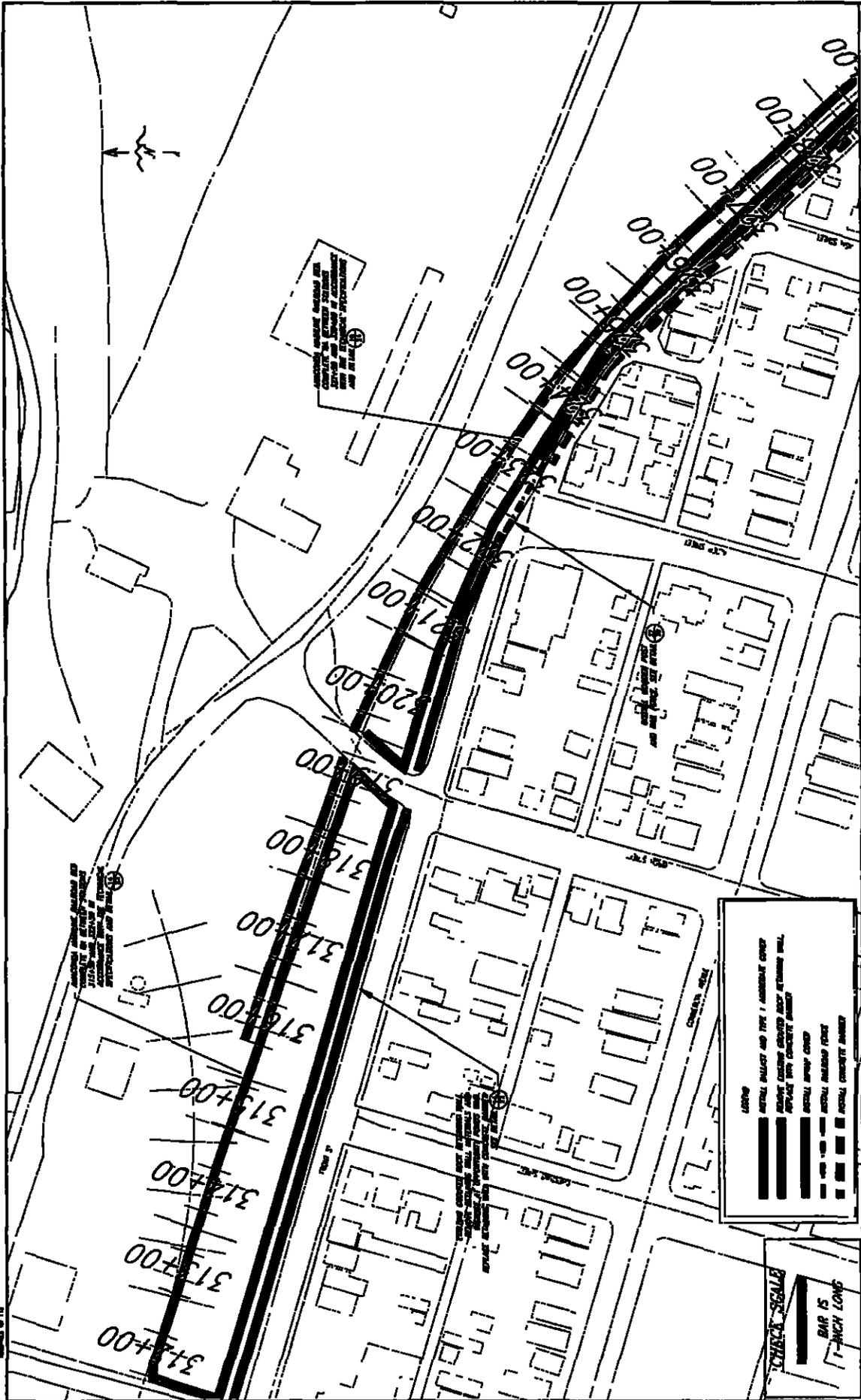
PIONEER



68-102-10

CLIP'S SCALE
 BAR IS
 1-INCH LONG

TECHNICAL SERVICES, INC. P.O. BOX 204 AVONDALE, ARIZONA	ARIZONA OPERABLE UNIT 1001 S ANACORDA ACTIVE RAILROAD BEDS BA
ANACORDA MAINLINE SITE MAP	
8	

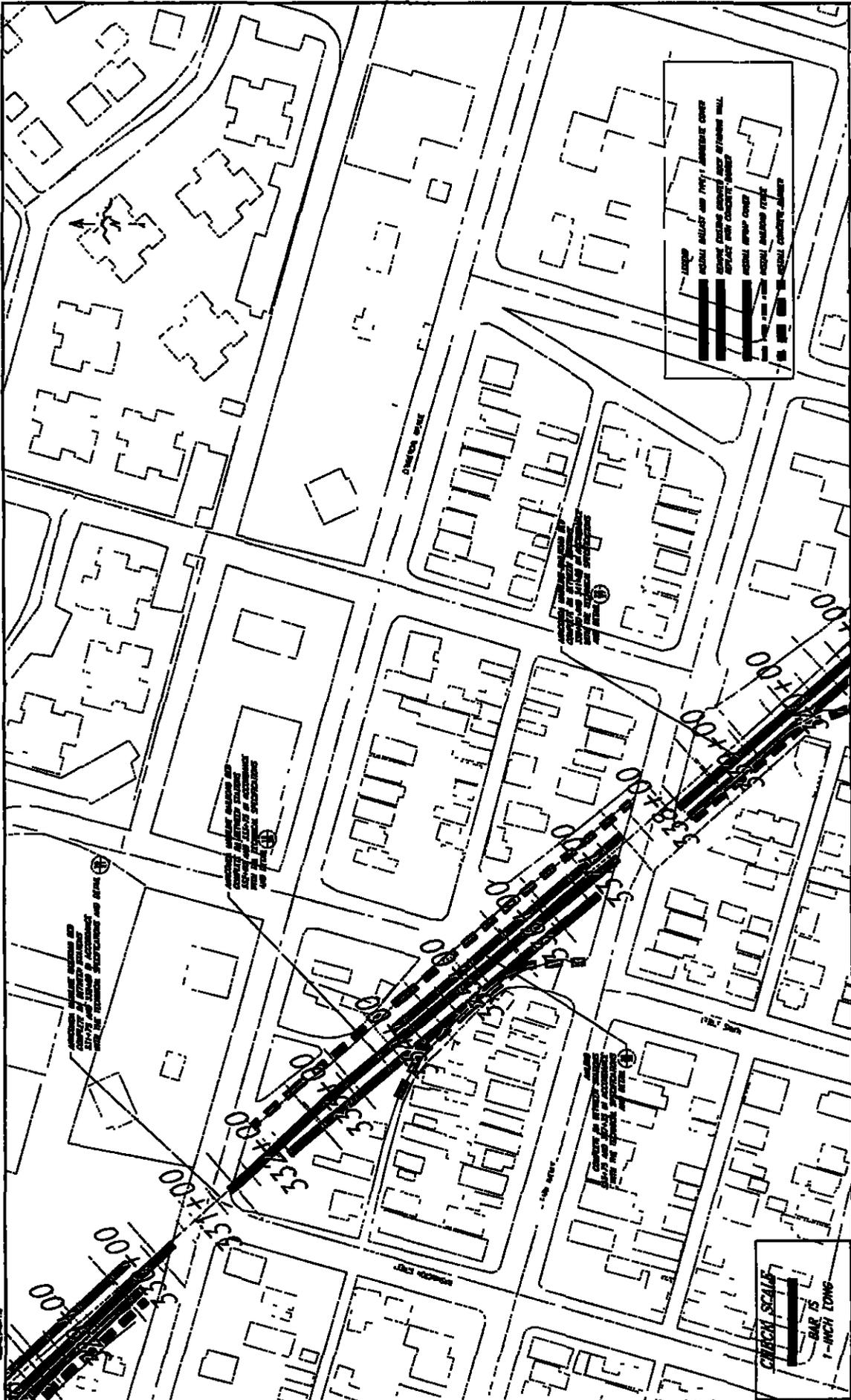


12
 ANACONDA MAINLINE
 STA 311+00 TO 329+00
 AIRWAYS OPERABLE UNIT
 BPO 6 ANACONDA ACTIVE RAILROAD SEGS BA

LEGEND
 [Symbol] ACTUAL PILECAP AND TYPE 1 ANCHORAGE GROUP
 [Symbol] ANCHORAGE GROUPS LOCATED ABOVE RETAINING WALL
 [Symbol] ANCHORAGE GROUPS LOCATED BELOW RETAINING WALL
 [Symbol] ACTUAL ANCHORAGE GROUP
 [Symbol] ACTUAL ANCHORAGE GROUP
 [Symbol] ACTUAL ANCHORAGE GROUP

GRAPHIC SCALE
 BAR IS
 7-INCH LONG

PIONEER
 ARCHITECTURAL SERVICES, INC.
 ALL THE WAY
 DIVISION OF P&S



13

ANACONDA MAINLINE
STA 329+00 TO 341+00

ARWAS OPERABLE UNIT
RUE & ANACONDA ACTIVE RAILROAD BEDS BA

GENERAL SERVICES DIV. 100
P.O. BOX 100
MONTANA 59403

SCALE: 1" = 40'

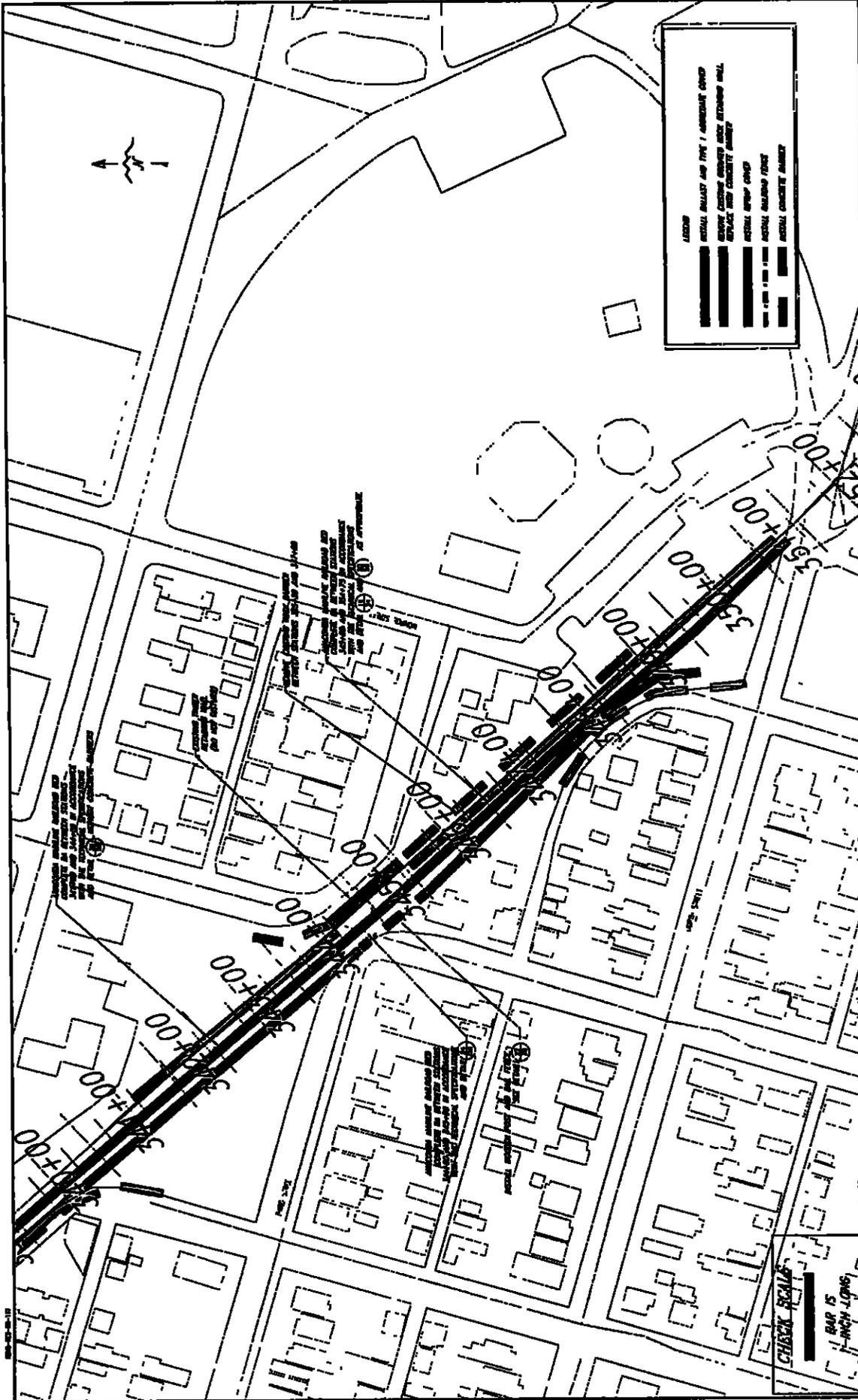
DATE: 10/1/88

DRAWN BY: J. W. B.

CHECKED BY: J. W. B.

APPROVED BY: J. W. B.

PIONEER



- LEGEND**
- EXISTING MAINLINE AND TRAIL / ADJUSTED CENTER
 - EXISTING CENTER DRIVEWAY WITH RETAINING WALL
 - EXISTING DRIVEWAY WITH CONCRETE DRIVEWAY
 - EXISTING DRIVEWAY
 - EXISTING DRIVEWAY DRIVE
 - EXISTING DRIVEWAY DRIVE

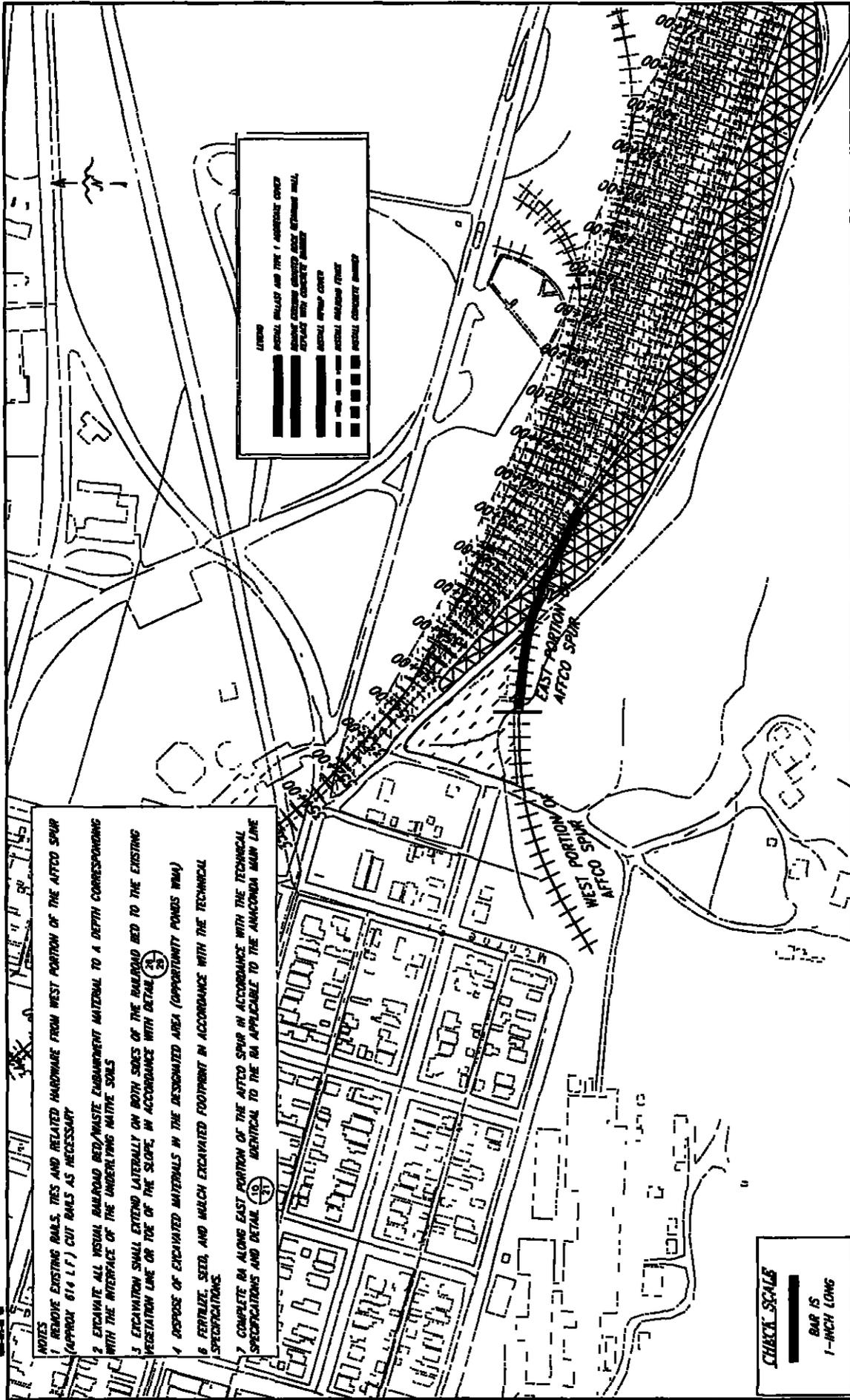
ANACORDA MAINLINE
 STA 341+00 TO 358+00

AIRWAYS OPERABLE UNIT
 BIRD & ANACORDA ACTIVE RAILROAD CROSSING

SHEET NO. 14

CHASCO SCALE
 1" BAR IS
 100' LONG

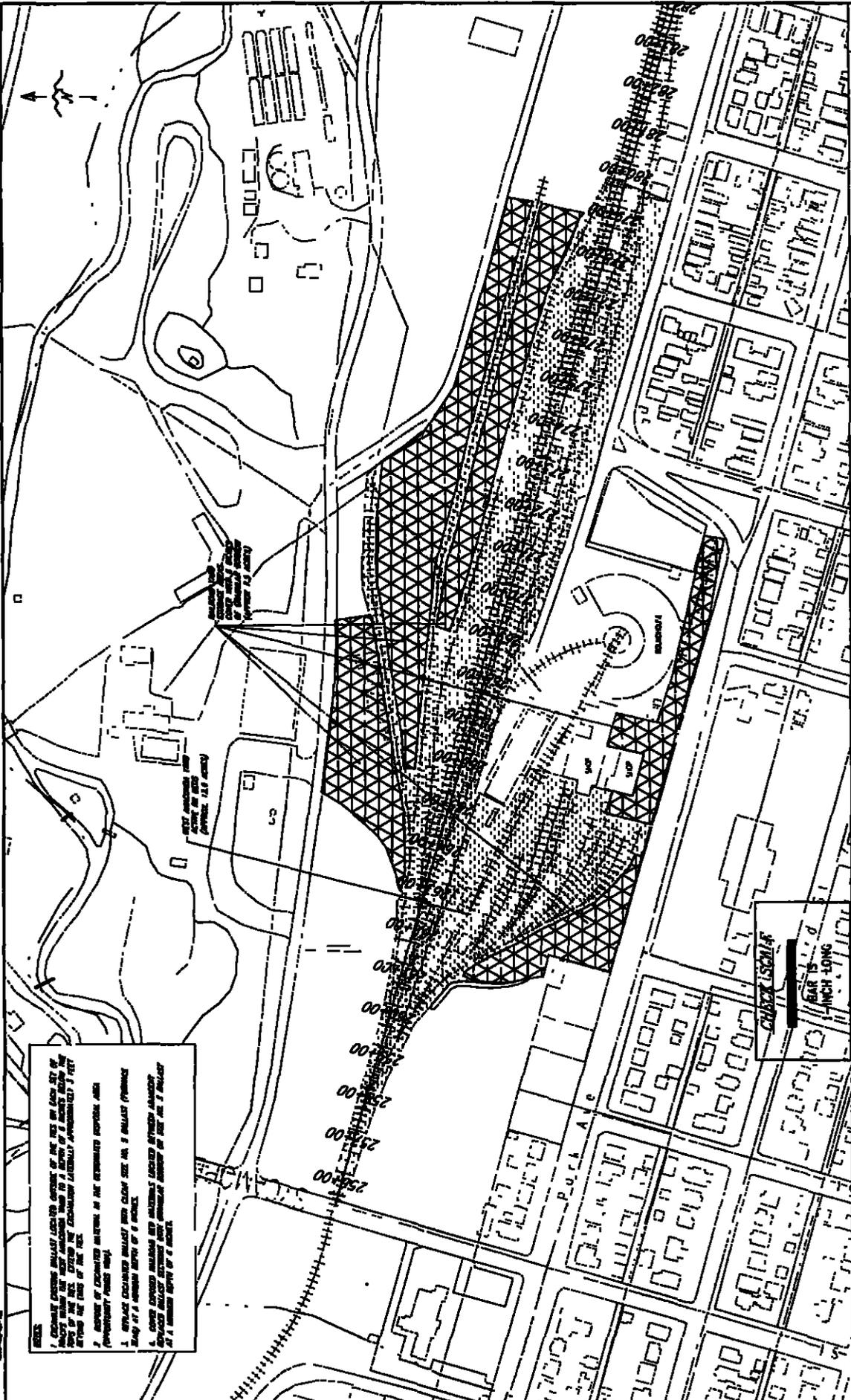
PIONEER
 PROFESSIONAL SERVICES, INC.
 110 N. 1ST ST.
 ANACORDA, IA 50009



- NOTES**
- 1 REMOVE EXISTING RAILS, TIES AND RELATED HARDWARE FROM WEST PORTION OF THE AFCCO SPUR (APPROX 616 L.F.) CUT RAILS AS NECESSARY
 - 2 EXCAVATE ALL VISUAL RAILROAD BED/WASTE EMBANKMENT MATERIAL TO A DEPTH CORRESPONDING WITH THE INTERFACE OF THE UNDERLYING NATIVE SOILS
 - 3 EXCAVATION SHALL EXTEND Laterally ON BOTH SIDES OF THE RAILROAD BED TO THE EXISTING VEGETATION LINE OR TOE OF THE SLOPE, IN ACCORDANCE WITH DETAIL 20
 - 4 DEPOSE OF EXCAVATED MATERIALS IN THE DESIGNATED AREA (OPPORTUNITY PONDS (NMA))
 - 5 FERTILIZE, SEED, AND MULCH EXCAVATED FOOTPRINT IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
 - 6 COMPLETE BA ALONG EAST PORTION OF THE AFCCO SPUR IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS AND DETAIL 10 IDENTICAL TO THE BA APPLICABLE TO THE ANACONDA MAIN LINE

- LEGEND**
- 1. AREAS TO BE REMOVED
 - 2. AREAS TO BE EXCAVATED
 - 3. AREAS TO BE FILLED
 - 4. AREAS TO BE PLANTED
 - 5. AREAS TO BE MULCHED
 - 6. AREAS TO BE FERTILIZED
 - 7. AREAS TO BE SEED
 - 8. AREAS TO BE MULCHED
 - 9. AREAS TO BE FERTILIZED
 - 10. AREAS TO BE SEED

CHECK SCALE
 BAR IS
 1-INCH LONG



- NOTES:**
1. EXISTING EXTERIOR WALLS LOCATED OUTSIDE OF THE 100' SET BACK LINE OF THE EXISTING EXTERIOR WALLS SHALL BE REMOVED AND THE EXTERIOR WALLS RECONSTRUCTED TO THE EXISTING FINISH OF THE FACE.
 2. EXTERIOR OF EXISTING WALLS IN THE RECONSTRUCTED PORTION SHALL BE FINISHED WITH BRICK.
 3. REPLACE EXISTING WALLS WITH CLAY TILE AND 8" BRICK (FINISH BRICK) AT A MINIMUM THICKNESS OF 8" BRICK.
 4. COVER EXISTING WALLS WITH MATERIALS LOCATED BETWEEN EXISTING EXTERIOR WALLS AND EXTERIOR WALLS TO BE RECONSTRUCTED AT A MINIMUM THICKNESS OF 8" BRICK.

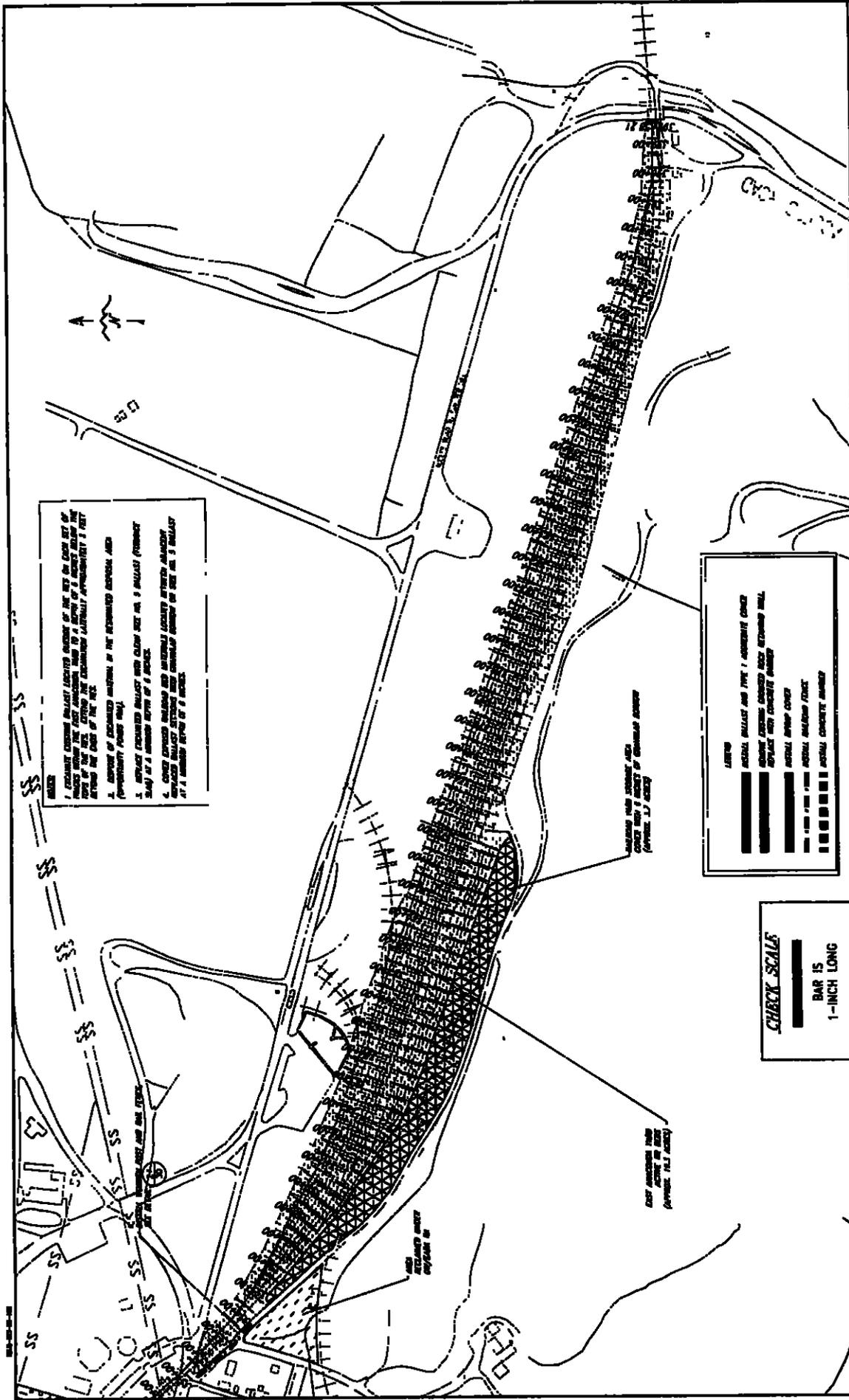
16

**WEST ANACORDA YARD
EA PLAN**

**ARTWAYS OPERABLE UNIT
RDU & ANACORDA ACTIVE RAILROAD BEDS EA**

PIONEER ENGINEERING SERVICES, INC.
1401 W. 10TH AVE.
DENVER, CO 80202

DATE: 10/10/00
SCALE: AS SHOWN
DRAWN BY: JLM
CHECKED BY: JLM



NOTES

1. EXISTING EXPOSED BALLAST LOCATED EASTWARD OF THE NEW ON CURB SET OF TRACKS SHALL BE CUT AWAY, Hauled to a depth of 6 inches below the top of the new concrete slab and removed laterally approximately 1 foot beyond the edge of the slab.
2. REMOVE OF EXPOSED MATERIAL IN THE INDICATED SECTION AREA (APPROXIMATELY 100' LONG).
3. SPREAD EXISTING BALLAST INTO CLEAN 200 # 1/2 BALLAST (FINISHING SLAB) TO A MINIMUM DEPTH OF 6 INCHES.
4. COVER EXPOSED BALLAST AND EXISTING EXPOSED EXPOSED ANACONDA EXPOSED BALLAST WITH NEW 100 # 1/2 BALLAST TO A MINIMUM DEPTH OF 6 INCHES.

LEGEND

- ANACONDA BALLAST AND TYPE 1 AGGREGATE COVER
- EXPOSED EXISTING EXPOSED EXPOSED EXPOSED BALLAST
- EXPOSED EXISTING EXPOSED EXPOSED EXPOSED BALLAST
- ANACONDA BALLAST COVER
- ANACONDA BALLAST COVER
- ANACONDA BALLAST COVER
- ANACONDA BALLAST COVER

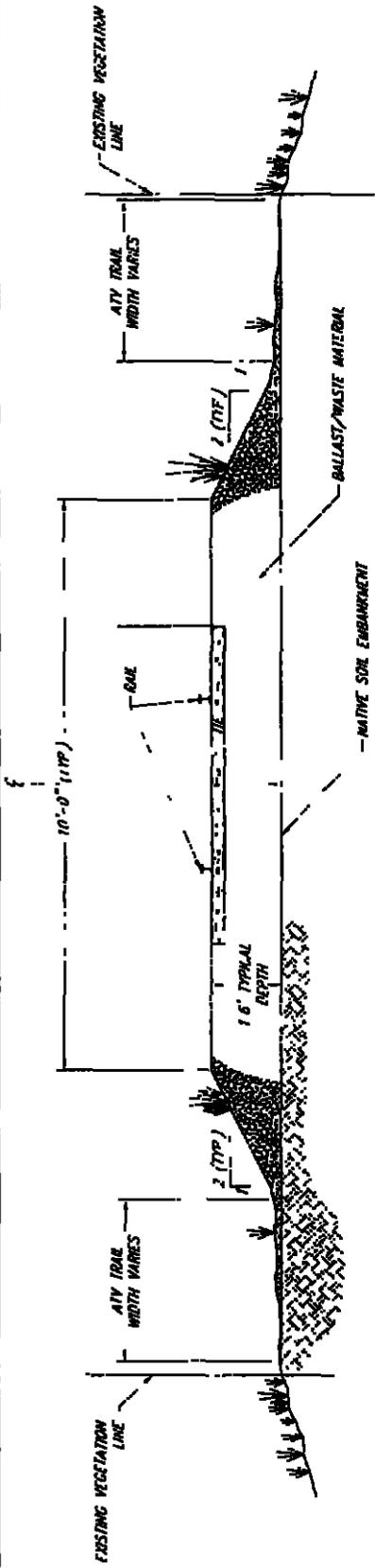
CHECK SCALE

BAR IS 1-INCH LONG

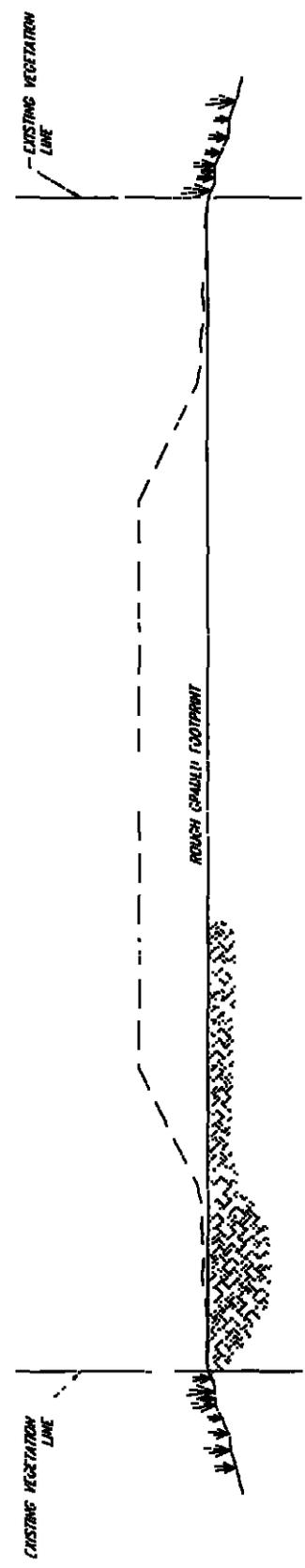
EXISTING EXPOSED BALLAST AND TYPE 1 AGGREGATE COVER (APPROX. 10' DEPTH)

EXISTING EXPOSED BALLAST AND TYPE 1 AGGREGATE COVER (APPROX. 10' DEPTH)

SECTION 3

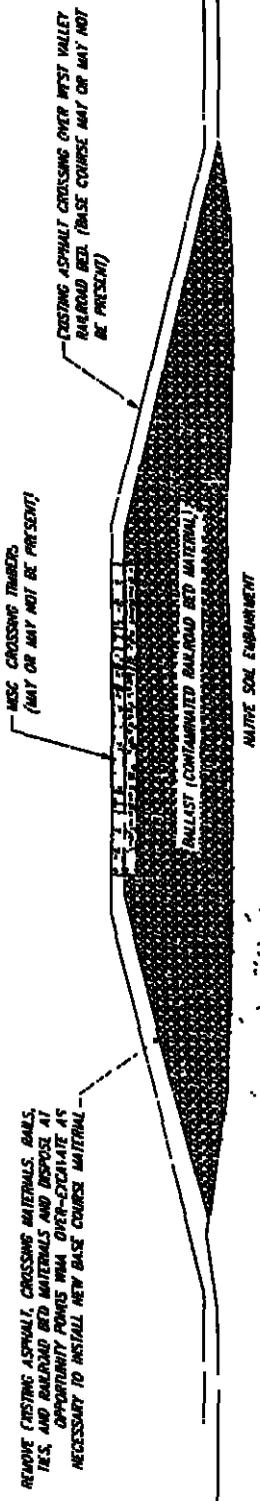


WEST VALLEY RAILROAD BED TYPICAL EXISTING CROSS-SECTION 3

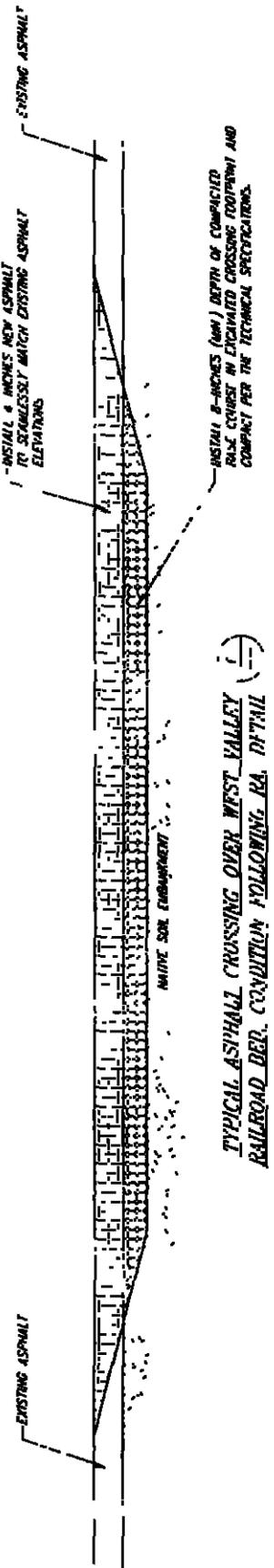


WEST VALLEY RAILROAD BED TYPICAL CONDITION FOLLOWING WASTE REMOVAL DETAIL 4

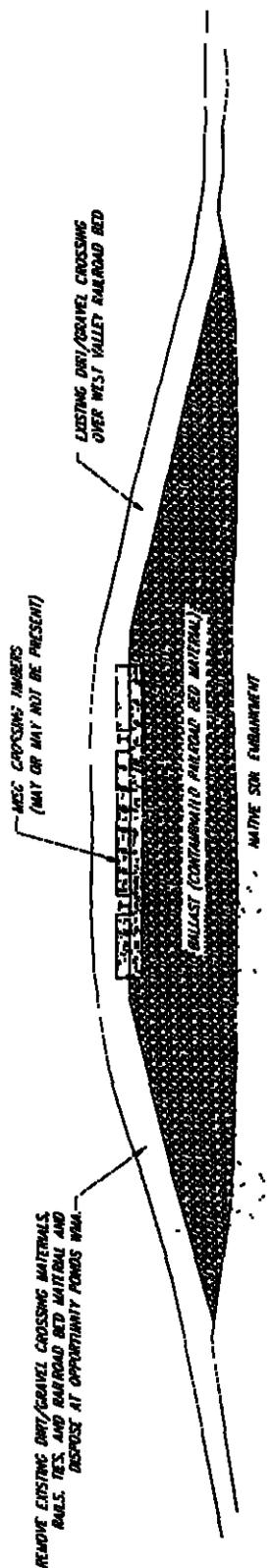
<p>PROFESSIONAL SERVICES, INC. P.O. BOX 604 MARIETTA, GA 30067</p>		<p>PROJECT NO. 100-100000-01 SHEET NO. 18</p>	
<p>PIONEER</p>		<p>DETAILS</p>	
<p>AIRWAYS OPERABLE UNIT RUN 5 ANDORRA ACTIVE RAILROAD BED IN</p>		<p>18</p>	



TYPICAL ASPHALT CROSSING OVER WEST VALLEY RAILROAD BED. EXISTING CONDITION (5)



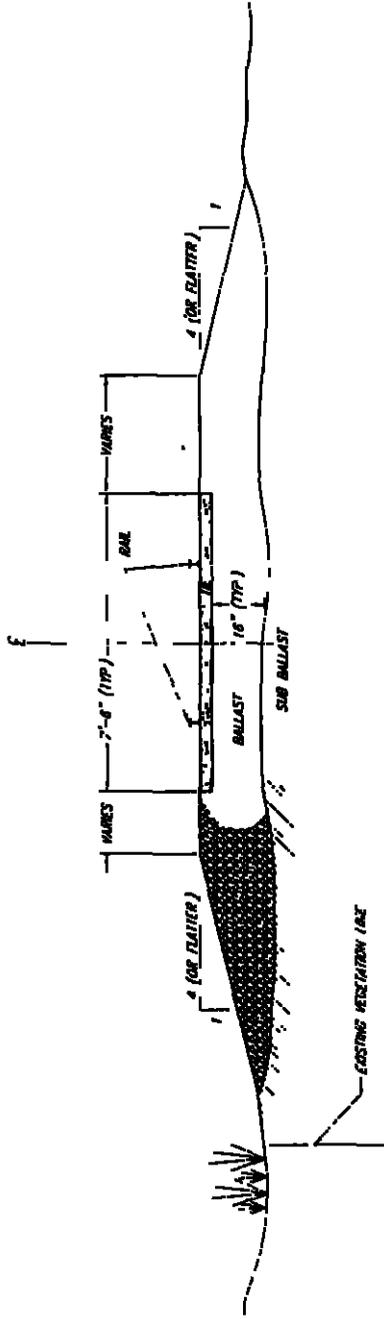
TYPICAL ASPHALT CROSSING OVER WEST VALLEY RAILROAD BED. CONDITION FOLLOWING RA DETAIL (1)



TYPICAL DIRT/GRAVEL CROSSING OVER WEST VALLEY RAILROAD BED - EXISTING CONDITION

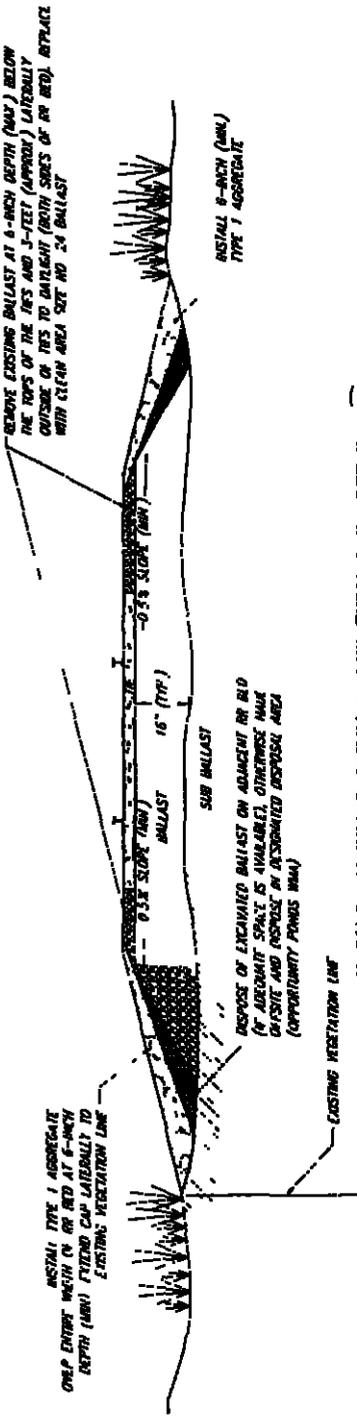


TYPICAL DIRT/GRAVEL CROSSING OVER WEST VALLEY RAILROAD BED - CONDITION FOLLOWING RAIL DETAIL



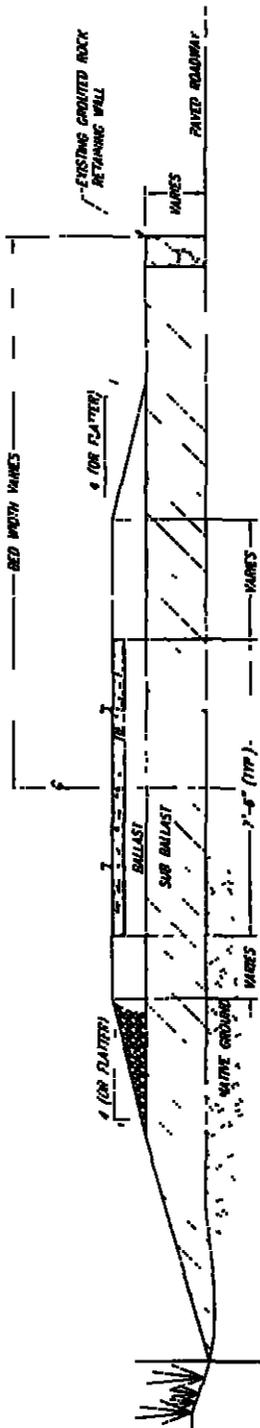
ANACONDA MAINLINE TYPICAL EXISTING RAILROAD BED CROSS-SECTION (9)

STA 245+00 TO 255+00 AND
STA 280+00 TO 300+00



ANACONDA MAINLINE RAILROAD BED TYPICAL RA DETAIL (10)

STA 245+00 TO 255+00 AND
STA 280+00 TO 300+00



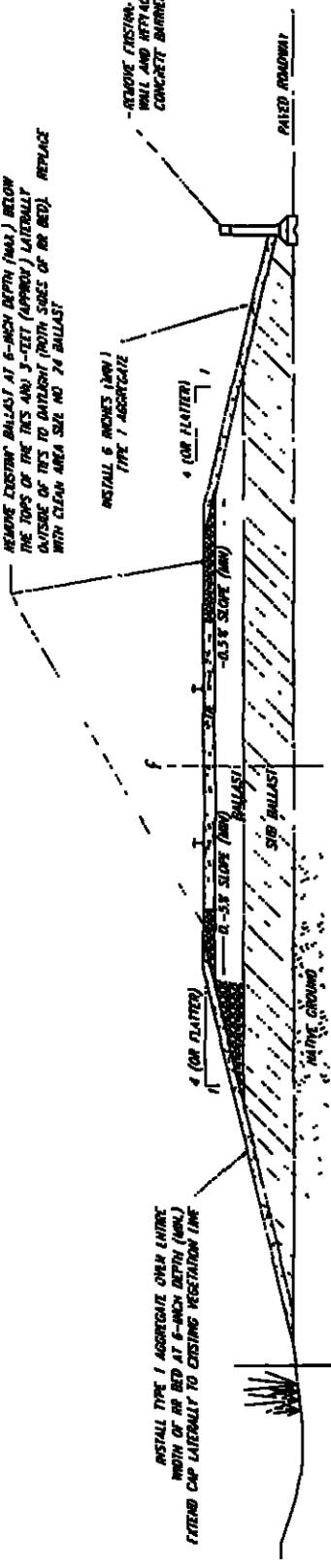
ANACONDA MAINLINE TYPICAL RAISING RR BED CROSS-SECTION
 STA 300+00 TO 315+50

REMOVE EXISTING BALLAST AT 6-INCH DEPTH (MAX.) BELOW THE TOPS OF THE TIES AND 3'-0" (MIN.) LATERALLY OUTSIDE OF TIES TO OUTDOOR (OUTH SIDES OF RR BED). REPLACE WITH CLEAN AREA SIZE NO. 24 BALLAST.

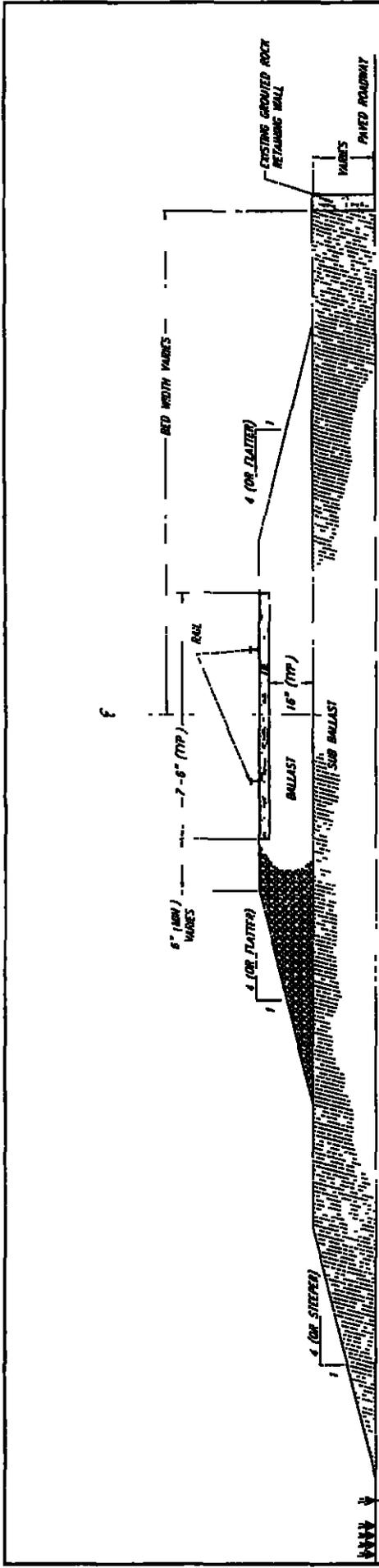
INSTALL 6 INCHES (MIN.) TYPE 1 AGGREGATE

INSTALL TYPE 1 AGGREGATE OVER ENTIRE WIDTH OF RR BED AT 6-INCH DEPTH (MIN.) FILLING CAP LATERALLY TO EXISTING VEGETATION LINE

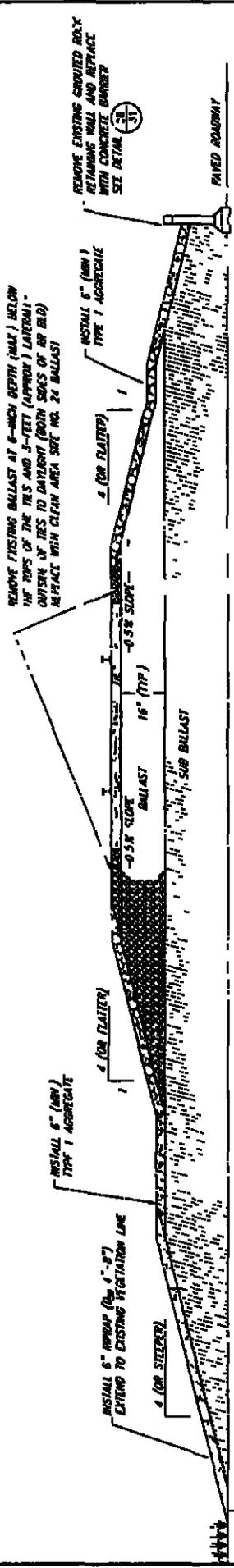
REMOVE EXISTING GRADED ROCK RETAINING WALL AND REPLACE WITH CONCRETE BARRIER SEE DETAIL (31)



ANACONDA MAINLINE RR BED TYPICAL RA DETAIL (12)
 STA 300+00 TO 315+50

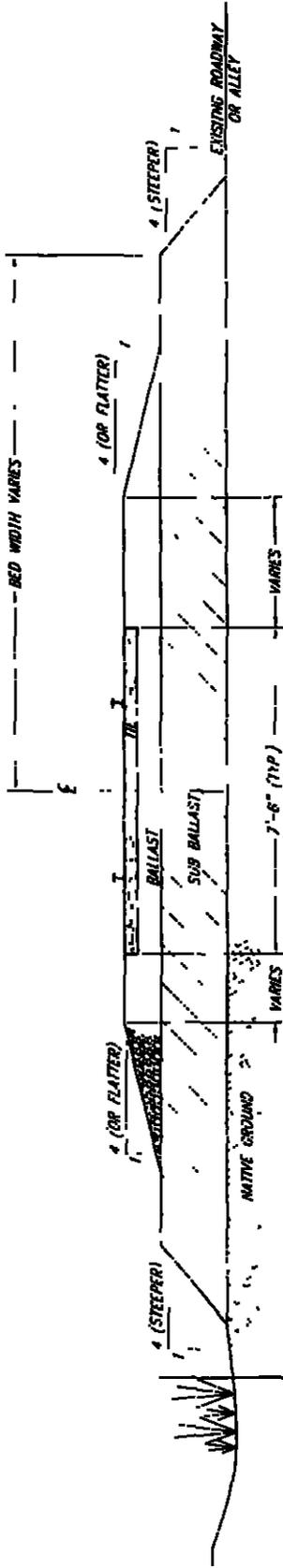


ANACUNDA MAINLINE TYPICAL EXISTING RAILROAD BED (CROSS-SECTION DETAIL 13)
 STA 315+50 TO STA 322+50

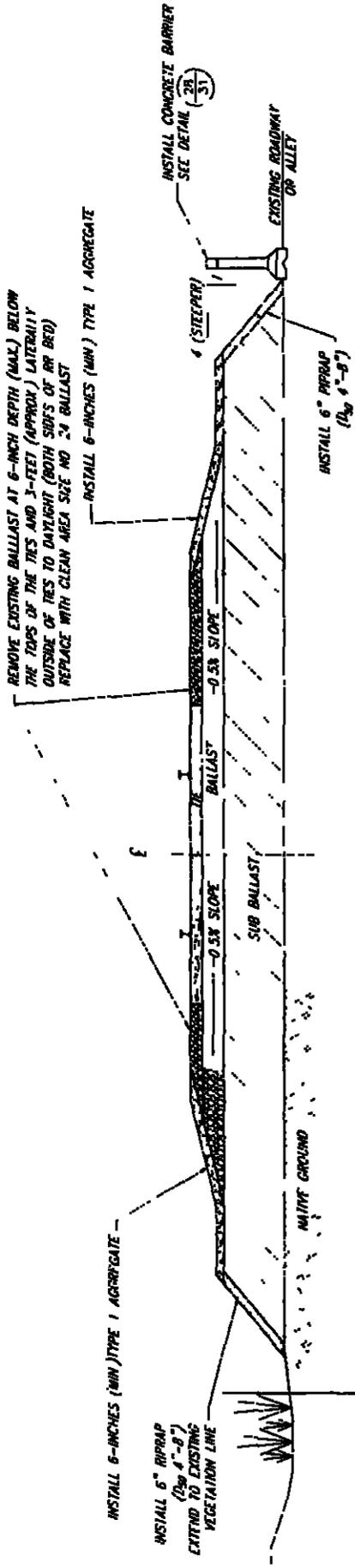


ANACUNDA MAINLINE TYPICAL RA DETAIL (14)
 STA 315+50 TO STA 322+50

 PIONEER TECHNICAL SERVICES, INC. P.O. BOX 248 BUTTE, MT 59701	DATE: 11/15/11 DRAWN BY: J. L. BROWN CHECKED BY: J. L. BROWN SCALE: AS SHOWN SHEET NO.: 11	ARROWAS OPERABLE UNIT ROW 5 ANACUNDA ACTIVE RAILROAD BED 2A	DETAILS	23
	11/15/11			

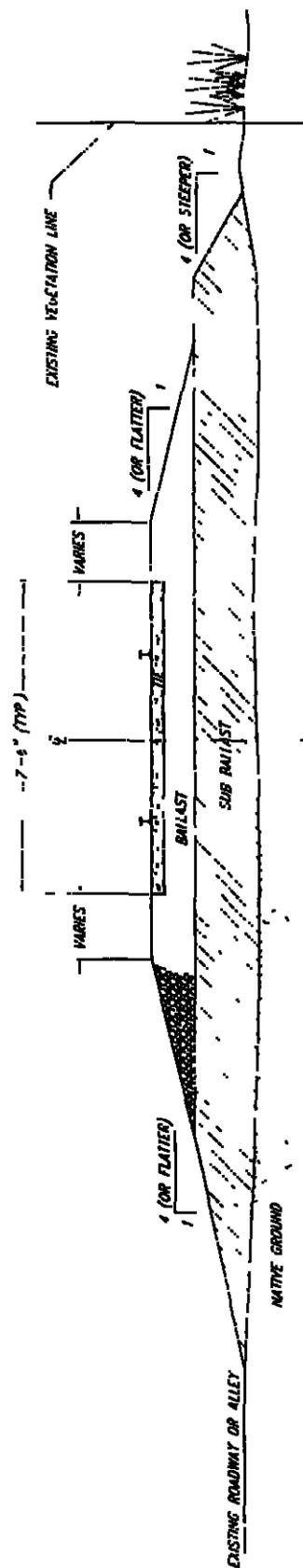


ANACONDA MAINLINE TYPICAL EXISTING RR BED CROSS-SECTION (15)
 STA 322+50 TO 330+00

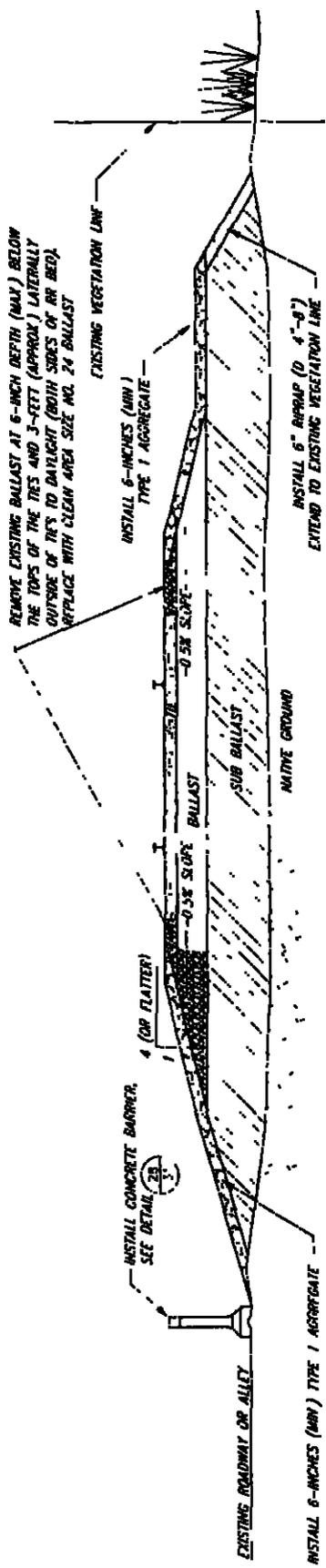


ANACONDA MAINLINE RAILROAD BED TYPICAL, RA DETAIL (16)
 STA 322+50 TO STA 330+00

	PROFESSIONAL SURVEYORS, INC. P.O. BOX 448 BUTTE, MT 59702	DATE: _____ SCALE: _____ SHEET: _____ OF _____	DRAWN BY: _____ CHECKED BY: _____ DATE: _____	ARMYAS OPERABLE UNIT REV 5 ANACONDA ACTIVE RAILROAD BEDS RA	DETAILS	24
	PROJECT: _____					

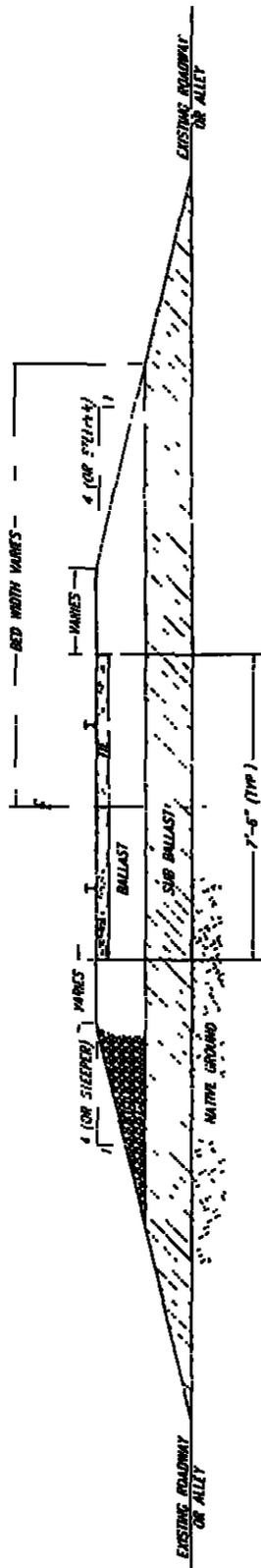


ANACONDA MAINLINE TYPICAL EXISTING RR BED CROSS-SECTION (17)
 STA 332+00 TO STA 333+75 AND
 STA 345+00 TO 347+00



TYPICAL DIRT GRAVEL CROSSING OVER WEST VALLEY (18)
 STA 332+00 TO STA 333+75 AND
 STA 315+00 TO STA 347+00

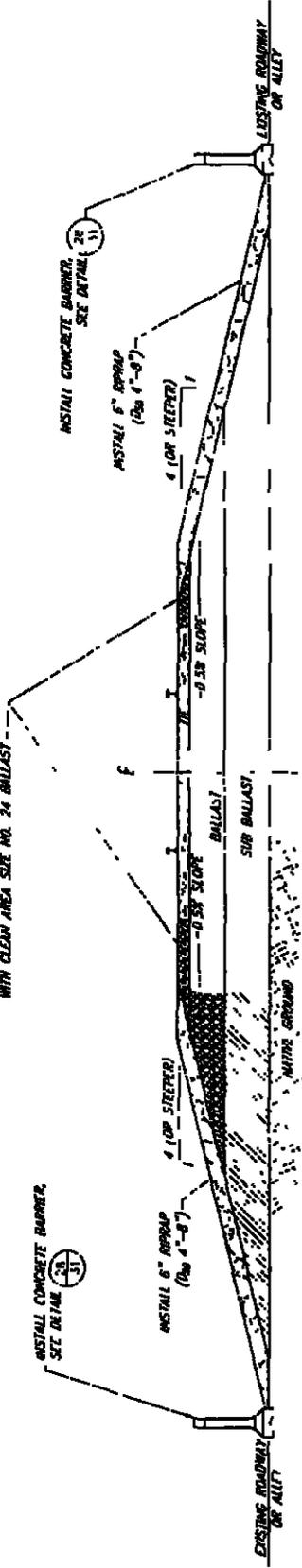
	TECHNICAL SERVICES, INC. P.O. BOX 2048 BUTTE, MT 09703			SHEET NO. 25	DETAILS
					AIRWAYS OPERABLE UNIT ROAD & ALLIANCE, ACTIVE RAILROAD CROSSING



AMCONDA MAINLINE TYPICAL EXISTING RR AND CROSS-SECTION DETAIL (19)

STA 333+75 TO STA 337+25
 STA 341+00 TO STA 344+00 AND
 STA 347+00 TO STA 349+50

REMOVE EXISTING BALLAST AT 6-INCH DEPTH (MAX.) BELOW THE TOPS OF THE TIES AND 3-FOOT (APPROX) LATERALLY OUTSIDE OF TIES TO DIVULGENT (BOTH SIDES OF RR BED) REPLACE WITH CLEAN AREA SIZE NO. 24 BALLAST



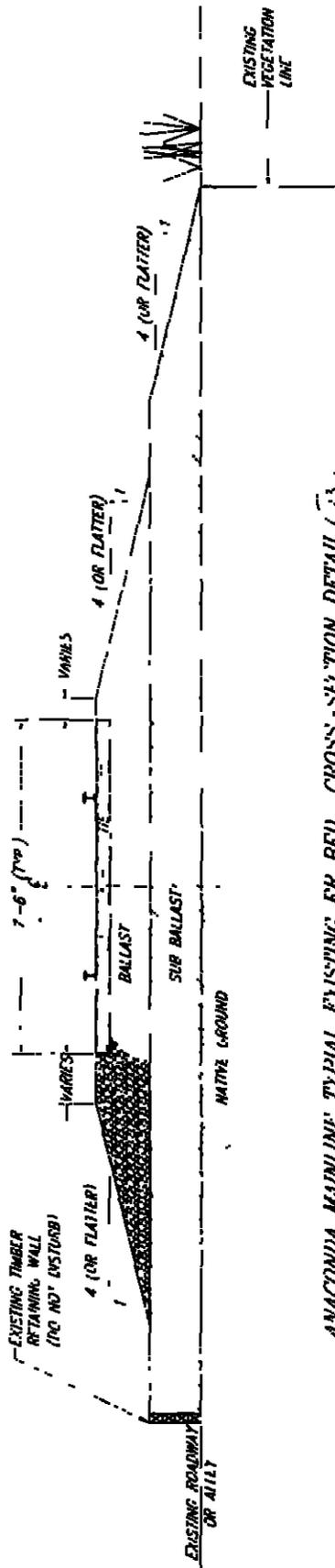
AMCONDA MAINLINE TYPICAL RA DETAIL (20)

STA 333+75 TO STA 337+25
 STA 341+00 TO STA 344+00 AND
 STA 347+00 TO STA 349+50

TRONIER
 PROFESSIONAL SERVICES, INC.
 P.O. BOX 3448
 BOSTON, MA 02118

ARRANGED OPERABLE UNIT
 BPO 6 AMCONDA ACTIVE RAILROAD BPO 6A

DETAILS

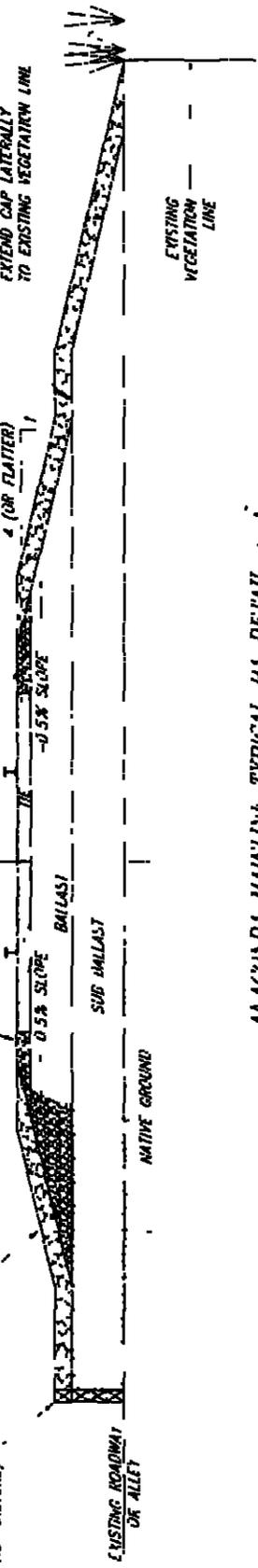


ANACONDA MAINLINE TYPICAL EXISTING RR BED CROSS-SECTION DETAIL (23)
 STA 344+00 TO 345+00

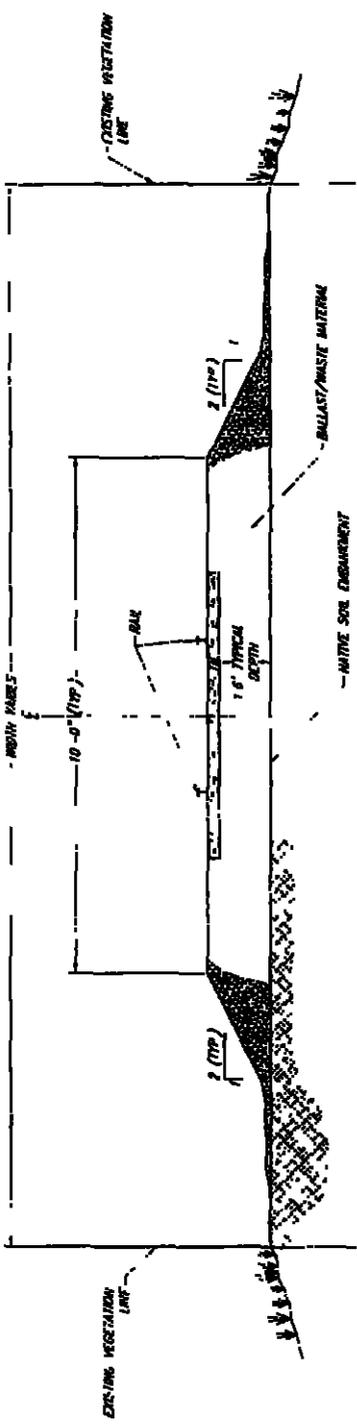
REMOVE EXISTING BALLAST AT 6-INCH DEPTH (MAX) BELOW THE TOPS OF THE TIES AND 3-FEET (APPROX) LATERALLY OUTSIDE OF TIES TO DAYLIGHT (BOTH SIDES OF RR BED). REPLACE WITH CLEAN AREA SIZE NO. 24 BALLAST.

INSTALL 6" (MIN.) TYPE 1 AGGREGATE

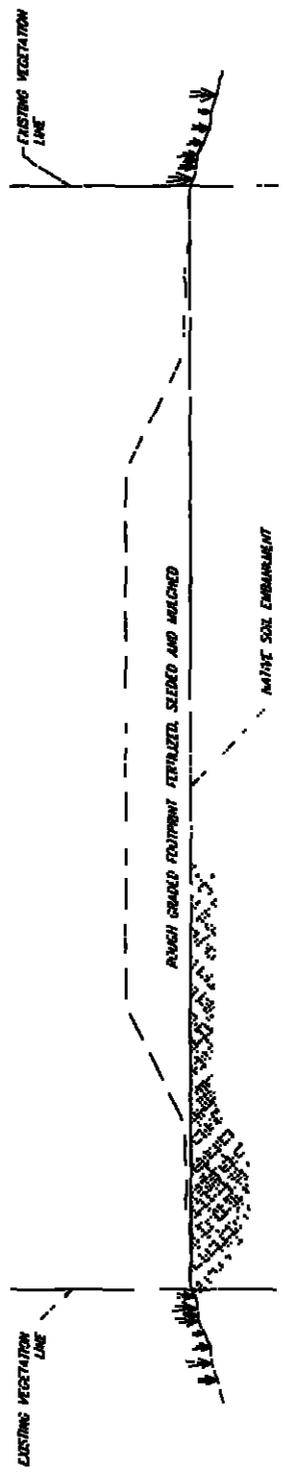
EXISTING TIMBER RETAINING WALL (DO NOT DISTURB)



ANACONDA MAINLINE TYPICAL RR DETAIL (24)
 STA 344+00 TO STA 345+00

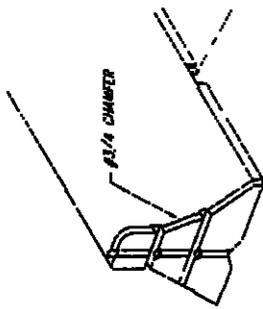


AFECO SPUR, TYPICAL EXISTING RAILROAD BED CROSS-SECTION (25)

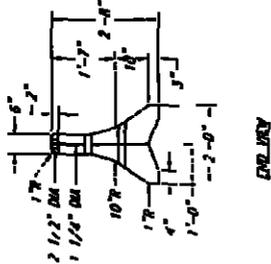


AFECO SPUR RAILROAD BED TYPICAL CONDITION FOLLOWING WASTE REMOVAL, DETAIL (26)

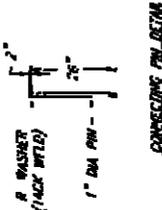
		TECHNICAL SERVICES, INC. P.O. BOX 2048 DENVER, CO 80202	DRAWING NO. 84-42-10-18 SHEET NO. 29
PROJECT: ARMY'S OPERABLE UNIT ROW 5, ANACORDIA ACTIVE RAILROAD BEDS BA		DATE: 11/15/84 SCALE: AS SHOWN	DRAWN BY: [blank] CHECKED BY: [blank]



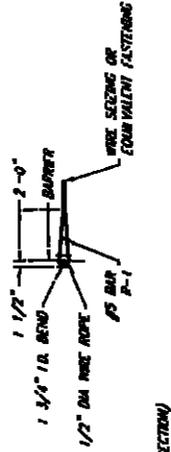
3/4" CHAMFER OR SUFFICIENTLY ROUNDED THAT A SMOOTH EDGE RESULTS



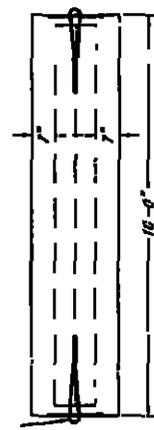
ELEVATION



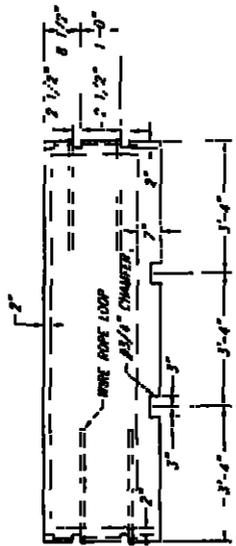
CONNECTING POST DETAIL



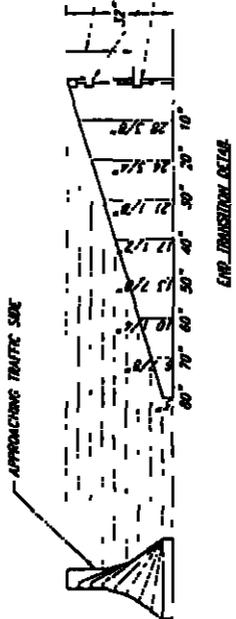
WIRE ROPE CONNECTION



PLAN VIEW



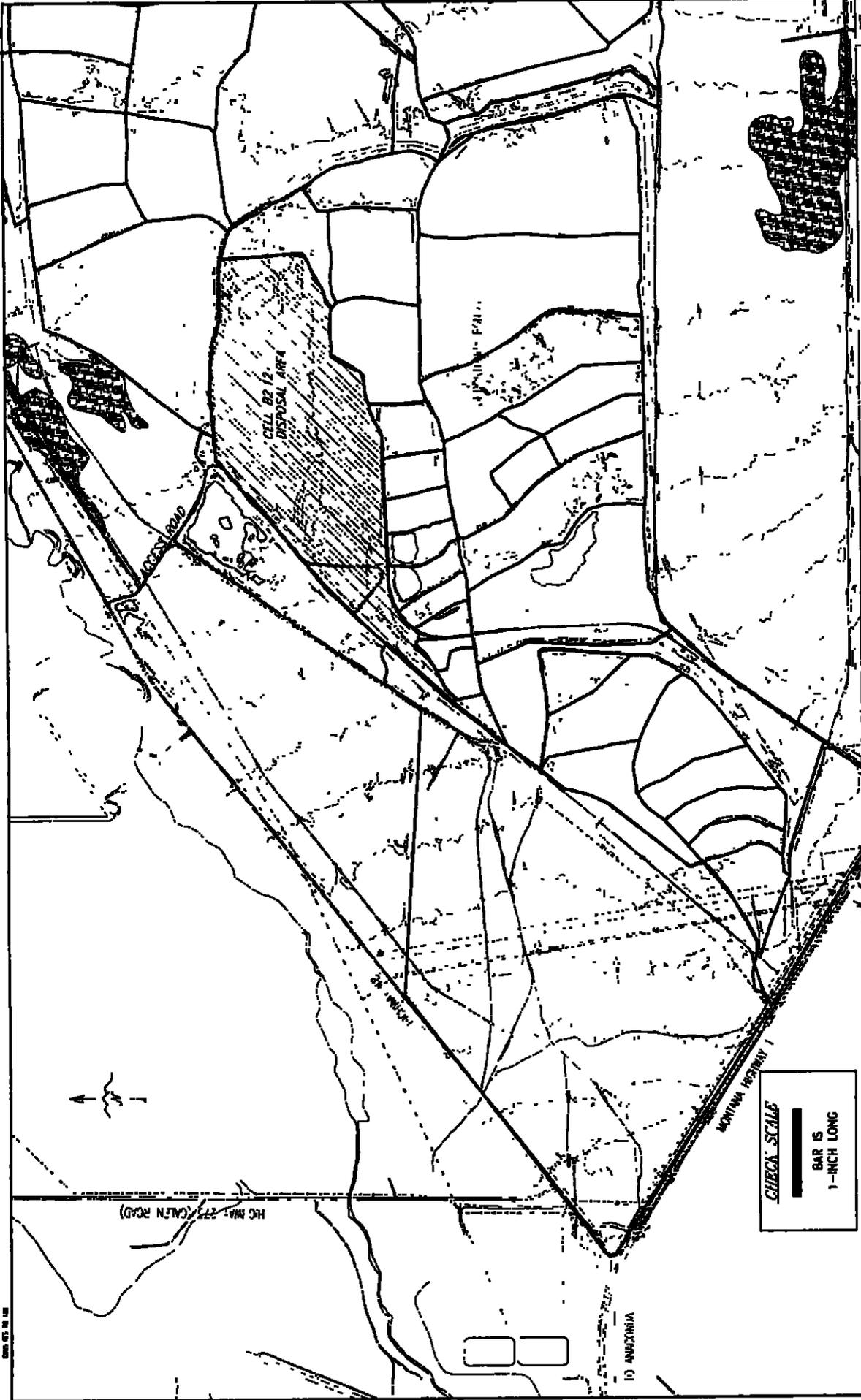
ELEVATION



END TRANSITION DETAIL

- NOTES:
1. CONCRETE SHALL BE CLASS "B" OR EQUAL.
 2. REINFORCING STEEL SHALL BE MADE OF DETONATED BARS AND SHALL CONFORM TO ASTM A-615, GRADE 60.
 3. EACH 10' SECTION SHALL BE CONNECTED WITH A 1" DIA. x 26" PIN.
 4. THE END TRANSITION SHALL BE CAST IN PLACE SECTION WITH TRANSVERSE JOINTS PROVIDED AT 10' CENTERS. A 1/4" OPEN JOINT EDGED WITH A 1/4" RADIUS TOOL SHALL BE USED. THE CONTRACTOR MAY CHOOSE TO USE EIGHT PRECAST SECTIONS, BUT SHALL MAKE PROVISIONS FOR CONNECTING THE SECTIONS TOGETHER AND FOR LIFTING. THIS SHALL BE APPROVED IN WRITING BY THE ENGINEER.
 5. NOTICES SHALL BE PLACED ON BOTH ENDS OF EACH SECTION, AS SHOWN, TO FACILITATE EASY REMOVAL.
 6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER FIT-UP OF THE PRECAST CONCRETE BARRIER SUPPORTS. PRECAST SECTIONS SHALL BE ASSEMBLED AND FINISHED IN THE FABRICATOR'S PLANT TO DETERMINE THAT PROPER FIT-UP CAN BE MAINTAINED ON ALL ROADWAY ALIGNMENTS. CONTACTS SHALL BE MADE AS ON TANGENT. THIS SHALL BE DETERMINED EARLY IN FABRICATION.
 7. WIRE ROPE SHALL BE ZINC-COATED STEEL WIRE WITH A MINIMUM BREAKING STRENGTH OF 16,000 LBS.
 8. CONNECTING PIN SHALL CONFORM TO ASTM A663, GRADE 45 OR BETTER AND WELD NOT BE PAINTED.

CONCRETE BARRIER DETAIL (28)
(NOT STANDARD DRAWING NO. 84)



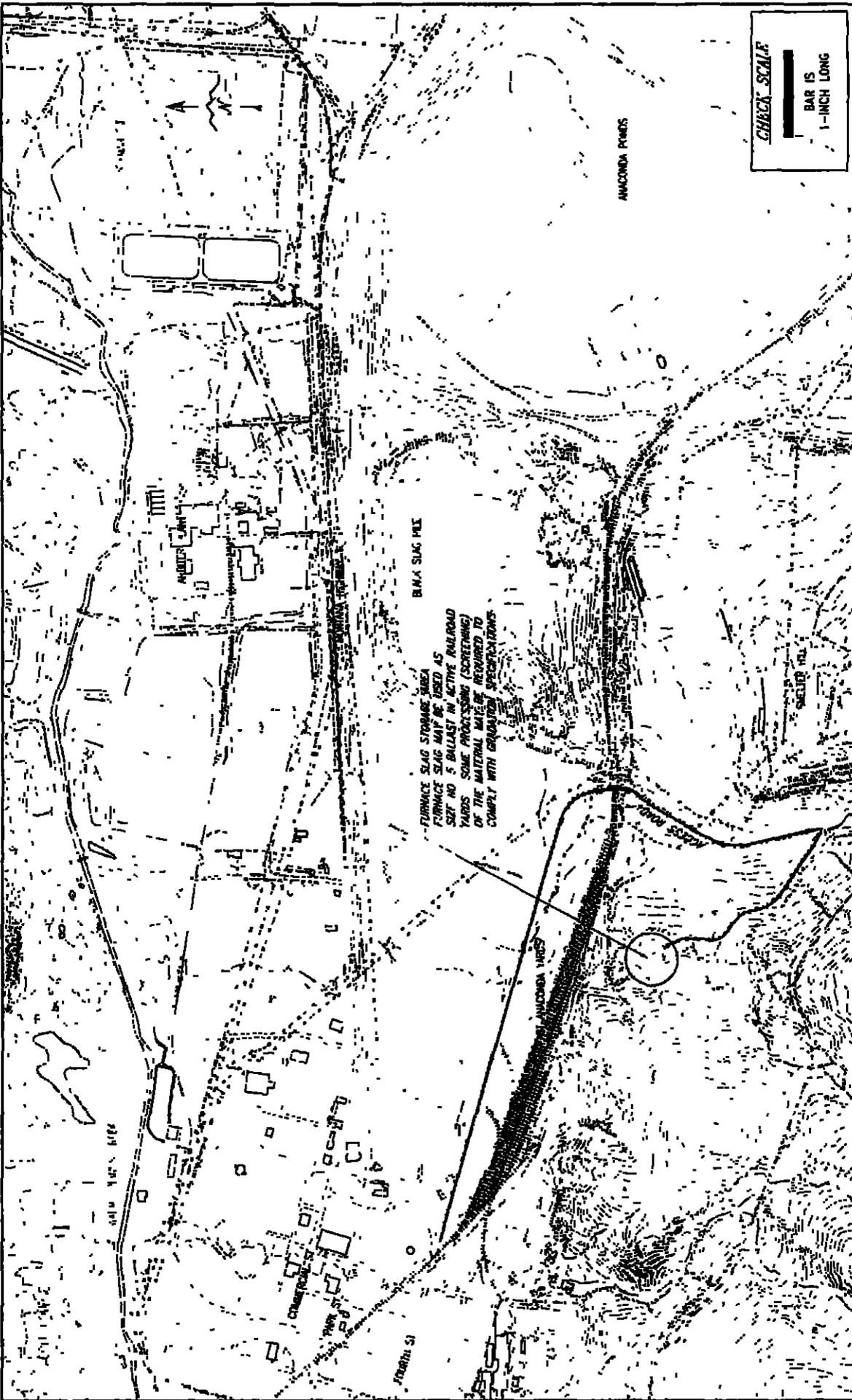
32

**OPPORTUNITY PONDS
CELL B2 12 DISPOSAL AREA**

**ARTWAS OPERABLE UNIT
RED 6 AMXONDA ACTIVE RAILROAD BEDS BA**

CHECK SCALE
 BAR IS
 1-INCH LONG

PIONEER



FURNACE SLAG STORAGE AREA
 FURNACE SLAG MAY BE USED AS
 SIFT NO 5 BALLAST IN ACTIVE RAILROAD
 YARDS SOME PROCESSING (SCREENING)
 OF THE MATERIAL MAY BE REQUIRED TO
 COMPLY WITH GRADATION SPECIFICATIONS

CHECK SCALE
 BAR IS
 1-INCH LONG

APPENDIX B

TECHNICAL SPECIFICATIONS

**FINAL
TECHNICAL SPECIFICATIONS**

for
Anaconda Regional Water, Waste & Soils (ARWW&S) Operable Unit (OU)
RDU 5 Anaconda Active Railroad Beds Remedial Action

Prepared for:

Potentially Responsible Party (PRP) Group

RARUS Railway

and

Burlington Northern Santa Fe Railway

and

Atlantic Richfield Company

Prepared by:

Pioneer Technical Services, Inc.
P.O. Box 3445
Butte, Montana 59702

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SUBSECTION 201.00: CLEARING AND GRUBBING

201.01 GENERAL

- A. **DESCRIPTION** - This work shall consist of clearing, grubbing, removing, and disposing of soil, vegetation (including existing sod) and debris that may be located within borrow areas, stockpile areas, or areas specified to receive Remedial Action. Clearing and grubbing shall be limited to the areas designated on the Drawings or designated in the field by the PRPs. Large vegetation and objects designated to remain shall be preserved free from injury and defacement.

If any evidence of aboriginal or historical activity or occupation is encountered during clearing and grubbing activities, the Contractor shall immediately stop work and notify the Engineer, who shall contact the proper authorities for an assessment of the significance of the resource.

The work shall be classified as follows:

1. **Clearing**. Clearing shall consist of removal and disposal of unwanted brush, logs, limbs, sticks, debris, vegetation, and other objectionable matter existing within the clearing limits that interfere with the excavation.
2. **Grubbing**. Grubbing shall consist of the removal and disposal of stumps, rock, roots, debris, and other objectionable matter from the grubbing limits.
3. **Disposal**. Disposal shall consist of removing and disposing of the refuse accumulations from clearing and grubbing operations as approved by the PRPs. The refuse resulting from these operations shall be disposed of as described below:
 - A) Burial or burning of materials on-site will not be allowed.
 - B) **SALVAGING** - Any materials denoted to be salvaged shall be carefully moved and stockpiled in the areas designated by the PRPs. Salvaged materials are not to be used by the Contractor in the course of his work. Salvaged materials or resources are not the property of the Contractor.
 - C) **OFF-SITE DISPOSAL** - Any unusable materials not designated for salvaging shall be hauled and disposed of at a legal off-site disposal area at no additional cost.

201.02 RELATED SECTIONS

- Subsection 202.00 - Excavation and Grading
- Subsection 206 00 - Haul
- Subsection 550.00 - Traffic Control
- Subsection 560.00 - Underground Utilities

201.03 MATERIALS

Section not used

201.04 CONSTRUCTION REQUIREMENTS

- A. **GENERAL** - Clearing and grubbing shall be done at times and in a manner that the surrounding vegetation, adjacent property, and anything designated to remain shall not be damaged. Dragging, piling, disposing of debris, and other work that may be injurious to existing vegetation shall be confined to areas that carry no vegetation or that will be covered or disturbed by excavations in the course of the work.

Vegetation adjacent to areas designated to be disturbed shall be preserved and protected from injury unless the vegetation conflicts with construction operations and is designated by the PRPs to be removed. If any vegetation designated to be preserved becomes damaged or destroyed by the Contractor, it shall be replaced to the satisfaction of the PRPs at no additional cost.

The PRPs will designate trees or other objects that are to remain. The Contractor shall preserve all objects so designated.

The Contractor shall not injure trees, shrubbery, vines, plants, grasses, and other vegetation growing outside of the limits of excavation and embankment. The Contractor shall paint all cut or scarred surfaces of trees or shrubs selected for retention. The paint shall be an approved asphaltum base paint prepared especially for tree surgery.

- B. **CLEARING** - All areas within the neat lines of cut or fill areas shall constitute the clearing limits.

Unless specifically designated to be saved, all trees, stumps, brush, logs, and other objectionable matter occurring within clearing limits shall be cut off and disposed of. All stumps within the clearing limits and all trees, the stumps of which are not to be grubbed, shall be cut at a height no greater than the diameter of the stump, and in any instance not more than 12 inches above the ground.

The refuse resulting from the clearing operation shall be removed and disposed as specified herein. In no case shall any unwanted material be left on the site, moved onto adjacent private properties, or be buried in embankments on the project.

- C. GRUBBING - All areas within the neat lines of the disturbance limits shall also constitute the grubbing limits.

All stumps, roots, logs, or other timber more than 3-inches in diameter, and all brush, matted roots, rock, and other debris within the grubbing limits shall be pulled or otherwise removed.

All material resulting from the grubbing operations shall be disposed of as specified herein. All depressions below subgrade, or below the final surface of the ground resulting from the grubbing operations shall be backfilled with suitable material.

END OF SUBSECTION 201

SUBSECTION 202.00: EXCAVATION AND GRADING

202.01 GENERAL

A **DESCRIPTION** - All excavation work shall be in accordance with these Specifications and in reasonably close conformity with the lines, grades, and depths shown on the Drawings, or as established in the field by the PRPs

1. **Excavation.** This work shall consist of performing all operations necessary to excavate and satisfactorily remove for disposal all ballast and soil materials encountered during excavation of the areas designated on the Drawings.

On active railroad beds, excavation will generally be limited to cutting existing ballast located immediately outside of the railroad ties to a depth of six-inches below the tops of the ties, and extending the excavation laterally three-feet (approximately) beyond both ends of the ties. To maintain positive drainage and to avoid creating a topographic low adjacent to the railroad bed, the excavation shall extend laterally in both directions at -0.5% slope (minimum) to daylight on the shoulder of the railroad bed.

Materials excavated from active railroad beds shall be disposed of on the adjacent railroad bed (if adequate space is available) or hauled off-site and disposed in the designated disposal area (Opportunity Ponds WMA) in accordance with Subsection 220 of these Technical Specifications.

In areas difficult to excavate due to space limitations between adjacent railroad ties (such as within active railroad yards where multiple railroad tracks and ties converge) some excavation by hand will be required. In these areas, excavation shall be completed by hand in reasonably close conformity with the lines, grades, and depths shown on the Drawings, to the extent practicable.

2. **Grading.** All grading shall be completed in such a manner to ensure positive drainage. Grading of active railroad beds shall be performed after excavation of designated ballast materials is completed to the satisfaction of the PRPs. Grading shall include blending the excavated ballast material into the adjacent railroad bed as shown on the Drawings, to create a continuous slope with no abrupt changes in grade.

Rough grading of railroad bed materials shall be completed, to the satisfaction of the PRPs, prior to placement of cap materials. All

completed, rough-graded slopes on active railroad beds shall be no steeper than 2H:1V. Finish grading shall be performed after cap materials are placed. Finish grading shall be completed in such a manner to assure that cap materials are placed at the minimum depths specified.

202.02 RELATED SECTIONS

Subsection 201.00 - Clearing and Grubbing
Subsection 206.00 - Haul
Subsection 220.00 - Ballast and Soil Disposal
Subsection 550.00 - Traffic Control
Subsection 560.00 - Underground Utilities
Subsection 820.00 - Ballast and Aggregate Materials

202.03 MATERIALS

- A. **REPLACEMENT BALLAST** - Excavated ballast on active railroad lines and within active railroad yards shall be replaced with ballast meeting American Railway Engineering Association (AREA) ballast specifications as specified under Subsection 820 - Ballast and Aggregates, of the Technical Specifications.
- B. **AGGREGATE CAPPING MATERIALS** - Requirements for capping materials to be installed over active railroad beds, within active railroad yards, and on walking trails are specified under Subsection 820 - Ballast and Aggregates, of the Technical Specifications.
- C. **EXCAVATED MATERIALS** - Excavated materials that are not specified to be disposed on the adjacent railroad bed, or where adequate space is not available to dispose of the excavated material on the adjacent railroad bed, shall be hauled and disposed at the Opportunity Ponds WMA as specified under Subsection 220 - Ballast and Soil Disposal, of the Technical Specifications.

202.04 CONSTRUCTION REQUIREMENTS

- A. **GENERAL** - All excavation shall be considered unclassified and shall consist of the removal and disposal of any and all material encountered, regardless of type or nature obtained, within the construction limits designated on the Drawings.

All materials removed from excavation areas shall be disposed at designated locations as described above.

- B. **SITE PREPARATION** - Prior to excavation, all buried utilities shall be located and marked in accordance with Subsection 560 - Underground Utilities of the Technical Specifications
- C. **LINE AND GRADE CONTROL** - Prior to excavation, backfill, and grading operations, the Contractor shall verify that an adequate number of construction stakes (installed by others) are in place to define the construction limits. All construction stakes shall be maintained, to the extent practical, for reference throughout the construction period. At a minimum, a sufficient number of construction stakes shall be maintained throughout the work to permit verification of the excavation and capping work within the depth tolerances specified.
- D. **EXCAVATION**
1. **General.** The Contractor shall utilize excavating equipment appropriate for the work being performed. The method of excavation shall be the Contractor's responsibility. All methods and equipment used shall result in finished work meeting the construction tolerances specified. No work shall be performed beyond the construction limits without prior written approval from the Landowner and the PRPs
- E. **BALLAST, AGGREGATE, AND SOIL REPLACEMENT**
1. **Obtaining Capping Materials.** Size No. 5 ballast (furnace slag) shall be obtained from the designated location on Smelter Hill. All other specified aggregates shall be obtained from sources determined by the Contractor. The sources shall be approved by the PRPs prior to use on the project. Any materials temporarily stockpiled by the Contractor shall be rehandled and placed without additional compensation. The sites of all stockpiles and areas adjacent thereto which have been disturbed by the Contractor shall be graded, if required, and returned to a condition acceptable for seeding.
 2. **Placing Cap Materials.** After excavation, rough grading, and compaction have been completed and accepted, aggregate capping materials shall be deposited and evenly placed/graded on the subgrade in lifts not to exceed 6-inches in depth. Capping materials shall not be applied when the ground or capping materials are frozen, excessively wet, or otherwise in a condition detrimental to the work
 3. **Finish Grading.** Following general placement of the capping materials, the caps shall be brought to the lines, grades, and cross-sections shown on the Drawings so that the final surface approximately matches the surrounding topography. Where specific grades have not been

established, the areas shall be smooth graded to prevent, insofar as practical, the formation of low areas or pockets where water will stand, and to facilitate positive drainage.

- F. CLEANUP - After finish grading work is accepted, the Contractor shall remove all tools, equipment, excess materials, debris, etc. from the vicinity of the work site.

END OF SUBSECTION 202

SUBSECTION 203.00: PROVIDING AND/OR STOCKPILING CAPPING MATERIALS

203.01 GENERAL

- A. **DESCRIPTION** - This work shall consist of furnishing, producing and hauling capping materials (ballast, aggregate, etc.), including any specified additives, in accordance with these Specifications. Areas on site for stockpiling capping materials may be utilized, upon approval by the PRPs. Capping materials at the source of supply are subject to the PRP's approval prior to delivery of the materials to the project.

203.02 RELATED SECTIONS

Subsection 201.00 - Clearing and Grubbing
Subsection 202.00 - Excavation and Grading
Subsection 206.00 - Haul
Subsection 550.00 - Traffic Control
Subsection 560.00 - Underground Utilities

203.03 MATERIALS

Furnace slag shall be obtained from the approved designated sources. Size No 5 ballast (furnace slag) shall be obtained from the designated location on Smelter Hill. All other specified aggregates shall be obtained from sources determined by the Contractor. The sources shall be approved by the PRPs prior to use on the project. All capping materials shall be as specified in the pertinent Section(s) of these Technical Specifications. The Contractor shall provide all testing required, at no cost to the Owner, for approval of all materials sources prior to delivery of the materials to the site. Such testing shall be done by an approved testing laboratory

203.04 CONSTRUCTION REQUIREMENTS

Any proposed stockpile areas shall be cleared of weeds, roots, stumps, rocks and other contaminating matter. The cleared matter shall be disposed of in accordance with Subsection 201 – Clearing and Grubbing, or as otherwise approved by the PRPs. Any stockpile sites shall occupy a minimum area. Equipment or methods that cause segregation, degradation or contamination of the material shall not be used when delivering materials from the borrow source or storage area.

END OF SUBECTION 203

SUBSECTION 206.00: HAUL

206.01 GENERAL

- A. **DESCRIPTION** - This work shall consist of loading and hauling material excavated or removed from its original location and transporting it to its final specified location as indicated on the Drawings. The work shall include dumping or unloading hauled material in a location that will facilitate placement as specified under other Subsections of these Technical Specifications, and watering for dust control. The work shall also include all signing and traffic control, including flagmen, if necessary. This work also applies to hauling of aggregates, other miscellaneous excavated materials, and construction materials, where necessary.

206.02 RELATED SECTIONS

Subsection 201 00 - Clearing and Grubbing
Subsection 202.00 - Excavation and Grading
Subsection 203.00 - Providing and/or Stockpiling Capping Materials
Subsection 220.00 - Ballast and Soil Disposal
Subsection 550.00 - Traffic Control
Subsection 820.00 - Ballast and Aggregate Materials
Subsection 840.00 - Concrete Barriers

206.03 MATERIALS

Section not used.

206.04 CONSTRUCTION REQUIREMENTS

- A. **HAUL** - All materials to be hauled shall be removed from their original location and placed in covered truck beds or other suitable, covered equipment capable of transporting the material without spillage. Haul routes shall be determined by the Contractor.

END OF SUBSECTION 206

SUBSECTION 220.00: BALLAST AND SOIL DISPOSAL

220.01 GENERAL

- A. **DESCRIPTION** - This work shall consist of loading, hauling, dumping, stockpiling, and disposing of the ballast and soils excavated from the specified railroad bed areas. The work will include disposal site preparation, hauling, stockpiling, stockpile leveling and regrading in accordance with these specifications.
- B. **SUBMITTALS** - The following submittals will be required:
- The details, equipment, anticipated sequence, and schedule for those areas where soils are to be removed.

220.02 RELATED SECTIONS

Subsection 202.00 - Excavation and Grading
Subsection 206.00 - Haul
Subsection 550.00 - Traffic Control

220.03 MATERIALS

Section not used.

220.04 CONSTRUCTION REQUIREMENTS

- A. **HAULING and STOCKPILING** - Ballast and/or soils shall be hauled from the excavation areas and dumped in locations specified on the Drawings or by the PRPs. Traffic control shall be in accordance with Subsection 550 - Traffic Control. Any necessary stockpiling shall be in such a manner as to be consistent with all state, county, and municipal regulations regarding health, safety, and public welfare.
- B. **DISPOSAL** - Ballast and/or soils that are removed from specified areas shall be hauled and disposed at the Opportunity Ponds WMA.

END OF SUBSECTION 220

SUBSECTION 230.00: SILT FENCE

230.01 GENERAL

This section includes product material specifications, storage and handling guidelines, and installation procedures for geotextiles required in BMP installation.

230.02 RELATED SECTIONS

Subsection 201.00 - Clearing and Grubbing
Subsection 202.00 - Excavation and Grading
Subsection 820.00 - Ballast and Aggregate Materials

230.03 MATERIALS

Silt Fence shall be AMOCO Style 2130 or PRP approved equivalent woven geotextile.

A. PRODUCT DELIVERY, STORAGE AND HANDLING

1. **Packaging:** Each roll of material shall be packaged individually in a suitable sheet, wrapper or container to protect the fabric from damage from ultraviolet light and moisture during storage and handling. The GCL shall be wound around a rigid core whose diameter is sufficient to facilitate handling. The core should be sufficiently strong to prevent collapse during transit.
2. **Labeling:** Each roll shall be identified by a tag or label securely affixed to the outside of the roll on one end. The label shall include the manufacturer (Manufacturer's name and address, brand name, product code) or supplier, the style number and the roll number, roll length, width and weight.
3. **Storage:** Store all geosynthetic materials elevated above the ground and ensure that they are adequately covered to protect the material from damage. A dedicated storage area shall be selected at the job site that is away from high traffic areas and is level, dry and well-drained. Rolls should be stored in a manner that prevents sliding or rolling from the stacks and may be accomplished by the use of chock blocks or by use of the dunnage shipped between rolls. Rolls shall be stacked at a height no higher than that at which the lifting apparatus can be safely handled (typically no higher than four). The integrity and legibility of the labels shall be preserved during storage.
4. **Geosynthetics damaged during transport, storage or placement will be replaced at no expense to the PRPs.**

230.04**CONSTRUCTION REQUIREMENTS**

- A. The Contractor shall install silt fence as directed by the PRPs.
- B. Silt fence shall be installed on the streamside or wetland side of all construction activities, but shall not be installed in direct contact with the stream or wetland.
- C. Adjacent panels of silt fencing shall be sewn together in accordance with manufacturer's requirements and instructions.
- D. At the PRPs option, samples of the silt fence geotextile will be submitted for material property confirmation testing.
- E. All silt fence geotextile that has defects, deterioration, or damage as determined by the PRPs may be rejected and shall be replaced at Contractor's expense.
- F. Steel T posts shall be placed on maximum spacing of 10 feet.
- G. Silt fence fabric shall be attached to posts as recommended by the manufacturer and as approved by the PRPs prior to installation.
- II. Silt fence shall be checked regularly for fabric sagging between posts, torn fabric, and signs of erosion and/or sedimentation downslope from the fence. Make repairs as necessary by installing a new section of silt fence of sufficient length to span at least two posts. The new silt fence shall be joined to the existing silt fence by sewing. Accumulated sediment behind silt fences shall be removed when it reaches approximately one-third the exposed height of the fence.

END OF SUBSECTION 230

SUBSECTION 320.00: FERTILIZING AND SEEDING

320.01 GENERAL

A. **DESCRIPTION** - This work shall consist of ground surface preparation, furnishing, applying and incorporating fertilizer into the soil, furnishing and planting seed; tracking; and cleanup. The work includes permanent seeding.

B. **CERTIFICATIONS** -

1 **Indigenous Seed**. Defined by MCA 80-5-101(4):

"Indigenous seeds include the seeds of those plants that are naturally adapted to an area where the intended use is for revegetation of disturbed sites. These species include grasses, forbs, shrubs and legumes."

The Contractor shall supply The PRPs with all seed bag tags and a certification from the supplier stating that the seed complies with the Federal Seed Act and the Montana Seed Laws (MCA 80-5-101 through 305).

2 **Fertilizer** Fertilizer shall be delivered in standard size bags from the manufacturer showing weight analysis and manufacturer's name, or in bulk quantities accompanied with written certifications from the manufacturer stating that the fertilizer supplied complies with applicable specifications.

320.02 RELATED SECTIONS

Subsection 206.00 - Haul

Subsection 330.00 - Mulch

Subsection 550.00 - Traffic Control

320.03 MATERIALS

A. **INDIGENOUS SEED** - All seed shall comply with and be labeled in accordance with the Montana Seed Law. MCA 80-5-104(2) states...

"indigenous seeds, as defined in 80-5-101, in amounts of 1 pound or more, whether in package or bulk, must be labeled with the following information"

- (a) . . . the statement "Labeled only for reclamation purposes;"
- (b) . . . lot number or other distinguishing mark;

- (c) . . . the common name, genus, species and subspecies, when applicable, including the name of each kind of seed present in excess of 5%. When two or more kinds of seed are named on the label, the label shall specify the percentage of each. When only one kind of seed is present in excess of 5% and no variety name or type designation is shown, the percentage must apply to seed of the kind named. If the name of the variety is given, the name may be associated with the name of the kind. The percentage in this case may be shown as "pure seed" and must apply only to seed of the variety named;
- (d) . . state or county of origin,
- (e) . . . the approximate percentage of viable seed, together with the date of test. When labeling mixtures, the percentage viability of each kind shall be stated;
- (f) . . the approximate percentage by weight of pure seed, meaning the freedom of seed from inert matter and from other seeds;
- (g) . . the approximate percentage by weight of sand, dirt, broken seeds, sticks, chaff and other inert matter;
- (h) . . the approximate total percentage by weight of other seeds;
- (i) . . the name and approximate number of each kind of species of prohibited and restricted noxious weed seeds occurring per pound of seed;
- (j) . . the full name and address of the person, firm or corporation selling the seed.

As listed in the Montana Seed Law, seed shall contain no "PROHIBITED" noxious weed seed. The seed shall contain no "RESTRICTED" noxious weed seed in excess of the maximum numbers per pound as specified by MCA 80-5-105 or as specified by the appropriate County Weed Board, whichever is more stringent.

The number of seed allowed per pound, for all other noxious weed seeds shown on the "restricted list" will be zero.

Seed shall be grown in the North American continent above 41 degrees north latitude. Known varieties whose origin is above the 41st parallel but grown below are acceptable. All seed shall be a standard grade adapted to Montana conditions. Seed which has become wet, moldy or otherwise damaged will not be accepted.

Calculations of "pure live seed" may be made on the basis of either a germination test or a tetrazolium test in addition to the purity analysis. Seed shall be applied on a "pure live seed"

basis. The quantity of "pure live seed" in a 100 lb. container shall be determined by the formula: 100 multiplied by germination percentage, and this product multiplied by the purity percentage (for example, if the seed is 85% pure and test 90% germination, then a 100 lb container would contain 76.5 lbs. of "pure live seed")

Excavated areas specified to be seeded shall be seeded with the following seed mix at the specified rate:

SEED MIX FOR RAILROAD BEDS RA

Common Name	Lbs. PLS/acre^{1,2}
Basin wildrye	8.0
Mammoth wildrye	5.0
Canada bluegrass	0.5
Intermediate wheatgrass	1.0
Hard sheep fescue	1.0
Streambank wheatgrass	2.0
Birdsfoot trefoil	0.5
Total	18.0

¹ PLS = Pure Live Seed

² Reported rates are for drill seeding, rates shall be doubled for hydraulic seeding and broadcast seeding

B FERTILIZER - Fertilizer shall be a soluble commercial carrier of available plant food element or combination thereof. All specified areas shall be fertilized with an inorganic chemical fertilizer with the following nutrients and associated rates:

Nitrogen (Elemental)	22.5 ± 1.0 lbs./acre
Phosphorus (P ₂ O ₅)	56.0 ± 1.0 lbs./acre
Potassium (K ₂ O)	14.0 ± 1.0 lbs./acre

The fertilizer shall be in uniform composition and in good condition for application by suitable equipment. It shall be labeled with the manufacturer's guaranteed analysis as governed by applicable fertilizer laws. Any fertilizer that becomes contaminated or damaged, making it unsuitable for use, will not be accepted.

320.04 CONSTRUCTION METHODS

- A. **GENERAL** - Areas to be seeded and fertilized shall be completed, in reasonable conformity, to specified lines and grades prior to seeding and fertilizing, and are subject to approval by The PRPs.

Arcas finished during the period of October 15 through April 30 shall be permanently seeded within this time period. The Contractor must obtain. Slopes and areas finished during the period of May 1 through October 14 shall be mulched only. The permanent seeding of these areas shall then commence during the fall, at a time approved by the PRPs.

Seeding of the finished slopes shall require repeated seeding operations until approved by The PRPs, and shall not be construed to mean that the required finishing, topsoiling, fertilizing, mulching, and seeding may be done only once at the convenience of the Contractor. Any additional move-in required will not be paid for separately; the cost thereof shall be absorbed in the Contract unit price for seeding, fertilizing and mulching.

It is necessary, insofar as it is practicable and feasible, as determined by The PRPs, that the seedbed surface, at the time of application of seeds, not be excessively wet, snow-covered, or frozen and be reasonably free of large lumps, clods, and impervious crusts of dirt; that there be no appreciable areas of loose soils which can feasibly be compacted; that the surface, to a depth of approximately 4-inches, not be so tightly compacted that seed cannot begin growth. The Contractor shall treat such areas, as required by The PRPs, to attain, as nearly as practicable, the condition described.

Excessively tight or compacted soils shall be loosened to a minimum depth of 4 inches. Discing, harrowing, tilling, or hand raking of the soil shall be done at right angles to the natural flow of water on the slopes, unless otherwise approved by The PRPs. Scarifying of the soil, when required, shall be performed by equipment that will produce a uniform rough textured surface ready for seeding and mulching.

Existing structures and facilities shall be adequately protected; any damage done by the Contractor shall be repaired or adjusted to the satisfaction of The PRPs.

- B. **APPLICATION OF FERTILIZER** - Fertilizer shall be applied to the accepted seedbed surface at the rate as specified in this Technical Specification. Mechanical or hydraulic methods of application are acceptable so long as a uniform application at the specified rate is accomplished. The fertilizer application method is subject to approval by The PRPs.

The fertilizer shall be incorporated into the surface soil by discing, raking, or shallow plowing to a maximum depth of 2 inches. Exceptions will be made.

for seed drills that are capable of incorporating the fertilizer and seed directly into the seedbed. In no instance shall subsoil be incorporated into the seedbed as a result of this operation. Fertilizer shall be incorporated with equipment operated at right angles to the slope of the land.

If the Contractor is required to temporarily mulch the prepared area, fertilization shall be completed at the time of permanent seeding. The application methods and methods for incorporating the fertilizer into the seedbed shall be as specified herein.

C. SEED DISTRIBUTION -

1. **General.** Seed shall be applied to the conditioned seedbed no longer than 48 hours after the seedbed has been conditioned.

Broadcast or hydraulic seeding methods shall not be used during adverse weather conditions, as determined by The PRPs.

The applied seed, regardless of the method of application, shall not be covered by a soil thickness greater than ½-inch in depth.

2. **Seeding by Drill.** Seeding equipment used for applying grass seed must be designed, modified or equipped to regulate the application rate and planting depth of grass seed. If equipment for sowing cover crop seed is not equipped with press wheels, the seed shall be compacted with a cultipacker immediately after the ground has been drilled. Seed must be uniformly distributed in the drill hopper during the drilling operation. Acceptable drills include: custom seeders, furrow drills, disc drills, no till drills, or other drills approved by The PRPs. All grass establishment equipment shall be operated normal to the slope drainage

Planting depth shall be regulated by depth bands or coulters. To provide for more even distribution of seed on sloping areas, the drill box shall be partitioned by dividers no more than 24 inches apart. A drill shall be no wider than the width of the area over which it is to operate.

The rows of planted seed shall be a maximum of 8 inches apart and shall be at right angles to the natural slopes.

3. **Broadcast Seeding.** Seeding by hand or mechanical broadcasting will be permitted on areas inaccessible to drills or impractical to seed by other prescribed methods. Broadcast seeding requires the approval of The PRPs.

4. **Hydraulic Seeding.** Hydraulic seeding equipment may be used. Seed and mulch will be applied in separate and distinct operations except for the following:

When using the hydraulic seeding method, the Contractor must provide 1 pound of wood fiber or organic mulch per each 3 gallons of water in the hydraulic seeder as a cushion against seed damage. The mulch used as a cushion may be part of the total required mulch with the remainder applied after the seed is in place.

When hydraulically applying mulch in a separate operation, the Contractor may mix the seed with the fertilizer if his hydraulic seeding equipment is capable of uniformly mixing water, fertilizer, and seed - in that order - and power blowing or spraying the mixture uniformly over the seedbed. After blending, the slurry shall be applied to the seedbed within 45 minutes after the seed has been added to the water/fertilizer mixture. If the slurry cannot be applied within the specified 45 minutes, it shall be fortified, at no cost to the Owner, with the correct ratio of seed to the remaining slurry and a new 45-minute time frame established for applying the fortified mixture.

The Contractor may be required to use extension hoses to reach the extremities of slopes.

The Contractor shall remove any excessively rutted equipment tracks on the seedbed prior to final mulching, as required by The PRPs. The Contractor shall use a rake, small harrow, or other acceptable means to remove the tracks.

- D. **TRACKING** - All seeded and fertilized areas may or may not require tracking. Tracking shall be accomplished using a tracked vehicle equipped with grousers sufficient to groove the surface to at least 1/2-inch depth. The tracking vehicle shall be operated so as to completely cover the surface with grouser marks. All grouser marks shall run perpendicular to the natural slopes. The tracking vehicle shall be operated alternately between forward and reverse on each pass to eliminate damage to the seedbed resulting from 180 degree skid turns.

If the area is seeded by hydraulic methods, tracking of the slopes shall be done at such time when the surface has had sufficient time to dry. The length of time established will be at the discretion of The PRPs. Hand raking following application of seed may necessary, at the discretion of The PRPs.

E. SEEDING DATES -

1. Seeding shall be permitted from October 15 through April 30.

END OF SUBSECTION 320

SUBSECTION 330.00: MULCH

330.01 GENERAL

- A. **DESCRIPTION** - This work shall consist of covering and processing specified seeded areas with mulch consisting of the specified materials.
- B. **SUBMITTALS** - The following submittals are required:
- Manufacturer's specifications and material content for hydromulch products that may be used on the project.
 - Manufacturer's recommended application methods and rate for hydromulch products that may be used on the project.
 - "Weed Seed Free" certification for hay or straw mulch.

330.02 RELATED SECTIONS

Subsection 206.00 - Haul

Subsection 320.00 - Fertilizing and Seeding

Subsection 550.00 - Traffic Control

330.03 MATERIALS

- A. **GENERAL** – Vegetative mulch or hydromulch may be used on the project as dictated by site-specific conditions.
- B. **VEGETATIVE MULCH** - This type of mulch material shall be composed of grass hay, wheat straw, rye straw, or barley straw, in that order of preference.
1. **Grass Hay**. This type of mulch material shall be composed primarily of perennial grasses. The grass hay mulch shall contain greater than 70% grass by weight and shall not contain greater than 10% alfalfa, crested wheatgrass or yellow sweet clover. Grass hay is subject to the PRP's approval and must be "Montana Noxious Weed Seed Free Hay".
 2. **Straw**. This type of mulch material shall be clean grain straw, shall be "Montana Noxious Weed Seed Free" straw and shall not contain greater than 5% cereal seed by weight, i.e., seed heads. Written confirmation from a certified supplier will be required.

Chopped or ground material is not acceptable. The mulch material is not acceptable if it is musty, moldy or rotted, or if it contains seed-bearing stalks of noxious weeds. It shall be free of stones, dirt, roots, stumps or other foreign material.

- C **TACKIFIER** - Tackifier shall be a biodegradable organic formulation processed specifically for the adhesive binding of mulch. The tackifier shall uniformly disperse when mixed with water and shall not be detrimental to the homogeneous properties of the mulch slurry. Any tackifier that has been damaged by excess moisture or damaged by other means will not be acceptable. Tackifier may be added either during the manufacturing of the mulch or incorporated during mulch application.

Organic soil and mulch tackifier for use in hydraulically planting of seeds shall consist of specifically blended compatible hydrocolloids. Starch-based tackifiers are unacceptable.

Soil and mulch tackifier shall be applied at a minimum rate of 40 pounds per acre on slopes 2:1 or flatter, or at 80 pounds per acre, or more on slopes steeper than 2:1, or at manufacturer's recommendations, as approved by The PRPs.

When applied, the organic soil and mulch tackifier shall form a loose chain-like protective film, but not a plant inhibiting membrane, which will allow moisture to percolate into the underlying soil, while helping "stick" seeds, fertilizer and other specified materials to the soil surface during germination and initial seedling growth, after which the organic soil and mulch tackifier shall breakdown by microbial action.

330.04 CONSTRUCTION REQUIREMENTS

- A **GENERAL** - Mulch, when required, must be applied to seeded areas not more than 24 hours after seeding regardless of the type used. If the Contractor does not mulch within 24 hours after seeding, the Contractor may be required to re-seed the project at no additional cost. Mulch shall not be applied in the presence of free surface water, but may be applied upon damp ground. Mulch shall not be applied to snow-covered ground surfaces.

Mulch shall not be applied to areas having a substantial vegetative growth, such as grasses, weeds and grains. Areas not to be mulched shall be determined by The PRPs. Mulching shall not be done during adverse weather conditions or when wind prevents uniform distribution. Application, if after seeding, shall be in a manner to not seriously disturb the seedbed surface.

- B. **APPLICATION OF VEGETATIVE MULCH** - Vegetative mulch shall be applied after seeding and fertilizing is completed unless otherwise specified. The mulch shall be applied in a uniform manner by a mulch spreader or by hand at a rate of 3,000 pounds per acre. The mulch spreader shall be designed

specifically for this type of work. The vegetative material shall be fed into the mechanical mulch spreader at an even, uniform rate.

Straw or native hay shall be uniformly spread at the rate specified. Unless otherwise specified by The PRPs, straw or hay shall be anchored into the seedbed by using a mulch crimper. Straw or hay mulch shall be pliable. If the straw breaks during crimping, it shall be sprinkled with water, not soaked, to facilitate placement.

The mulch crimper, specifically designed for this type of work, shall have round, flat (not angled), notched blades of the following approximate dimensions. ¼ inch thick by 18 inches in diameter and spaced 8 to 9 inches apart. The crimper shall have sufficient weight to force the vegetative mulch a minimum of 3 inches into the soil and shall be equipped with disc scrapers. Mulch crimping shall be done on all slopes capable of being safely traversed by a tracked vehicle. All mulch crimping shall be done perpendicular to the flowline of the slope.

- C. **FINISHING** - Prior to final acceptance of the project, the Contractor shall immediately re-mulch any area from which the original mulch may have been washed or blown. If the original seedbed and seeding is damaged due to the displacement of the mulching material, the seedbed shall be repaired and reseeded prior to re-mulching. The operations described in this paragraph shall be at the Contractor's expense if the damage is due to his negligence.

END OF SUBSECTION 330

SUBSECTION 550.00: TRAFFIC CONTROL

550.01 GENERAL

- A. **DESCRIPTION** - Traffic control shall consist of furnishing, installing, maintaining, and relocating necessary traffic signs, barricades, lights, signals, pavement markings, and other traffic control devices necessary to insure the safety of the general public and project personnel. This work shall include flagging for the guidance of traffic through the work zone(s) and the furnishing and application of water for dust control.
- B. **OPERATIONS** - The Contractor shall conduct his operations so that there is a minimum interruption in the use of the roads and highways involved at all times.

The Contractor shall schedule his operations to keep all roads and streets open to a minimum of one-way traffic during normal working hours during construction. Two-way traffic shall be provided at all times during overnight and weekend periods.

All work shall be coordinated with RARUS Railway and ADLC and shall be performed in accordance with the Contract Documents, the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) as published by the U.S. Department of Transportation, the Montana Department of Transportation (MDT) Standard Specifications for Road and Bridge Construction, the approved Traffic Control Plan, and as otherwise required by the PRPs.

C SUBMITTALS

1. **Traffic Control Plan** The Contractor shall submit a Traffic Control Plan for any work involving public roadways. All traffic control plans shall be submitted and accepted prior to construction and shall meet the requirements specified herein. The traffic control plan shall include the following, as appropriate:
- Itemization of signing, including: type, size, shape, color, location, and MUTCD reference.
 - Temporary pavement markings for traffic channelization (cones, barrels, barricades, etc.).
 - Flagging, including personnel numbers and location.
 - Lighting, as necessary.
 - Road closures and time(s) of road closures.
 - Special traffic patterns (pilot cars, one-way traffic lanes, detours)

- Signage during non-work hours

The Traffic Control Plan will be subject to review and approval by the Montana Department of Transportation (MDT) for roads under their jurisdiction, by the appropriate county for roads under county jurisdiction, and by any other public entity having jurisdiction over other public roadways (U.S. Forest Service, city/county, etc.) These approvals will be in addition to those provided by the PRPs in accordance with the Submittals Section. No work shall commence until all approvals of the Traffic Control Plan have been secured.

550.02 RELATED SECTIONS

Subsection 203.00 - Providing and/or Stockpiling Capping Materials

Subsection 206.00 - Haul

Subsection 220.00 - Ballast and Soil Disposal

Subsection 820.00 - Ballast and Aggregate Materials

Subsection 310.00 - Concrete Barriers

550.03 MATERIALS

All traffic control devices and materials shall be in accordance with MDT Standard Specifications for Road and Bridge Construction, most current edition.

550.04 CONSTRUCTION REQUIREMENTS

All devices utilized for traffic control shall be in accordance with the requirements of the Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways, most current edition.

Before placement of any traffic control for any stage of construction, the Contractor shall have on hand, at the project site, all necessary traffic control devices required for that construction stage. All traffic control devices necessary for construction shall be properly placed and in operation and approved before any construction is allowed to start. All devices shall be constructed and erected in a workmanlike manner and shall be properly maintained, cleaned, and operated during the entire time they are used. They shall remain in place only as long as they are needed and shall be removed immediately thereafter. Where operations are performed in stages, there shall be in place only those signs that apply to the present stage of construction. Signs that do not apply to the existing conditions shall be covered with opaque material, turned, or removed, so as not to be readable to oncoming traffic.

Construction equipment, vehicles, materials, and debris shall be stored or parked a minimum of 30 feet from the edge of the traveled way or behind guardrails, etc., as appropriate. When it is not feasible to park equipment or store materials a minimum of 30 feet from the edge of

the traveled way or behind guardrails, adequate warning devices and protective measures shall be utilized.

All traffic control devices furnished by the Contractor shall remain the property of the Contractor and shall be removed from the project when their use is no longer required. All properly installed traffic control devices shall be replaced by the Contractor when destroyed by traffic.

The Contractor shall schedule his construction operations in a manner that will assure: 1) the safety and convenience of motorists, pedestrians, and construction workers are adequately met at all times; and 2) the project is completed in a manner most beneficial to the project as a whole. Traffic control shall be provided in full compliance with MUTCD during materials hauling and equipment operation or transport along public roadways. No separate payment will be made for traffic control and all costs for traffic control shall be absorbed in other work items included in the Contract bid.

END OF SUBSECTION 550

SUBSECTION 560.00: UNDERGROUND UTILITIES

560.01 GENERAL

- A. **DESCRIPTION** - The work covered by this section includes the locating, uncovering, protection of, repair to, relocation of or any other work associated with crossing under any underground utility encountered during the excavation and subsequent construction of any portion of the project

560.02 RELATED SECTIONS

Subsection 201.00 - Clearing and Grubbing
Subsection 202.00 - Excavation and Grading

560.03 MATERIALS

Section not used.

560.04 CONSTRUCTION REQUIREMENTS

The Contractor shall have full responsibility for reviewing and checking all information and data regarding any underground facility, for locating all underground facilities for coordination of the work with the Owners of such Underground Facilities during construction, for the safety and protection thereof and repairing any damage thereto resulting from the Work, the cost of all of which will be considered as having been included in the unit contract price.

After the utility companies have completed their field locates, the Contractor is responsible for recording or preserving this information. The utility companies may charge the Contractor for excessive locates based on the respective utility company's policies. The Contractor is responsible for contacting each utility company to verify any policies and/or charges. Any charges incurred for excessive locates shall be at the expense of the Contractor.

- A. **EXISTING UNDERGROUND NATURAL GAS** - The Contractor shall be solely responsible for locating existing underground pipelines. After locates have been performed, Contractor is solely responsible for protection of and repair of any damage to underground natural gas lines as a result of his excavation. Upon discovery of gas lines, the Contractor shall notify the PRPs of its location. The Contractor shall record the size, location and depth of the utility crossing for the compilation of Record Drawings and allow the PRPs the opportunity to do the same.
- B. **EXISTING UNDERGROUND WATER LINES** - The Contractor shall be solely responsible for locating existing underground pipelines. After locates

have been performed, Contractor shall locate pipeline, in advance of excavating or trenching, by careful prospecting. Contractor is solely responsible for protection of and repair of any damage thereto including

mainline taps and corporation stops as a result of his excavation. Upon discovery of underground water lines, the Contractor shall notify the PRPs of its location. The Contractor shall record the size, location and depth of the utility crossing for the compilation of Record Drawings and allow the PRPs the opportunity to do the same.

- C. EXISTING UNDERGROUND SANITARY SEWER & STORM SEWER - Existing underground sanitary sewer or storm sewer mains and service connections are not shown on the drawings. The Contractor shall be solely responsible for locating existing underground pipelines. After locates have been performed, the Contractor shall locate lines and/or conduit, in advance of excavating or trenching, by careful prospecting. The Contractor is solely responsible for protection and repair of any damage thereto as a result of his excavation. Upon discovery of the lines and/or conduit, the Contractor shall notify the PRPs of its location. The Contractor shall record the size and depth of the utility crossing for the compilation of Record Drawings and shall allow the PRPs the opportunity to do the same.

- D. EXISTING UNDERGROUND TELEPHONE LINES - Existing underground telephone lines and/or conduit are not shown on the drawings. The Contractor shall be solely responsible for locating existing underground lines and/or conduit, by contacting the utility locate service and the utility companies.

After locates have been performed, the Contractor shall locate line and/or conduit, in advance of excavating or trenching, by careful prospecting. The Contractor is solely responsible for protection and repair of any damage thereto as a result of his excavation. Upon discovery of the lines and/or conduit, the Contractor shall notify the PRPs of its location. The Contractor shall record the size, location and depth of the utility crossing for the compilation of Record Drawings and allow the PRPs the opportunity to do the same.

- E. EXISTING UNDERGROUND IRRIGATION OR CULVERTS - Underground irrigation lines and appurtenances may exist, but are not shown on the Drawings. The Contractor shall be solely responsible for locating existing underground pipelines, by contacting the appropriate owner.

After locates have been performed, the Contractor shall locate pipeline, in advance of excavating or trenching, by careful prospecting. The Contractor is solely responsible for protection of and repair of any damage thereto including

sprinkler heads, valves, vaults, lines, laterals, fittings and electrical lines as a result of his excavation. Upon discovery of the pipelines, the Contractor shall notify the PRPs of its location. The Contractor shall record the size, location and depth of the utility crossing for the compilation of Record Drawings and allow the the PRPs the opportunity to do the same

END OF SUBSECTION 560

SUBSECTION 820.00: BALLAST AND AGGREGATE MATERIALS

820.01 GENERAL

A **DESCRIPTION** - This work shall consist of furnishing and placing aggregate composed of crushed gravel, or stone, or other similar materials meeting the grade or maximum size specified in these Technical Specifications. Placement shall be in conformance with these specifications. The Contractor shall arrange for sampling and testing materials to assure compliance with these Technical Specifications.

B. **SUBMITTALS** - The following submittals are required:

- **Test Reports:** The Contractor shall test materials and submit six copies, one initial set being used for Quality Control, of the following results to the PRPs:

- 1 All field density test reports and laboratory compaction curves
- 2 All sieve analyses (gradation) and Atterberg Limits analyses performed.
3. A complete set of aggregate quality tests as required by the Technical Specifications.

C. **REFERENCE STANDARDS**

1. ASTM C 88 Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate.
2. ASTM C 117 Standard Test Method for Materials Finer Than No. 200 Sieve in Mineral Aggregates by Washing.
3. ASTM C 127 Standard Test Method for Relative Density (Specific Gravity).
4. ASTM C 131 Standard Test Method for Resistance to Degradation of Small-Size Course Aggregate by Abrasion and Impact in the Los Angeles Machine.
5. ASTM C 136 Standard Test Method for Sieve Analysis of Fine and Course Aggregates.
6. ASTM C 142 Standard Test Method for Clay Lumps and Friable Particles in Aggregates

7. **ASTM D 75 Standard Practice for Sampling Aggregates. Test samples shall be reduced from field samples by means of ASTM C 702.**
8. **ASTM D 420 Recommended Practice for Investigating and Sampling Soil and Rock**
9. **ASTM D 421 Standard Practice for Dry Preparation of Soil Samples for Particle Size Analyses and Determination of Soil Constants.**
10. **ASTM D 422 Standard Method for Particle Size Analysis of Soils**
11. **ASTM D 698 Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using a 5-lb Rammer and 12-inch Drop.**
12. **ASTM D 2216 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil Aggregate Mixtures.**
13. **ASTM D 2487 Classification of Soils for Engineering Purposes**
14. **ASTM D 2922 Test Methods for Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).**
15. **ASTM D 3017 Moisture Content of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).**
16. **ASTM D 4318 Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.**
17. **ASTM D 4718 Standard Practice for Correction of Unity Weight and Water Content for Soils Containing Oversize Particles.**
18. **ASTM D 4791 Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Course Aggregate.**

820.02 RELATED SECTIONS

Subsection 202 00 - Excavation and Grading

Subsection 203 00 - Providing and/or Stockpiling Capping Materials

Subsection 206.00 - Haul

Subsection 550.00 - Traffic Control

820.03 MATERIALS

A. SIZE NO. 24 BALLAST – American Railway Engineering Association (AREA) crushed stone, Size No 24 Ballast (2½” to ¾” graded material), or alternate ballast material approved by RARUS Railway, to be installed in excavated areas along active railroad beds

1. GENERAL - Processed ballast shall be crushed stone, crushed air-cooled blast furnace slag, crushed steel furnace slag, or crushed smelter sag, composed of hard, strong, and durable particles, free from injurious amounts of deleterious substances and conforming to the requirements of these specifications.

2. QUALITY REQUIREMENTS - Deleterious substances shall not be present in the processed ballast in excess of the following amounts:
Soft and friable pieces..... 3 percent
Material finer than No. 200 sieve.....1 percent
Clay lumps0.5 percent

The percentage of wear of processed ballast, tested in the Los Angeles machine (ASTM C 131), shall not be greater than 40 percent.

The soundness of processed ballast shall be such that when tested in the sodium sulfate soundness test (ASTM C 88), the weighted average loss shall not be in excess of 7% after 5 cycles.

The weight per cubic foot (compacted) of processed slag ballast meeting the grading requirements of this specification shall not be less than 70 lbs. for blast-furnace slag and 100 lbs. for steel furnace slag and smelter slag, in accordance with ASTM C 127.

The percentage by weight of flat or elongated particles permitted in the ballast shall not exceed 5% (ASTM D 4791). Flat or elongated particles are defined as articles having a length that is equal to, or greater than, five times the average thickness.

2. GRADATION - As determined by ASTM C 136 and 117, AREA Size No. 24 Ballast shall meet the following gradation requirements:

**TABLE OF GRADATION
AREA Size No. 24 Ballast**

<u>Sieve Size</u>	<u>Percentage (by Weight) Passing Square Mesh Sieves</u>
3"	100
2½"	90 - 100
1½"	25 - 60
¾"	0 - 10
½"	0 - 5

B. SIZE NO. 5 BALLAST – Furnace slag meeting AREA Size No. 5 Ballast (1" to ¾" graded material) specifications, to be installed in excavated areas within active railroad yards. The furnace slag shall be obtained from the designated location on Smelter Hill.

1. **GENERAL** - Processed ballast shall be crushed air-cooled blast furnace slag composed of hard, strong, and durable particles, free from injurious amounts of deleterious substances and conforming to the requirements of these specifications
2. **QUALITY REQUIREMENTS** - Deleterious substances shall not be present in the processed ballast in excess of the following amounts:

Soft and friable pieces.....3 percent
 Material finer than No. 200 sieve1 percent
 Clay lumps 0.5 percent

The percentage of wear of processed ballast, tested in the Los Angeles machine (ASTM C 131), shall not be greater than 40 percent.

The soundness of processed ballast shall be such that when tested in the sodium sulfate soundness test (ASTM C 88), the weighted average loss shall not be in excess of 7% after 5 cycles.

The weight per cubic foot (compacted) of processed slag ballast meeting the grading requirements of this specification shall not be less than 70 lbs. for blast-furnace slag and 100 lbs. for steel furnace slag and smelter slag, in accordance with ASTM C 127

The percentage by weight of flat or elongated particles permitted in the ballast shall not exceed 5% (ASTM D 4791). Flat or elongated particles are defined as articles having a length that is equal to, or greater than, five times the average thickness

2. **GRADATION** - As determined by ASTM C 136 and 117, AREA Size No. 5 Ballast shall meet the following gradation requirements:

**TABLE OF GRADATION
AREA Size No. 5 Ballast**

<u>Sieve Size</u>	<u>Percentage (by Weight) Passing Square Mesh Sieves</u>
1½"	100
1"	90 - 100
¾"	40 - 75
½"	15 - 35
⅜"	0 - 15
No 4	0 - 5

- C. **TYPE 1 AGGREGATE** – Coarse aggregate (Type 1 aggregate) will be used as surface cap material for railroad beds and side slopes. Coarse aggregate materials shall be relatively free of “fines” to inhibit growth of unwanted vegetation along the railroad beds. Coarse aggregate shall consist of material with the following gradation requirements:

**TABLE OF GRADATION
Coarse Aggregate Material (Type 1 Aggregate)**

<u>Sieve Size</u>	<u>Percentage (by weight) Passing Square Mesh Sieves</u>
3"	100
¾"	0 - 15

- D. **RIPRAP** - Rock, solid, durable, and nonfriable; free of thin, slab-type rock; minimum specific gravity of 2.5 or as otherwise approved by The PRPs. Riprap may include rounded rock. Riprap shall consist of 6-inch minimum placed thickness in specified areas (railroad bed side slopes along the Anaconda Mainline steeper than 4:1, no graded slopes shall be steeper than 2:1). Riprap material shall comply with the following gradation requirements:

**TABLE OF GRADATION
Riprap**

D ₁₀₀ =	12"
D ₅₀ =	4 to 8"
D ₁₅ =	3 to 4 "
D ₀ =	½ to ¾ "

- E. **GRANULAR BORROW** - Used to construct surface caps on flat storage areas; primarily in active railroad yards (areas between and outside of ballast sections). Well graded granular materials meeting the following gradation requirements:

**TABLE OF GRADATION
Granular Borrow**

<u>Sieve Size</u>	<u>Percentage (by weight) Passing Square Mesh Sieves</u>
3"	100
No. 200	0 - 15

- F. **CRUSHED BASE COURSE** - Used directly beneath areas specified to receive asphalt surfacing. Specifically, crushed base course shall be placed in areas where asphalt roadways currently cross the West Valley railroad bed. Provide crushed base course material meeting the requirements listed below:

**TABLE OF GRADATION
Crushed Base Course**

<u>Sieve Size</u>	<u>Percentage (by weight) Passing Square Mesh Sieves</u>
1½"	100
¾"	75 - 95
¾"	40 - 75
No. 4	25 - 60
No. 40	14 - 34
No. 200	0 - 8

The maximum liquid limit and plasticity index for material passing the No. 40 sieve is 25 and 6, respectively, as determined by AASHTO T89 and T90.

The wear factor shall be less than 50 percent at 500 revolutions when tested under AASHTO T96 (Los Angeles Abrasion Test)

At least 25 percent by weight of the aggregate retained on the No. 4 sieve must have at least one mechanically fractured face.

G. CRUSHED TOP SURFACING MATERIALS – To be installed in areas where dirt/gravel roadways or driveways currently cross the West Valley railroad bed

1. **GENERAL** - Materials specified to be applied as the top surface on aggregate driveways/roadways shall consist of both fine and coarse fragments of crushed stone or crushed gravel, and/or natural gravel, and when approved by the PRPs, may be blended with sand, finely crushed stone, crusher screenings, or other similar materials. The completed mixture of aggregates shall be capable of being compacted into a dense and well-bonded base.

The method used in production shall be such that the percentage of fractured particles occurring in the finished product shall be as nearly constant and uniform as practicable. The crushing shall result in a product that at least 20% of the material retained on a No. 4 mesh sieve will have at least one fractured face. If necessary to meet this requirement or to eliminate an excess of fines or uncrushed particles, gravel shall be screened before crushing.

2. **GRADATION** - As determined by "Montana Test Method MT-202", the general crushed top surfacing material shall meet the following gradation requirements:

**TABLE OF GRADATION
Crushed Top Surfacing Material**

<u>Sieve Size</u>	<u>Percentage (by weight) Passing Square Mesh Sieves</u>
1"	100
3/4"	90-100
3/8"	20-55
No. 4	0 - 10
No. 8	0 - 5

- a. General crushed top surfacing material shall be placed at a minimum depth of 6-inches (+0.1-foot and -0.0-foot tolerance)

820.04**CONSTRUCTION REQUIREMENTS**

- A. **CAPPING MATERIALS**- Immediately prior to placing capping materials, the surface of the underlying embankment or subgrade shall be smooth graded and shaped to the cross-sections shown on the Drawings. The receiving surface shall be approved by The PRPs prior to placement of capping materials. No capping materials shall be placed upon wet or muddy materials.

Riprap material shall not be placed until the surface has been prepared and approved. The material shall conform to the cross-sections and profiles shown on the Drawings. The stone shall be carefully handled and dumped to avoid material segregation and damage. The rock shall be sufficiently manipulated by hand or machine methods to secure a regular surface and mass stability. Do not drop or place riprap in any manner that would damage the prepared subgrade.

The materials shall be mixed and placed in horizontal layers of not more than 6-inches loose thickness, except as allowed by The PRPs. The depositing and spreading of the material on the prepared subgrade shall commence at the point farthest from the point of loading, unless otherwise instructed, and shall progress continuously without breaks. Hauling over the subgrade will not be permitted at such times and in such manner as to be detrimental to the subgrade. The material shall be deposited and spread in a uniform layer without segregation of size to such loose depth that when compacted, the layer will have the required thickness. Spreading shall be as necessary to distribute the material in a uniform layer.

Material placed shall be compacted to the full width by rolling with approved equipment. Any irregularities or depressions that develop under rolling shall be corrected by loosening the material in these places and adding or removing material, as the case may require, until the surface is smooth and uniform.

Spreading and compacting shall be performed alternately as required to maintain a smooth, even, uniformly compacted surface until the final inspection. Along structures and at all places not accessible to the roller, the surface material shall be tamped thoroughly with approved mechanical tampers or hand tampers.

- B. **CRUSHED BASE COURSE** - Before placing the crushed base course, smooth and shape the surface of the underlying subgrade to a relatively flat cross-section before placing the base course. Do not place base course on wet subgrade. Compact the subgrade to a minimum field density of 95 percent of the maximum dry density as determined by AASHTO T99.

Place the crushed base course in maximum 6-inch loose lift thicknesses. Blade smooth and thoroughly compact each crushed base course layer to a minimum field density of 95 percent of the maximum dry density as determined by AASHTO T99 before placing the succeeding asphalt layer.

- C. GENERAL CRUSHED TOP SURFACING MATERIALS –Immediately prior to placing the top surfacing course, the surface of the underlying embankment or subgrade shall be smooth and shaped to approximately a flat cross-section before the top surfacing course is placed. No top surfacing course shall be placed upon wet or muddy materials.

The material shall be mixed and placed in horizontal layers of not more than 6-inches loose thickness, except as allowed by the PRPs. The subgrade upon which the top surfacing materials are placed shall be moisture conditioned and compacted, as appropriate, to assure that overlying embankment will attain the compaction specification. Crushed top surfacing materials shall be compacted (maximum 6-inch loose lifts) to attain 95% of Standard Proctor density at \pm 3% of Optimum Moisture Content.

The depositing and spreading of the material on the prepared subgrade shall commence at the point farthest from the point of loading, unless otherwise instructed, and shall progress continuously without breaks. Hauling over the subgrade will not be permitted at such times and in such manner as to be detrimental to the subgrade. The material shall be deposited and spread in a uniform layer without segregation of size to such loose depth that when compacted, the layer will have the required thickness. Spreading shall be as necessary to distribute the material in a uniform layer.

Material placed shall be compacted to the full width by rolling with approved equipment. Any irregularities or depressions that develop under rolling shall be corrected by loosening the material in these places and adding or removing material, as the case may require, until the surface is smooth and uniform.

Spreading and compacting shall be performed alternately as required to maintain a smooth, even, uniformly compacted surface until the final inspection. Along structures and at all places not accessible to the roller, the surfacing course material shall be tamped thoroughly with approved mechanical tampers or hand tampers to obtain a density conforming to the compaction requirements.

END OF SUBSECTION 820

SUBSECTION 830.00: ROAD MIX BITUMINOUS PAVEMENT

830.01 GENERAL

- A. **DESCRIPTION** - This work shall consist of production and placing of plant mix asphalt pavements. Plant mix pavement includes one or more courses of plant mixed aggregate, mineral filler or chemical additive when required, and bituminous material, constructed on a prepared foundation.

830.02 RELATED SECTIONS

- Subsection 206.00 - Haul
- Subsection 220.00 - Ballast and Soil Disposal
- Subsection 550.00 - Traffic Control
- Subsection 560.00 - Underground Utilities
- Subsection 820.00 - Ballast and Aggregate Materials

830.03 MATERIALS

Use bituminous materials complying with the specifications listed in Table 1.

**TABLE 1
BITUMINOUS MATERIALS SPECIFICATIONS**

TYPE and GRADE	SPECIFICATION	USE
Asphalt Cement Performance Grade 58-28	AASHTO M-20 Table 1 (or most current method)	Hot Plant Mix Bituminous Pavement
Emulsified Asphalt, SS-1, CSS-1, SS-1h, or Css-1h	(Anionic) AASHTO M-140 Modification (Cationic) AASHTO M-208 Modification	Tack, Prime

The bituminous plant mix shall be composed of a mixture of aggregate, filler if required, and bituminous material. Size, grade, and combine the aggregate fractions such that they meet the grading requirements of the job-mix formula. Design the mix by the Marshall Method in accordance with the most current edition of the Asphalt Institute MS-2 Manual and the requirements listed on Table 2.

**TABLE 2
PLANT MIX SPECIFICATIONS
AASHTO T245**

Number of blows on each side of specimen	50
Stability (min)	1,200
Flow (mm)	2 - 4
Asphalt Content	4 - 8
Percent Voids (Marshall)	3 - 5
Percent Voids (in place)	3 - 7
Percent Voids in Mineral Aggregate (VMA)	See Note Below

Note:

1. For 25mm nominal particle size: Minimum VMA is 12%
2. For 19mm nominal particle size: Minimum VMA is 13%
3. For 12.5mm nominal particle size: Minimum VMA is 14%

If the index of retained strength of the specimens of composite mixture, as determined by AASHTO T165, is less than 75 percent, or the dry stability is less than 200 pounds per square inch (psi), the aggregates will be rejected or the asphalt will be treated with an approved anti-stripping agent. If an anti-stripping agent is required, add an amount of anti-stripping agent sufficient to produce an index of retained strength of not less than 75 percent with a minimum dry stability of 200 psi. Provide the anti-stripping agent at no additional cost.

Submit a job-mix formula for each mixture to be supplied for the project to the PRPs for approval at least ten (10) days prior to the expected paving start date.

The gradations listed in Table 3 represent the limits that determine the suitability of aggregate for use as hot plant mix aggregate. For the job mix gradation, use a well-graded mix.

**TABLE 3
HOT PLANT MIX AGGREGATE**

SIEVE SIZE	PERCENT PASSING (by Weight)
$\frac{3}{4}$ "	100
$\frac{1}{2}$ "	80 - 100
No. 4	45 - 65
No. 10	32 - 45
No. 40	12 - 25
No 200	4 - 10

After the job mix formula has been established, the following tolerances will apply to the target gradation:

Passing ¼" Sieve	± 0%
Passing ½" Sieve	± 7%
Passing No. 4 Sieve	± 7%
Passing No. 10 Sieve	± 6%
Passing No. 40 Sieve	± 4%
Passing No. 200 sieve	± 1.5%

In addition, the Asphalt Content tolerance shall be within ± 0.4% of its target value if the job mix parameter curves indicate the corresponding Marshall design limits are not exceeded. Calculate the Asphalt Content on the percentage basis by weight of total mix.

830.04 CONSTRUCTION REQUIREMENTS

- A. **SUBGRADE SURFACE PREPARATION** - Prior to performing paving operations, verify the nature and extent of the areas designated on the plans to be surfaced.
1. Use a stringline or other approved method to provide suitable controls for the paver.
 2. Scarify the subgrade surface to a depth of 6 inches and recompact with a roller to a minimum of 95% of the maximum standard proctor dry density at a moisture content of ± 2% of optimum moisture as determined by AASHTO T99
 3. Proof roll the base with equipment having at least one 18-kip single axle load. Excavate, replace, and compact areas that yield or crack under the proof roll loading
 4. Using a thin coat of hot bituminous liquid, paint any vertical surfaces that will come in direct contact with the hot mix asphalt
- B. **PRIME COAT** - Before placing the asphalt pavement, apply the prime coat to the prepared subgrade surface after the PRP's approval
1. Apply the prime coat when the prepared surface is dry and the ambient temperature is 50 degrees F or higher.
 2. The PRPs will establish the bituminous material application rate.
 3. Treat only one half of the roadway width in one application.
- C. **HOT PLANT BITUMINOUS PAVEMENT** - Place the asphalt pavement to the lines and grades shown in the plans (minimum thickness of 4-inches).
1. Adjust and regulate the mechanical spreader to provide a smooth surface and a depth that when compacted, will conform to the cross section, grade, and contour shown in the plans.

2. Keep the asphalt mixture above 200 degrees F before dumping it into the mechanical spreader.
3. Place the mixture continuously and in such a manner as to minimize the longitudinal joints.
4. Follow the spreader with rakers and shovelers. Add hot mixture and rake as required to produce a course that will conform to all requirements specified herein.

D COMPACTION - After spreading, compact the mixture uniformly with powered rollers. Begin the compaction rolling as soon as the material will bear the roller without undue displacement. Complete compaction before the mat temperature drops below 180 degrees F.

1. Roll all surfaces longitudinally. Overlap roller paths on successive trips. Keep the roller wheels moist to avoid picking up the material.
2. Continue rolling until after all roller marks are eliminated, the surface is of a uniform texture and true to grade and cross section, and has a density of at least 95 percent of the maximum laboratory density specified in the job mix formula.
3. In areas not accessible to the roller, thoroughly compact the mixture with hand rollers.
4. Remove and replace any mixture that becomes loose and broken, mixed with dirt, or is in any way defective, with fresh hot mixture. Immediately compact the material to conform to the surrounding area. Complete this work at no additional expense to the Client.
5. After final rolling, keep all vehicular traffic off the pavement until it has cooled and hardened. As a minimum, keep all vehicular traffic off the pavement for at least six hours after final rolling.

E. FIELD QUALITY CONTROL - Provide Quality Control Testing and Sampling at no expense to the PRPs. The PRPs will provide the Quality Assurance Testing.

1. At a minimum, provide quality control testing at the rates specified below:

In-Place Density and Depth Check with Cores -- One core per replacement area. Follow AASHTO specifications T166, T168, T269, and T275 for sampling, collecting, and testing.

The field density and thickness of the pavement is determined by measuring the cores tested. The actual thickness must be within 1/4" of the specified thickness (4-inches). When the measurement of any core is less than the plan thickness by more than 1/4", the actual thickness of the pavement in that area may be determined by

taking additional cores at intervals parallel to the centerline in each direction from the affected location until, in each direction, a core is found which is not deficient by more than ¼". Areas found to be deficient in thickness by more than ¼" will be evaluated by the PRPs. If the PRPs determine the deficient areas warrant removal, remove and replace the areas with asphalt concrete of thickness shown on the plans. Additional coring is considered as re-testing of failing areas.

END OF SUBSECTION 830

SUBSECTION 840.00: CONCRETE BARRIERS

840.01 GENERAL

A. **DESCRIPTION** - Work under this section includes furnishing and properly installing pre-cast concrete median barriers at the locations shown on the Drawings

B. **REFERENCES** -

Montana Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition

- Section 551 - Portland Cement Concrete
- Section 554 - Precast Concrete Products

840.02 RELATED SECTIONS

Subsection 203.00 - Providing and/or Stockpiling Capping Materials

Subsection 206.00 - Haul

Subsection 550.00 - Traffic Control

Subsection 820 00 - Ballast and Aggregate Materials

840.03 MATERIALS

A. **PRECAST CONCRETE MEDIAN BARRIERS** - Precast concrete median barriers shall meet the specifications of Sections 551 and 554 of the *Montana Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition.*

840.04 CONSTRUCTION REQUIREMENTS

A. **INSTALLATION** - Install concrete median barrier rails, including terminal end sections, according to the alignment and connecting Details shown on the Drawings, and as directed in the field by the PRPs. Concrete median barrier rails shall be installed in such a manner as to maximize the driving surface area available to vehicles on alleys and roadways located adjacent to barrier installation. Under no circumstances shall the driving surface area be reduced from the pre-existing condition. Excavation of portions of existing railroad embankments may be necessary to install concrete median barrier rails in the manner specified, to maintain the available driving surface area.

END OF SUBSECTION 840

SUBSECTION 850.00 WOODEN POST AND RAIL FENCE

850.01 GENERAL

- A. **DESCRIPTION** - This work shall consist of providing all materials, labor equipment, and incidentals necessary for the installation of a wooden post and double rail fence at the locations shown on the Drawings. The work shall also include removal and disposal of existing wooden fences where indicated.

850.02 RELATED SECTIONS

Subsection 202 00 - Excavation and Grading

Subsection 206.00 - Haul

Subsection 550 00 - Traffic Control

Subsection 560.00 - Underground Utilities

Subsection 840.00 - Concrete Barriers

850.03 MATERIALS

- A. **POSTS** - Vertical posts used in fence construction shall be 6" x 8" planed and pressure treated lumber. Posts shall be a minimum of 80-inches in length and shall be cut at 45-degree angles (all sides) on the top of the post to form a pyramid as shown in the Drawings. Posts shall be treated with CCA to resist insect, fungal, and water decay. Vertical posts shall be set into the ground with the bottom of the post extending a minimum of 36-inches deep.

Vertical posts shall be notched on sides accepting the horizontal rails as shown on the Drawings. Dimensions notches cut into the vertical posts shall be approximately 5½" x 1".

- B. **RAILS** - Horizontal rails used in fence construction shall be 2" x 6" planed and pressure treated lumber. Rails shall be a minimum of 120-inches in length. Rails shall be treated with CCA to resist insect, fungal, and water decay.
- C. **LAG BOLTS** - Horizontal rails shall be permanently attached to vertical posts using 6" x ½" lag bolts with appropriately sized washers.

850.04 CONSTRUCTION REQUIREMENTS

- A. **GENERAL** - Remove and properly dispose of any existing fencing materials at the locations shown on the Drawings.

- B. **GRADING** - Provide grading and clearing, as necessary, to efficiently and properly construct the fences

- C. **EXCAVATION** - Excavate pits/holes for setting wooden posts to the specified depth, grade, and spacing as shown on the Drawings. Holes shall not be overly large in diameter, but shall provide adequate open space around the wooden post so that backfill can be tamped the full depth around the post. Backfill gradually and uniformly with soil around each post. Compact backfill firmly from the bottom of the hole to the ground surface.

- D. **BOLTS** - Predrilled lead holes shall be used for guiding lag bolts. The hole diameter shall be three-fourths the diameter of the bolt and drilled to a depth no greater than $\frac{3}{4}$ the length of the bolt

Upon completion, the fence shall be true to line and grade, all posts shall be vertical and firm, and rails shall be level and firmly attached to posts.

END OF SUBSECTION 850

APPENDIX C

CONSTRUCTION QUALITY ASSURANCE PLAN

**ANACONDA SMELTER NPL SITE
ANACONDA REGIONAL WATER, WASTE & SOILS
OPERABLE UNIT**

Draft Final

***Remedial Design Unit (RDU) 5 Anaconda Active Railroad Beds
Remedial Action Work Plan/Final Design Report (RAWP/FDR)
Construction Quality Assurance Plan (CQAP)***

Atlantic Richfield Company

August 15, 2003

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***Remedial Design Unit (RDU) 5 Anaconda Active Railroad Beds
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August 15, 2003

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1.0 INTRODUCTION

In 1996, the U.S. Environmental Protection Agency (EPA) and Montana Department of Environmental Quality (DEQ), together commonly referred to as the Agencies, issued a *Record of Decision* (ROD) (September 1996) for remediation of the Community Soils (CS) Operable Unit (OU) of the Anaconda Smelter National Priorities List (NPL) Site. In 1997, the Atlantic Richfield Company (Atlantic Richfield), a Potentially Responsible Party (PRP) and the Agencies entered into the 11th Amendment to Administrative Order of Consent (AOC) 88-16 for the remedial design of the CS OU. This amendment to the AOC specified completion of a Work Plan that describes the Remedial Design/Remedial Action (RD/RA) for the CS OU. As agreed upon between Atlantic Richfield and the Agencies under the CS OU Unilateral Administrative Order (UAO) for residential yards, active railroad beds within the CS OU (within and near the community of Anaconda, Montana) were transferred to Remedial Design Unit (RDU) 5 of the Anaconda Regional Water, Waste and Soils (ARWW&S) OU in 2002.

The Anaconda Active Railroad Beds RDU 5 Remedial Action Work Plan/Final Design Report (RAWP/FDR) identifies and describes the planned RD/RA for the site. This Construction Quality Assurance Plan (CQAP) describes construction quality assurance (QA) procedures and responsibilities applicable to the Anaconda Active Railroad Beds RAWP/FDR for RDU 5 of the ARWW&S OU. This CQAP has been prepared by Atlantic Richfield for the PRP Group.

1.1 Purpose and Objectives

Construction quality control (QC) will be the responsibility of the RA Construction Contractor. The RAWP/FDR for the project outlines the QC requirements that the Construction Contractor is expected to fulfill. The PRPs have the responsibility to implement and maintain a QA program as a means of verifying the Contractor's QC procedures. The main purpose of this CQAP is to outline QA procedures for confirming that the RA for RDU 5 Anaconda Active Railroad Beds meets the performance standards presented in the RDU 5 Anaconda Active Railroad Beds RAWP/FDR, plans, specifications, and other RD/RA documents. The specific objectives of the CQAP include:

- Define the QA Team organization and responsibilities.
- Define the interaction between the QA Program and the RA Contractor's QC Plan.
- Describe project communication, documentation, and record keeping protocols, on-site communications, progress meetings, and preparation of progress reports and construction files.
- Detail the role of the QA team in reviewing and approving certifications and submittals; in conducting verification testing, sampling, and analyses; and in monitoring during RA construction activities. These QA efforts are in addition to the testing and analyses applicable to the Contractor's QC Program.
- Define independent testing to be conducted by the QA Team.

1.2 Site Location and Description

The Anaconda Smelter NPL Site is located in the Deer Lodge Valley in southwestern Montana, in and around the city of Anaconda, Montana, and approximately 25 miles northwest of the city of Butte. Smelting activities conducted at the Old Works and Washoe Reduction Works smelters for nearly 100 years have resulted in the contamination of various environmental media in the surrounding area, primarily through airborne emissions and disposal from smelting operations. Past practices included utilizing mine waste materials in the construction of railroad beds. The primary objective of the RDU 5 Anaconda Active Railroad Beds RA is to construct Engineered Covers over other contaminated railroad bed materials to prevent direct contact with and reduce potential for erosion and transport of contaminated materials. Certain abandoned railroad bed materials (West Valley and AFFCO Spur) will be removed from within the footprint of the railroad bed and the waste materials will be disposed of at the Opportunity Ponds Waste Management Area (WMA). Current open space/recreational and commercial/industrial areas will be remediated to the corresponding action levels of 1,000 and 500 parts per million (ppm) soil arsenic concentrations, respectively, using removal/disposal, aggregate covers and institutional controls (ICs) to provide for appropriate protection of human health and the environment in a manner consistent with the ARWW&S OU ROD (EPA, 1998) and the AOC.

2.0 QUALITY ASSURANCE ORGANIZATION AND RESPONSIBILITIES

2.1 Quality Assurance Organization

The PRPs will be responsible for implementing and maintaining construction QA activities. Contractors for the PRPs (hereafter referenced as the "QA Team") will be tasked with performing the QA activities. The QA Team will be comprised of engineers, scientists, and technicians qualified and experienced in work similar to the RDU 5 RA. Specific personnel assignments will be established prior to initiation of the RA construction activities. A QA Team Leader will be identified as the main point of contact for the QA Team. The QA Team will conduct both office and fieldwork to verify that the RA construction work is completed as specified. Laboratory analyses and testing will be performed by a qualified, contracted laboratory facility. Figure 1 shows the organization of the QA Team applicable to the RDU 5 RA work.

2.2 Quality Assurance Responsibilities

The following sections of this CQAP detail the responsibilities of the QA Team. In general, the QA Team will be responsible for the following during the RA construction activities:

- Planning and implementing QA reporting, record keeping, progress meetings, and inspections;
- Reviewing and approving materials certifications and other submittals;
- Conducting field staking, verification tests, sampling, and materials analyses;
- Verifying the quality of all construction activities to assure compliance with the design criteria; and
- Verifying aggregate covers quality and application thicknesses.

3.0 PROJECT COMMUNICATION

3.1 Reporting

The PRPs will be responsible for submitting a Monthly Progress Report to to the Agencies. These reports will present summaries of the important information relating to the monthly RA construction activities gathered from the various records described in Section 3.2. The Monthly Progress Report will include; if necessary, any proposed or field-approved modifications (and justifications) to the RAWP/FDR, this CQAP, the Drawings, the Technical Specifications, or the Site-Specific Health and Safety Plan (SSHASP). The QA Team Leader will obtain updated information from the Construction Contractor regarding construction activities, including percent completion and any scheduling modifications. The Monthly Progress Report will include the construction progress information as well as a summary of all available laboratory testing results.

3.2 Record Keeping

Members of the QA Team will perform various record keeping duties under the supervision of the QA Team Leader. The QA Team is responsible for maintaining a complete and accurate record of all significant observations and inspections, and documenting all field and laboratory testing. These records will be kept on-site to allow review by the PRPs and Agency personnel. The record keeping responsibilities of the QA Team will include the following:

- **Daily Project Logs** – A member of the QA Team will complete a daily project log describing all field activities. Log entries will document all significant activities including any abnormal observations, weather conditions, deviations from the Drawings or the Technical Specifications or other standard procedures, health and safety meetings, important information and summaries regarding field sampling, measurements, observations or testing, equipment calibration results (as necessary), any photographs taken and topics/results of any significant meetings or discussions. Record keeping in the logs will generally be in accordance with the methods and procedures specified in the *Clark Fork River Superfund Site Investigation (CFRSSI) Standard Operating Procedure (SOP) G-4* (ARCO, 1992).
- **Photographs** – Construction photographs and associated logs will be recorded on a periodic basis to visually document significant construction activities and to provide visual reference material.
- **QA Testing Documents** – Instrument and equipment calibration/standardization forms, field and laboratory measurement and sampling forms, sample logs, documentation forms, sample analysis requests, chain of custody forms, and any other documents related to QA testing will be kept by the QA Team Leader and the PRPs.
- **Other Documentation** – Other documentation includes; but is not necessarily limited to, materials compliance certifications, Material Safety Data Sheets (MSDS), health and safety and construction meeting summaries, inspection records, relevant construction files, material samples and manufacturer's recommended installation or operating instructions.

3.3 Construction Inspections and Meetings

A series of meetings and inspections will be conducted during the implementation of each phase of the RA work. The meetings and inspections mentioned in this section are in addition to the daily construction oversight inspections to be conducted by the QA Team. The following are inspections and meetings anticipated for each phase of RA construction:

- **Pre-Construction Meeting** – The PRPs will initiate and conduct a pre-construction meeting with the RA Contractor, Agency personnel, and other involved parties prior to the start of RA construction. The goal of this meeting includes familiarizing all parties with the requirements of the project; safety concerns and hazards, relevant access and logistical issues, and verifying that the design criteria specified in the RAWP/FDR, the Drawings, and the Technical Specifications are understood.
- **Weekly Progress Meetings** – Weekly progress meetings will be conducted to inform all parties of scheduling changes, overall RA implementation progress and any other relevant construction issues, as necessary. Weekly progress meetings will be scheduled for a common day and time that is mutually agreed upon by all parties involved. Weekly progress meetings may be changed to a less frequent schedule if construction activities become routine and weekly meetings are not warranted.
- **Final Inspection and Meeting** – This meeting will be conducted to identify the completion or resolution of any outstanding issues at the point of completion of each phase of the RA construction.

3.4 Final QA Construction Monitoring Report

Upon completion of the construction phase of the RA, a QA summary containing the results of the construction monitoring and testing will be included in the Construction Completion Report (CCR). The summary will be comprehensive and will contain a description of all QA activities, a summary of the results, significant events, and supporting data. The summary will not include the daily construction logs; however, significant or relevant portions of the logs may be used or referenced.

4.0 CONSTRUCTION QUALITY ASSURANCE ACTIVITIES

4.1 Materials Certification

Certain materials have been specified in the Technical Specifications. It is imperative that the correct materials are used during RA construction to maintain the functionality of the design. It will be the responsibility of the QA Team to review and approve all certifications required as specified in the project Technical Specifications. Table 1 lists the materials anticipated for certification submittal and review. Table 1 may change, if necessary.

**TABLE 1: MATERIALS CERTIFICATION REQUIREMENTS
RDU 5 RAILROAD BEDS RA**

MATERIAL/EQUIPMENT	SPECIFIC CERTIFICATIONS REQUIRED	
Aggregates	Mainline Ballast	Granular Borrow
	Furnace Slag (RR Yard Ballast)	Riprap
	Type 1 Aggregate	

4.2 Construction Staking and Verification

The QA Team will be responsible for all construction area staking for the RA work. The following sections of this CQAP describe the anticipated features of the RA, which will need to be staked for excavation depth and alignment, and limits of cap installation. In general, existing features such as vegetation lines, toes of slopes, streets, curbs, and fences will be used to define excavation boundaries and capping limits.

4.2.1 Excavation of Active Railroad Beds Material

Active Railroad beds may not be staked to define excavation boundaries. Excavation of Active Railroad beds material (ballast) will be relative to the location of the existing railroad ties. Active Railroads will be subject to cutting/excavating existing ballast located outside of the ties to a depth of six inches below the tops of the ties, and extending the excavation laterally three-feet (approximately) beyond both ends of the ties. To maintain positive drainage and to avoid creating a topographic low adjacent to the railroad bed, the excavation will extend laterally in both directions at -0.5% slope (minimum) to daylight on the shoulder of the railroad bed (see Construction Drawings [Appendix A of this RAWP/FDR]).

4.2.2 Ballast Replacement on Active Railroad Beds

Active Railroad beds may not be staked to define ballast replacement boundaries. Replacement of ballast will be relative to the location of the existing railroad ties. Ballast will be replaced at a depth corresponding with the tops of the ties (approximately six inches deep), and will extend approximately three feet beyond the ends of the ties on both sides of the active track.

4.2.3 Aggregate Cover Placement on Active Railroad Beds

Active Railroad beds that have exposed railroad bed materials located outside of the 3 feet ballast replacement sections, will be covered with 6 inches of Type 1 aggregate or riprap where specified (Modified Type C Cap). These areas will be staked with a suitable number of stakes, which indicate the capping depth (six inches) and associated lateral capping limits. In general, the capping limits in these areas will be defined by existing features such as vegetation lines and/or toes of railroad bed slopes.

4.2.4 Aggregate Cover Placement in Railroad Yards

Railroad yards that exceed appropriate action levels will be covered with six inches of specified aggregate (Modified Type C Cap). These areas will be staked with a suitable number of stakes, which indicate the capping depth (six inches) and associated lateral capping limits. In general, the capping limits in these areas will be defined by existing features such as vegetation lines, toes of slopes, fences, curbs, and roadways.

4.3 Testing, Sampling, and Analyses

4.3.1 Ballast and Aggregate Materials Sampling and Analyses

Conformance testing of the specified ballast and aggregate materials will be conducted by the QA Team to assure the consistency of the aggregate material properties obtained from the aggregate source. At a minimum, the particle size distribution of the ballast and aggregate materials will be tested in accordance with American Standards for Testing and Materials (ASTM) C 136 and 117 at a frequency of 1 test per 1,000 cubic yards of each type of material installed.

5.0 ENVIRONMENTAL MONITORING

5.1 Water Quality Monitoring

No surface water or ground water monitoring is required during the RA for the Anaconda Active Railroad Beds portion of RDU 5. Since the excavation activities do not include excavating any areas to a depth greater than approximately 24 inches below the ground surface, ground water is not expected to be encountered nor impacted by the RA activities. Construction Best Management Practices (BMPs) will be implemented where the West Valley Railroad Bed crosses Warm Springs Creek to prevent sedimentation and runoff from entering into the creek. The RAs in this area will remove all waste materials; therefore, monitoring is not required.

The wastes and contaminated soils permanently removed under this RA will be disposed in an existing WMA within the NPL Site (Opportunity Ponds). Routine ground water and surface water monitoring programs are already in place at this WMA.

5.2 Air Quality Monitoring

Air monitoring will be conducted as required by the SSHASP prepared for the project. The SSHASP will be submitted under separate cover. The SSHASP addresses the responsibilities, health, safety, access restriction, site security and emergency response requirements for all RA operations. The SSHASP will be amended on an as-needed basis as site conditions change or as construction activities are completed.

5.2.1 Dust Control

Fugitive dust emissions will be controlled during all RA operations to comply with the site performance standards specified in the ARWW& S OU ROD (EPA, 1998) and CS OU ROD (EPA, 1996). If air emissions from the RA operations are excessive, operations will be modified and/or dust control measures will be implemented to achieve compliance within limits. Dust control measures may include: applying water directly to the removal/replacement areas; haul roads or other disturbed areas; construction of wind breaks around excavation areas; or requiring work activity modifications or shutdown. A final decision regarding what, if any, dust control measures are required will be made by the PRPs and Agency field personnel. If handling methods are the cause of excessive airborne emissions, then modifications to the handling methods will be instituted.

6.0 REFERENCES

- ARCO, 1992. Clark Fork River Superfund Site Investigations, Standard Operating Procedures. September 1992.**
- EPA, 1996. Record of Decision, Community Soils Operable Unit, Anaconda Smelter NPL Site, Anaconda, Montana. September 1996.**
- EPA, 1998. Anaconda Smelter NPL Site, Anaconda Regional Water, Waste and Soils Operable Unit Record of Decision. September 1998.**

APPENDIX D

EXISTING SITE DATA (FURNACE SLAG)

TABLE 1: SMELTER HILL GRANULATED SLAG PILE AND FURNACE SLAG PILE DATA SUMMARY

METALS	MAIN SLAG PILE TOTAL METALS			FURNACE SLAG TOTAL METALS (2002)	
	1985 RI/FS Range (mg/kg)	1985 RI/FS Mean (mg/kg)	1994 Data (mg/kg)	Upper Pile (mg/kg)	Lower Pile (mg/kg)
Aluminum	17,100 - 30,700	21,690			
Antimony	42 - 219	111			
Arsenic	498 - 3,190	1,978	2,690	2,140	1,990
Barium	266 - 3,190	1,180			
Beryllium	<2.5 - 2.7	2.5			
Boron	<8.0 - 170	33			
Cadmium	4.4 - 44	22.8	23.3	36.6	29.3
Chromium	45 - 436	271			
Cobalt	28 - 517	142			
Copper	3,140 - 9,760	6,271	5,550	18,000	9,090
Iron	188,000 - 341,000	307,500			
Lead	364 - 4,310	2,044	2,730	1,770	1,230
Manganese	710 - 17,200	3,373			
Mercury	<0.04 - 0.08	0.04		0.16	0.056
Molybdenum	<3 - 670	151			
Nickel	<20 - 291	71			
Selenium	<50 - 85	54			
Silver	<5.0 - 88	16			
Tin	<20 - 220	101			
Vanadium	83 - 229	156			
Zinc	8,380 - 36,300	26,198	23,300	31,500	26,000
NON-METALS					
Conductance (umhos/cm)				721	489
pH	6.4 - 8.9			6.70	8.50

TABLE 2: TCLP DATA SUMMARY

TCLP METALS	MAIN SLAG PILE 1985 RI/FS (ug/L)	FURNACE SLAG (2002)		TCLP Max. Conc.* (ug/L)
		Upper Pile (ug/L)	Lower Pile (ug/L)	
Arsenic	<10.0	1,010	707	5,000
Barium	1,480	88.3	65.2	100,000
Cadmium	<10.0	26.2	21.9	1,000
Chromium	<10.0	<10.0	<10.0	5,000
Lead	<100	1,140	626	5,000
Mercury	<0.100	0.33	0.24	200
Selenium	70.0	<90.6	<90.6	1,000
Silver	40.0	<3.7	<3.7	5,000

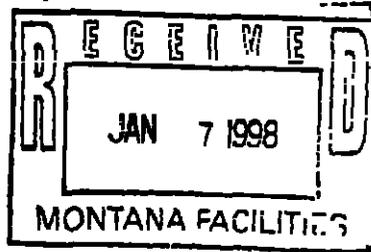
* = Samples that exceed the listed TCLP Maximum Concentration may be considered characteristic hazardous waste, for the characteristic of toxicity

None of the main slag or furnace slag samples exceed the TCLP criteria

TABLE 3: SYNTHETIC PRECIPITATION LEACHING PROCEDURE (SPLP) DATA SUMMARY

METALS	FURNACE SLAG (2002)	
	Upper Pile (ug/L)	Lower Pile (ug/L)
Arsenic	336	64 0
Barium	13 0	21 0
Cadmium	5 0	<3 7
Chromium	<9 9	<9 9
Copper	108	23 0
Lead	40 0	32 0
Mercury	0 22	0 11
Selenium	<0 85	<0 85
Silver	<4 2	<4 2
Zinc	396	512

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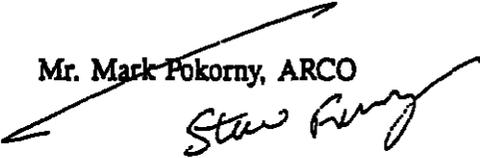
Daily Report

Date: December 2, 1997

Project: BJEX-97-029A Construction Testing
ARCO Golf Course

To: Mr. Duane Logan
Pioneer Technical Services
c/o ARCO
307 East Park Street, Ste 400
Anaconda, Montana 59711

Copies: Mr. Mark Pokorny, ARCO



Steve Perry

I arrived on the site at 8:45 a.m., to obtain samples as requested by Mr. Steve Perry with ARCO on November 24, 1997.

When I arrived, I met with Mr. Duane Logan with Pioneer Technical Services. One sample consisting of eight 5-gallon buckets of material was obtained from the on-site stockpile in accordance with ASTM D 75. The sample was transported back to our Butte laboratory. The following tests will be performed on the sample: sieve analysis, LA abrasion (wear), sodium soundness, bulk specific gravity, absorption, clay lumps and friable particles, flat and/or elongated particles (weight and number), and unit weight tests. I departed the site at 10:00 a.m.

Attached:
Laboratory Test of Aggregate
Clay Lumps and Friable Particles in Aggregate
Sodium Sulfate Soundness Test
Flat and Elongated Particles in Coarse Aggregate (number)
Flat and Elongated Particles in Coarse Aggregate (weight)



for Steven T. Shafer
Engineering Technician

BRAUNSM

INTERTEC

Braun Intertec Corporation
 1911 Meadowlark Lane
 PO Box 302a
 Butte, Montana 59702-3026
 406-494-1675 Fax 494-1678
 Engineers and Scientists Serving
 the Built and Natural Environments®

Laboratory Test of Aggregate (Summary)

Date: January 6, 1998 Project: BJBX-97-029A Construction Testing
 1996 OW/EADA RAWP and Anaconda Yard
 To: Duane Logan Copies: Mark Pokorny, ARCO
 c/o ARCO
 307 East Park Street, Ste 400
 Anaconda, Montana 59711

Sampled By: STS/BIC & DL/PTS Source: Anaconda Smelter Coarse Slag Stockpile
 Date Sampled: 12/02/97 Sample No.: Field: 4 Furnace Slag
 Lab: 97459
 Date Received: 12/02/97 Purpose: American Railway Engineering Associatio
 (AREA) Yard Ballast Materials

Sieve Analysis: ASTM C 136 and C 117

Sieve	% Passing	AREA Size No. 5 Specifications
3"	100	100
2 1/2"	100	100
2"	*99	100
1 1/2"	*99	100
1"	98	90-100
3/4"	*96	40-75
1/2"	*79	15-35
3/8"	*63	0-15
#4	*36	0-5
#8	21	—
#16	12	—
#30	6.9	—
#50	4.5	—
#100	3.0	—
#200	*2.1	1% max.

Properties:

	Results	Blast Furnace Slag Specifications
Wear (LA Abrasion), Grade A, ASTM C 131	15%	40% Max.
Sodium soundness (coarse only), 5 cycle, ASTM C 88	2.2%	5% Max.
Bulk specific gravity, oven, ASTM C 127	3.533	2.30 Min.
Absorption, ASTM C 127	1.3%	5.0% Max.
Clay lumps & friable particles, ASTM C 142	0.002	0.5% Max.
Flax and/or elongated particles (by weight), CRD-C119	4%	5% Max.
Flat and/or elongated particles (by number), CRD-C119	3%	5% Max.
Unit weight, loose method, ASTM C 29	132.7 pcf	—

Remarks: *Sample did not meet the given gradation specifications.
 Entire sieve analysis sample was washed through a 200 sieve.
 Sample was re-graduated for use.

Handwritten signature: Andy Conner

BRAUN™

INTERTEC Clay Lumps and Friable Particles in Aggregates, ASTM C 142

Date: January 6, 1998 **Project:** BJBX-97-029A
1996 OW/EADA RAWP and
Anaconda Yard

Client: Duane Logan **Copies:** Steve Ferry, ARCO
c/o ARCO Mark Pokorny, ARCO
307 E Park Street, Ste 400
Anaconda, Montana 59711

Sample Data

Sampled by: STS/BIC **Source:** Anaconda Smelter Coarse Slag Stockpile (Furnace Slag)
Date sampled: 12/02/97 **Sample No.:** Field: 4
Lab: 97459
Date received: 12/02/97 **Purpose:** American Railway Engineering Association (AREA)
Yard Ballast Materials

Coarse Aggregate

Sieve Size	Original Sample % Retained	Coarse Agg. % Retained	Weight of Test Fractions Before Test, gms	Weight of Test Fractions After Test, gms	Percentage Passing Designated Sieve After Test	Weighted Percentage Loss
3 to 1 1/2 in *	2	2.0	0.0	0.0	0.03%	0.0006
1 1/2 to 3/4 in.	5	5.0	3823.4	3822.2	0.03%	0.0016
3/4 to 3/8 in.	50.2	50.3	2030.4	2030.4	0.00%	0.0000
3/8 to No. 4	43	43.2	1068.5	1068.5	0.00%	0.0000
Totals	100	100				0.002

Remarks: * Size range not tested, used value from nearest range tested
Percentages are based on material retained on the No. 4 sieve.



for Nathan P. Boeshans, PE
Materials Engineer

BRAUN

INTERTEC Sodium Sulfate Soundness Test, ASTM C 88

Date: January 6, 1998 **Project:** BJBX-97-029A
1996 OW/EADA RAWP and
Anaconda Yard

Client: Duane Logan **Copies:** Steve Ferry, ARCO
c/o ARCO Mark Pokorny, ARCO
307 E Park Street, Ste 400
Anaconda, Montana 59711

Sample Data

Sampled by: STS/BIC **Source:** Anaconda Smelter Coarse Slag Stockpiles (Furnace Slag)
Date sampled: 12/02/97 **Sample No.:** Field: 4
Lab: 97459
Date received: 12/02/97 **Purpose:** American Railway Engineering Association (AREA)
Yard Ballast Materials

Sodium Sulfate Test Results - Coarse Aggregate

Sieve Size	Original Sample % Retained	Coarse Agg. % Retained	Weight of Test Fractions Before Test, gms	Weight of Test Fractions After Test, gms	Percentage Passing Designated Sieve After Test	Weighted Percentage Loss
3 to 1 1/2 in. *	2	2.0	0.0	0.0	25.60%	0.51
1 1/2 to 3/4 in.	5	5.0	1483.5	1103.7	25.60%	1.28
3/4 to 3/8 in.	50.2	50.3	1000.9	992.9	0.80%	0.40
3/8 to No 4	43	43.2	299.8	299.5	0.10%	0.04
Totals	100	100				2.2

Remarks: * Size range not tested, used value from nearest range tested.
Percentages are based on material retained on the No 4 sieve.


for Nathan P. Boeshans, PE
Materials Engineer

Flat and Elongated Particles in Coarse Aggregate (number), CRD-C119

Date: January 6, 1998 Project: BIBX-97-079A
1996 OW/EADA BAWP and Anaconda Yard

Client: Duane Logan
c/o ARCO
307 East Park Street, Ste 400
Anaconda, Montana 59711 Copies: Mr. Steve Ferry, ARCO
Mr. Mark Polansky, ARCO

Sample Date: Sampled by STS/BIC
Date sampled 12/02/97
Date received 12/02/97
Source: Anaconda Sinter Coarse Slag Sample (Furnace Slag)
Sample No. 4
Field Lab: 97459
Purpose: American Railway Engineering Association (AREA)
Yard Ballast Materials

Flat and Elongated Particles in Coarse Aggregate

Slag Size	Original Sample	No. of Particles Test Fraction Before Test	Flat		Elongated		Not Flat or Elongated		Flat		Elongated		Not Flat or Elongated	
			Number of Particles After Test	Percentage Retained Designated Slags After Test by Number	Number of Particles After Test	Percentage Retained Designated Slags After Test by Number	Number of Particles After Test	Percentage Retained Designated Slags After Test by Number	Weighted Average Percentage (by number of particles)					
2 1/2 in.	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 in.	1.10	3.0	0.0	1.0%	0.0	1.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 1/2 in.	0.00	0.0	0.0	1.0%	0.0	1.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 in.	0.99	2.7	0.0	1.0%	0.0	1.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3/4 in.	2.24	6.1	0.0	1.0%	0.0	1.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1/2 in.	16.48	43.0	1.0	1.0%	1.0	1.0%	91.0	91.0	0.0	0.0	0.0	0.0	0.0	0.0
3/8 in.	13.90	43.2	1.0	1.0%	3.0	3.0%	95.0	95.0	0.0	0.0	1.0	1.0	0.0	1.7
No. 4	27.70	0.0												
Sum No. 4	35.00	0.0												
Total	100	100												

Remarks: * This test not tested above is included here thus 10 per cent of the sample assumed to have the same percentages of flat and elongated particles as test consider case, as indicated.

Small Plot
Lowell F. Klucka, CEM
Manager, Beta Operations

BRAUNSM INTERTEC

Flat and Elongated Particles in Coarse Aggregate (weight), CRD-C 119

Date: January 5, 1997

Client: Duane Logan
c/o ARCO
307 East Park Street, Ste 400
Anaconda, Montana 59711

Project: BJBX-97-029A
1996 OW/EADA RAWP and Anaconda Yard

Captest: Mr Steve Ferry, ARCO
Mr. Mark Pokorny, ARCO

Sample Data

Sampled by: STS/BIC
Date sampled 12/02/97
Date received 12/02/97

Source: Anaconda Smelter Coarse Slag Stockpile (Furnace Slag)
Sample No.: 4
Field: 4
Lab: 97A59
Purpose: American Railway Engineering Association (AREA)
Yard Ballast Materials

Flat and Elongated Particles in Coarse Aggregate

Sieve Size	Original Sample #	Retained %	Calculated on Portion on 3/8 in. Sieve	Weight of Test Fraction Before Test, grams	Flat		Elongated		Not Flat or Elongated Weight of Test Fraction After Test, grams	Flat Weighted Average Percentages (by weight)	Elongated Weighted Average Percentages (by weight)	Total Flat or Elongated Percentages (by weight)
					Weight of Test Fraction After Test, grams	Percentage Retained After Test, %	Weight of Test Fraction After Test, grams	Percentage Retained After Test, %				
2 1/2 in.	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
2 in.	1.10	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 1/2 in.	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
1 in.	0.98	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
3/4 in.	2.24	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7
1/2 in.	18.48	45.0	673.7	8.0	9.7	1.4%	156.0	1.4%	263.2	1.1	1.8	2.9
3/8 in.	15.90	43.2	277.0	3.7	10.1	3.6%	10.1	3.6%	263.2	1.1	2.1	3.2
No. 4	27.70	0.0										
Subtotal No. 4	35.60	0.0										4
Total	100	100										

Remarks: * This size not tested since it included less than 10 percent of the samples, assumed to have the same percentages of flat and elongated particles as next smaller size, as indicated.

James P. Klocke
Lowell F. Klocke, CBET
Manager, Brute Operations