DLA 2003-006

Remediation Waste Disposal Project
Defense Logistics Agency (DLA)
New Haven, Indiana

PROJECT CLOSURE REPORT

FINAL

February 2005

Prepared by

Pangea Group
2604 S. Jefferson
St. Louis, Missouri 63118

For the

U.S. DEPARTMENT OF DEFENSE
DEFENSE NATIONAL STOCKPILE CENTER
New Haven Depot
15411 Dawkins Road, New Haven, Indiana 46774
Under Contract DLA 2003-006

Summary of Changes

This *Project Closure Report* is the final version. Any changed sections of future versions will be identified in the text.

Addendum Number	Date	Comments
Draft Version	12/07/2004	New Document
Revision 0, Final	02/21/2004	Comments on Draft Version Incorporated

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1. Signature Sheet

DLA 2003-006

Remediation Waste Disposal Project
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PLAN TITLE:

PROJECT CLOSURE REPORT

February 2005

APPROVALS

Matthew Cushman (Originator) — 02/21/05 Date

Christopher Stone, Project Manager (PM) — 02/21/05 Date

Daniel Hoffman, CHP, CIH, CSP, CHMM, EH&S Manager — 02/21/05 Date

2. Project Background and Introduction

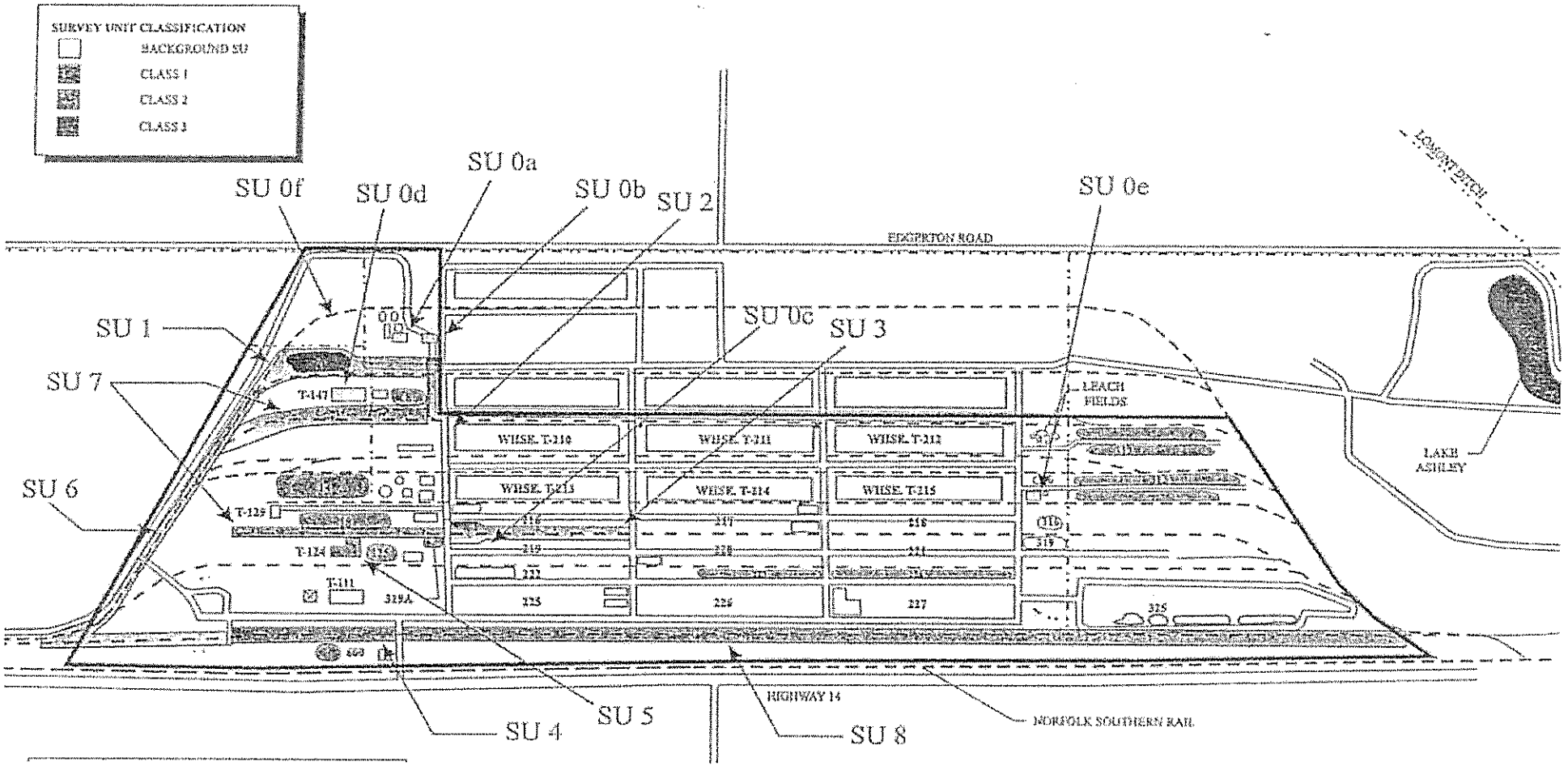
The US Army Field Support Command (AFSC) has contracted Pangea Group (Pangea) to provide services for the removal of unwanted radioactive materials from the Defense Logistics Agency (DLA) Defense National Stockpile Center Depot located in New Haven, Indiana, under Project No. 2003-006. The work involved excavation, profiling and packaging of approximately 2,500 cubic yards of radioactively contaminated soils and miscellaneous debris. Other activities included topographical and radiological surveys of the work area and transportation and disposal of the waste at U.S. Ecology–Grandview, Idaho.

The site (268 acres) is located three miles east of New Haven, IN at 15411 Dawkins Road. It is currently owned by the General Services Administration (GSA), and operated by the DOD Defense Logistics Agency, Defense National Stockpile Center. Figure 1-1 is a *Facility Layout Map.*

The site has been used historically for the purpose of storing metallurgical ores and materials necessary for manufacturing defense materials or strategic materials used in national defense. The site is currently an active storage depot, engaged in the storage of various materials, including metallic ores, refined metals, mineral substances such a fluorspar and certain natural organic materials such as tannin extract.

The site includes a series of rail spurs extending from the Norfolk Southern rail line, which crosses the site along its east-west axis, converging at the southwestern and southeastern corners of the site. A six-foot high fence topped with barbed wire surrounds the site and a site security officer controls front gate.

Prior to October 2000, the facility stored two piles of baddeleyite ore containing natural uranium and thorium. Baddeleyite ore is comprised of natural zirconium oxide found in Brazil and Sri Lanka (Ceylon). A typical assay for this material is reported as 0.20 wt % Uranium and 0.091 wt % Thorium. The two piles designated as 111 and 111A were located in open area "7A" in the northwest corner of the depot (see Fig 1-1 and 1-2). An asphalt pad was constructed for storage piles with a drainage tile system protecting the area from subsidence. The ore was in the form of stones, (rocks and pebbles) and was not subject to dispersal, as would a powder or other fine-grained material. The original piles were removed as of October 2000; however, residual material remained on the footprint of the storage piles, which exceeded the size of the asphalt pad on which it was stored. The original area of concern, the 7A area is approximately 940 feet by 120 (112,800 sq. ft.). After further investigation during the mobilization process, the area of concern was reduced the East Access Road, 930 feet of rail track (extending west from the eastern boundary road), the West Access Road and Area 7A. Initial characterization efforts conducted by DLA in 2001 indicated that radiological contamination had not migrated into the existing soil beyond 15 cm (6 inches) in depth. Figure 1-2 is a *Work Site Map.* Figure 1-3 is a *Map of the "7A" Area.*



Remediation Waste Disposal Project
Defense Logistics Agency (DLA)
New Haven, Indiana

Figure 2-1 Facility Layout Map

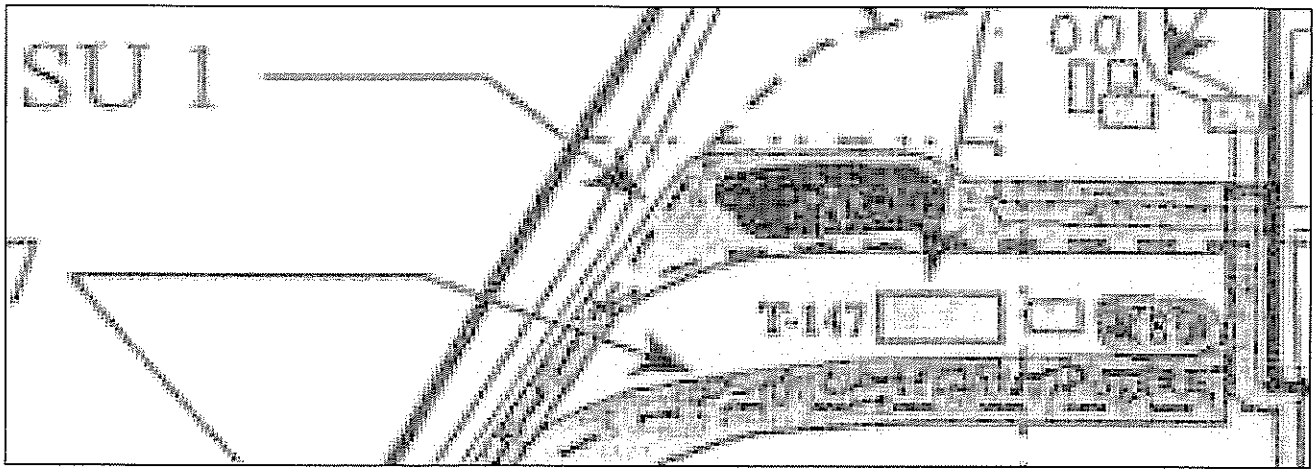


Figure 2-2 Work Site Map

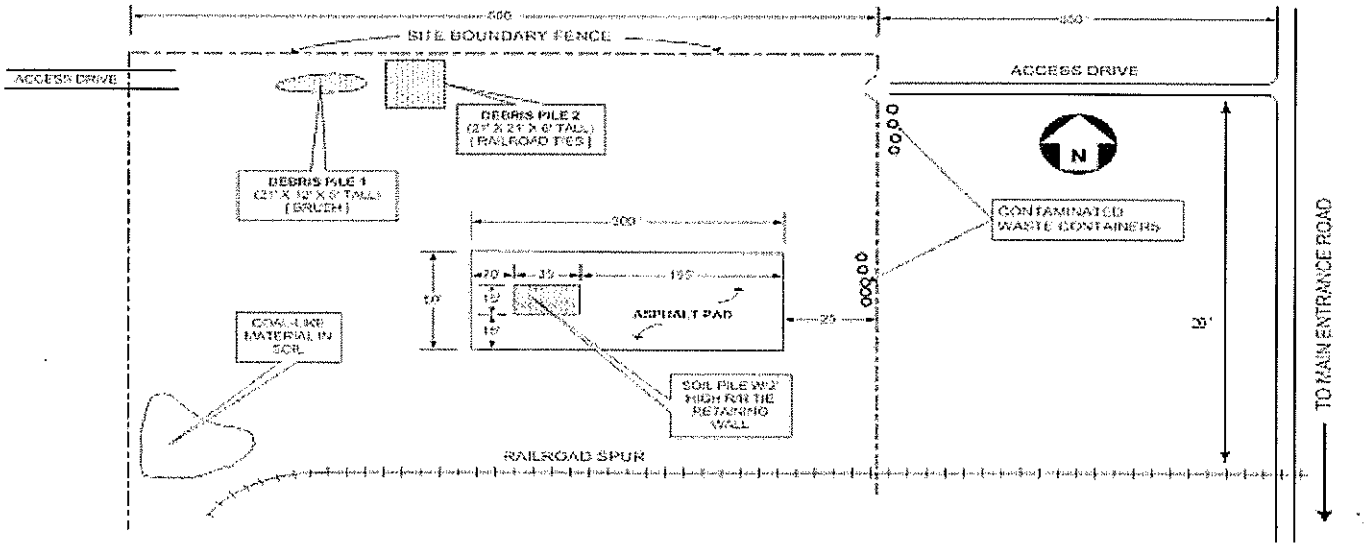


Figure 2-3 Map of the "7A" Area

3. Narrative of Project Activities

The project site work included the following tasks: Tasks were performed in the general sequence listed below. Some tasks were performed concurrently

- Mobilization
- Pre-excavation topographical survey
- Waste characterization and profiling
- Clearing and grubbing
- Soil/waste excavation
- Track improvements
- Waste packaging and loading
- Waste transportation and disposal at U.S. Ecology – Grandview, ID
- Radiological clearance survey
- Post-excavation topographical survey
- Demobilization

3.1 Mobilization

Pangea mobilized on 18 May 2004. Several factors affected the ability of Pangea to start work. Weather was a major factor in initial delays in mobilization. The Fort Wayne area received an above normal rainfall in May and June along with severe thunderstorms, lightning and tornados. Pre-excavation radiological surveys performed during this period indicated contaminated material was limited to the 7A area, the eastern access road, and the railroad track bed. Mobilization was completed the week of 7 June 2004.

3.2 Pre-Excavation Topographical Surveys

Pangea subcontracted Dickmeyer and Associates, Engineers-Surveyors, Inc. to perform the pre-excavation topographical survey. Area 7A was surveyed on 2 June 2004. The results of that survey have been included as Figure 2-1, *Topographical Map of Initial Elevations*. Figures 2-2 and 2-3 have been included to show additional detail.

Additional topographic surveys were performed the week of 14 July to encompass the east and west access roads, and the railroad tracks running the length of the work area. The survey of June 14 established a 50' x 50' grid that was used later in the project to track progress, develop excavated soil volumes, and perform radiological surveys. The results of those surveys have been included as Figure 2-4, *Topographical Map of Initial Elevations of 7A Grid, Access Roads, and Railroads*. Figures 2-5 and 2-6 have been included to show additional detail.

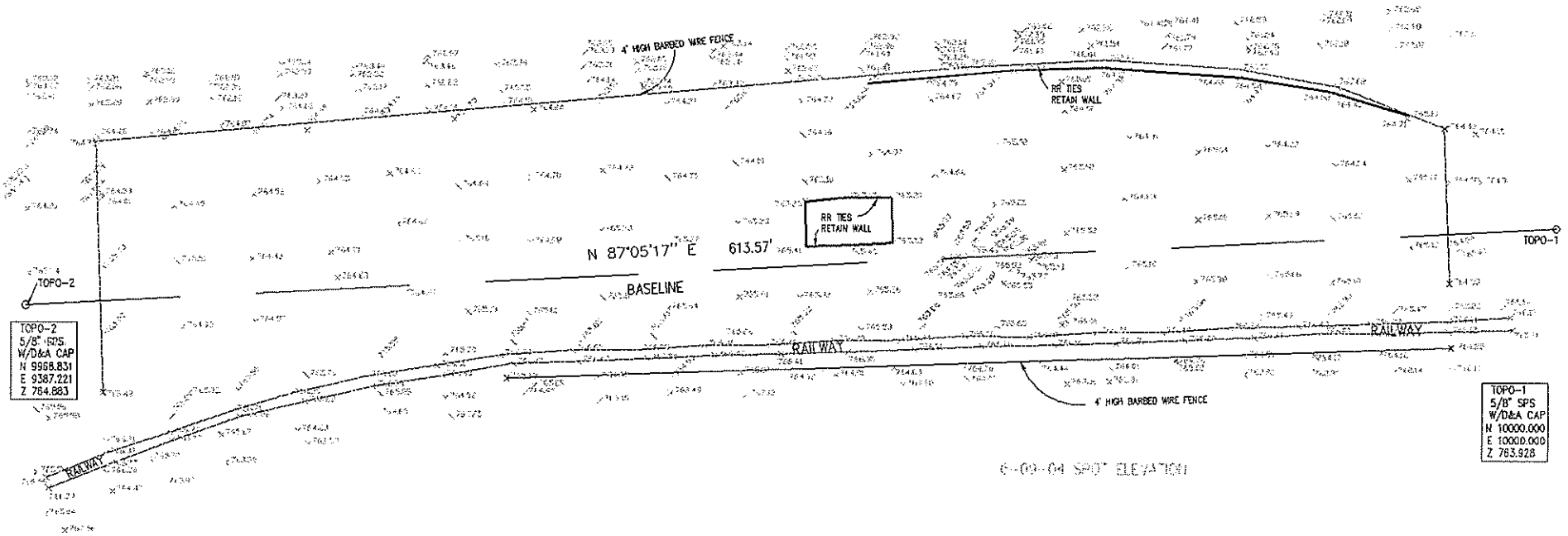


Figure 3-1 Topographical Map of Initial Elevations

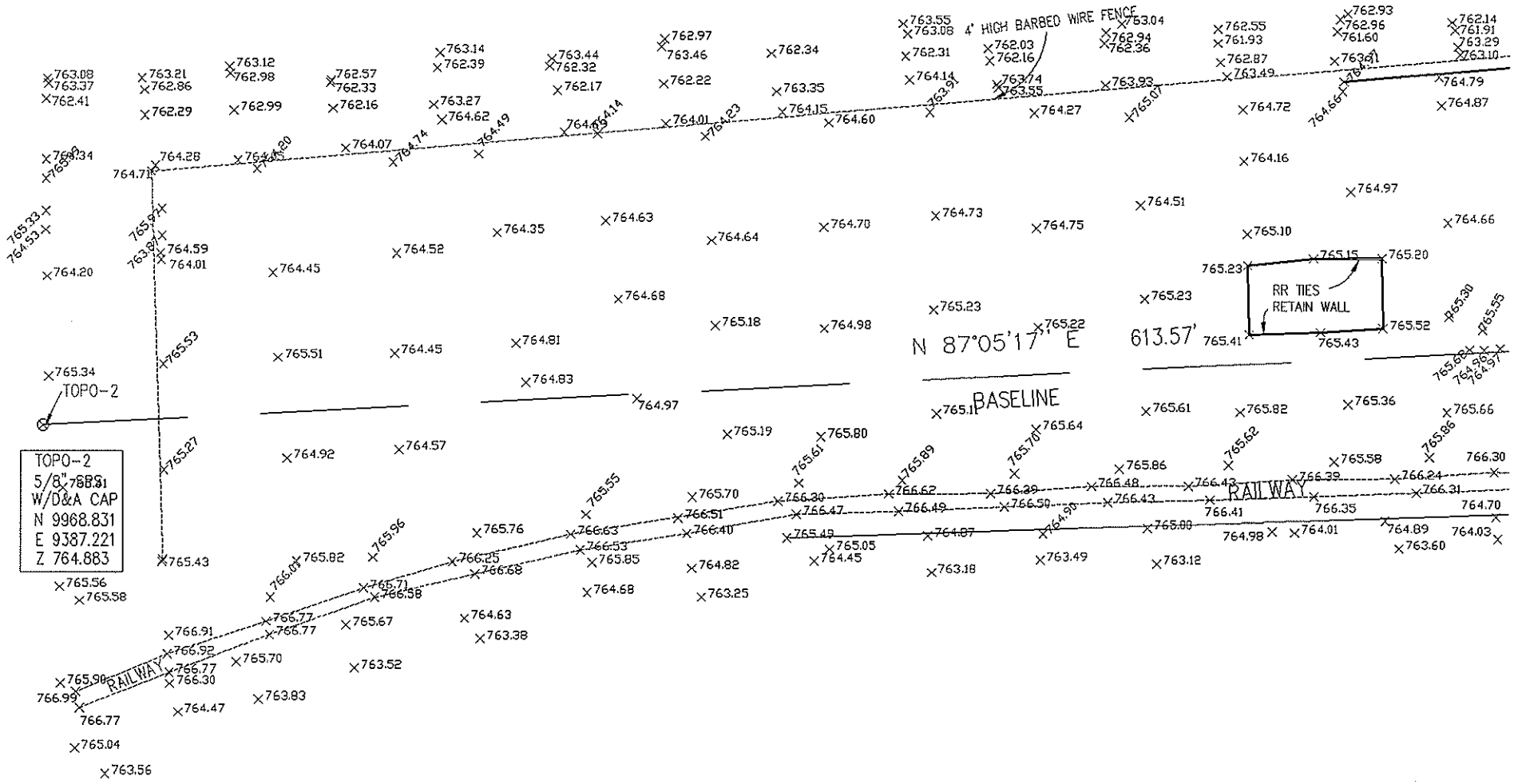


Figure 3-2 Topographical Map of Initial Elevations (West Side Blow Up)

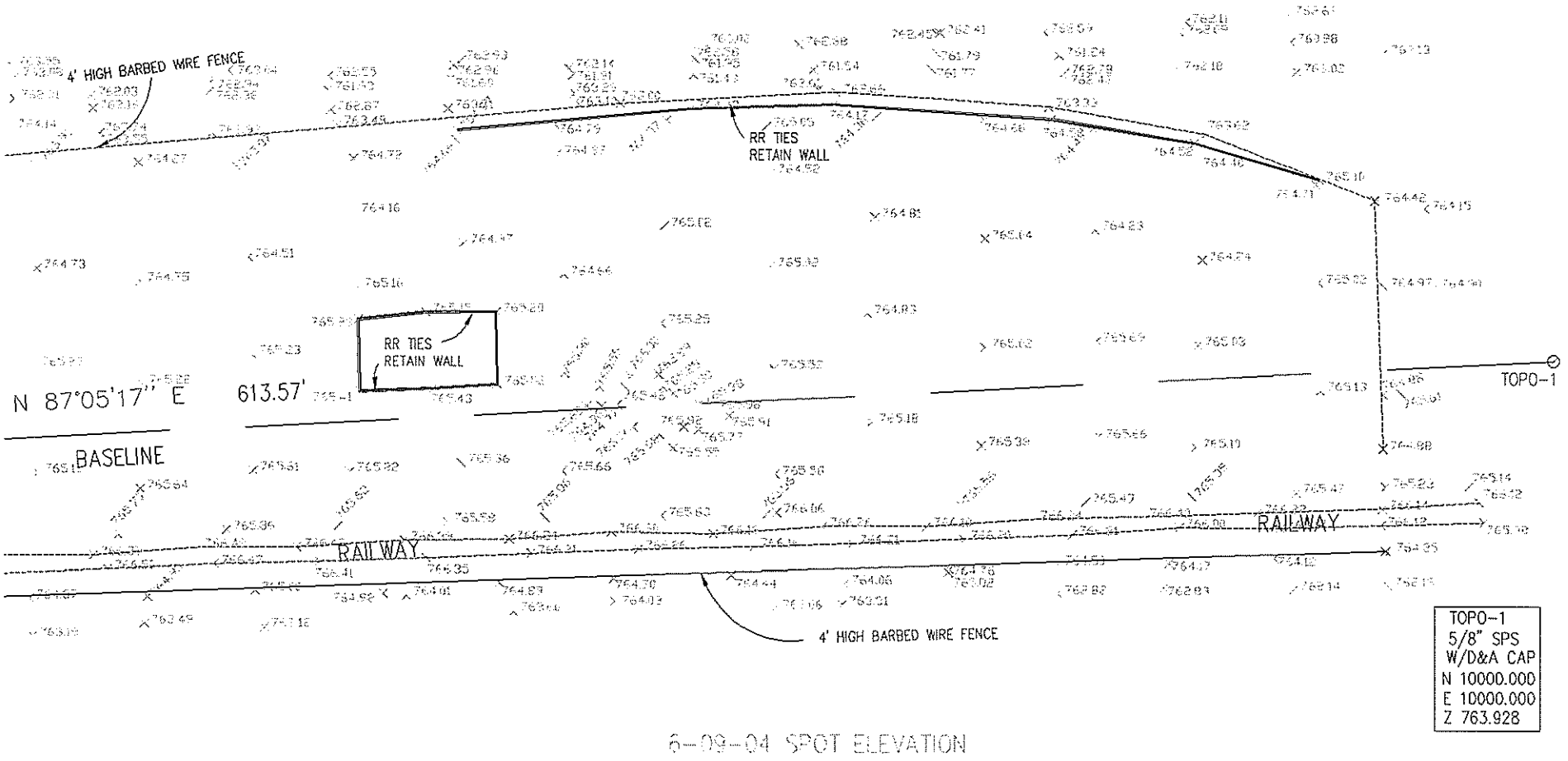


Figure 3-3 Topographical Map of Initial Elevations (East Side Blow Up)

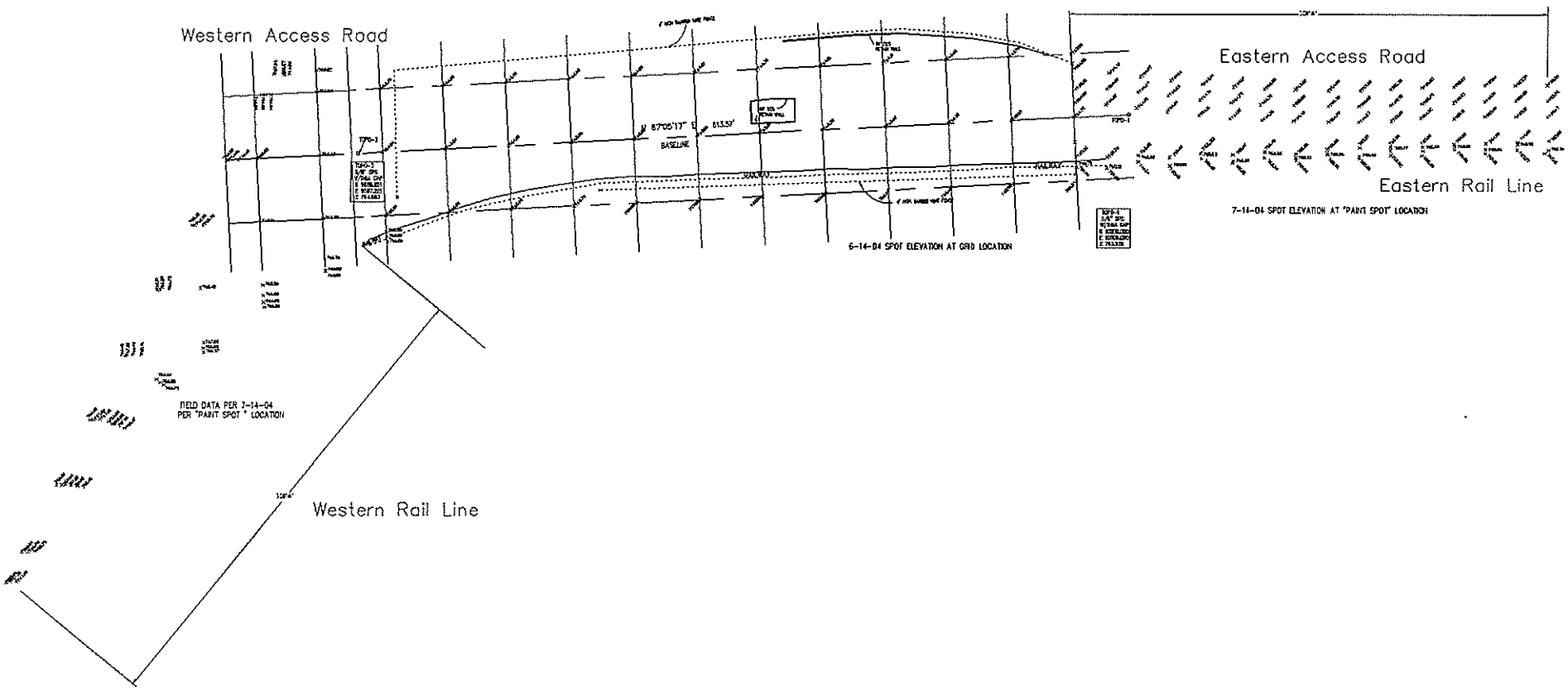


Figure 3-4 Topographical Map of Initial Elevations of 7A Grid, Access Roads, and Railroads

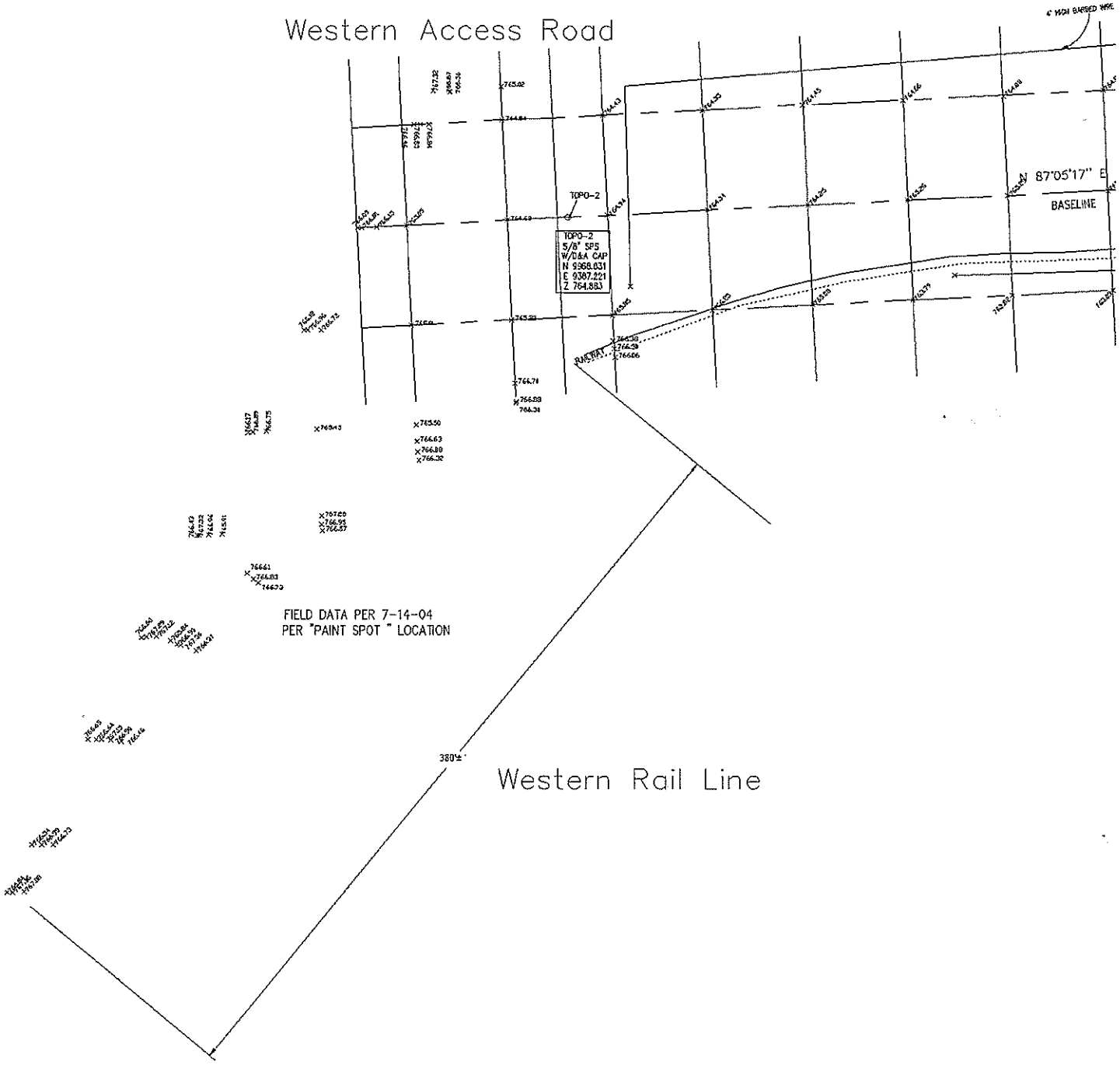


Figure 3-5 Topo Map of Initial Elevations of 7A Grid, Access Roads, and RR (Western Blow Up)

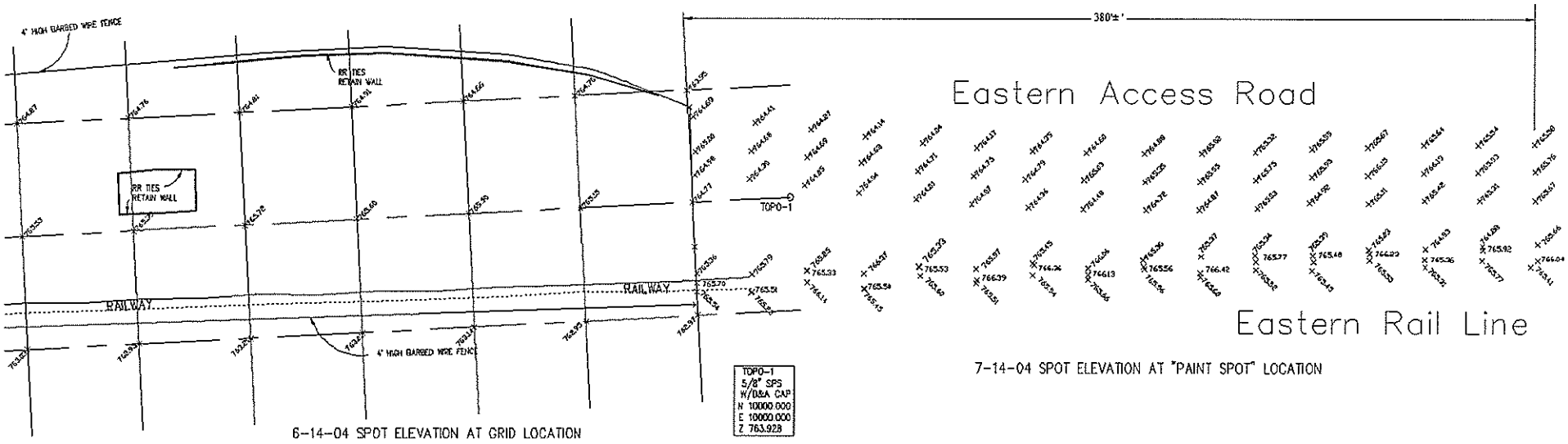


Figure 3-6 Topo Map of Initial Elevations of 7A Grid, Access Roads, and RR (Eastern Blow Up)

3.3 Waste Characterization and Profiling

Based on the initial site characterization sampling conducted in June 2003, the primary radionuclides present were natural uranium and natural thorium. The analytical data indicates that U-238, measured up to 335 pCi/g, is in secular equilibrium with its daughter products. In addition, Th-232, measured up to 35 pCi/g, appears to be in secular equilibrium with its daughter products. The soils samples contained approximately 0.023% Uranium and 0.11% Thorium by weight. The fact that the U-238 and Th-232 series of radionuclides appear to be in secular equilibrium with their respective progeny is consistent with the history of the site, i.e., that only raw (unprocessed) ores were known to be stored in Area 7A of the site. Laboratory analysis results of these samples have been included as Appendix D.

Waste profiling discussions between Pangea and US Ecology started immediately upon mobilization. In its "as-shipped" state, i.e., unprocessed ore mixed with surrounding soils, the material met the criteria for "unimportant quantities of source material" as defined in NRC regulation 10CFR40.13(b). This classification was used for the New Haven wastes, which allowed it to meet the waste acceptance criteria for the waste disposal facility.

3.4 Clearing and Grubbing

Vegetation within the 7A area consisted of mostly grasses, small bushes, and saplings. Because the vegetative growth was not extensive, clearing and grubbing was performed as a part of the initial excavation.

3.5 Soil/Waste Excavation

Soil excavation started on June 17, 2004 at the east end of area 7A. Soil was removed to a minimum depth of 15 cm (6 inches) over the entire footprint of the 7A area, including the eastern access road and railroad track bed. The removal was performed utilizing a trackhoe to excavate and a front-end loader to stockpile the excavated soils. All loose debris (railroad ties, buckets of ore, etc.) was first relocated into a stockpile at the southwestern corner of the 7A area for efficient disposition to the rail spur. Soil removal activities then began in the eastern sections of the 7A area and worked their way towards the southwest corner, where the soils were also stockpiled for load-out. The eastern access road and railway tracks were then taken up, working from east to west. Environmental controls, such as silt fence, were put into place prior to beginning excavation activities to control any possible runoff caused by inclement weather. The radiological controls are discussed in Section 4.2 of this report.

Minimum excavation depth was tracked using a laser transit taking initial elevations from the pre-excavation topographical surveys and undisturbed elevations adjacent to excavation areas. No attempt was made to maintain original grade.

As the excavation progressed and the initial 15 cm (6 inches) of soil was removed, it became apparent that contamination existed below the original estimated depth of 6 inches. A radiological survey was performed on July 23 2004 to characterize the contamination below 6 inches, and is included as Appendix B. Due to the presence of contaminated materials below the

initial excavation, field background gamma count rates for the area, as measured with a 2x2 sodium iodide detector, were elevated, reading 18,000 cpm to 26,000 cpm. The contamination was found primarily along an east-west line in the northern section of the area. This east-west line was in the approximately the same location of the northern edge of the former asphalt pad. This line showed areas ranging from 2 times background up to 760,000 cpm. Notification was made to DNSC, DLA and AFSC. It was determined that additional excavation was needed, beyond that identified in the original scope of work. A topographical survey was performed on July 28, 2004 to ensure that the necessary 6 inches had been removed from the area that was subjected to radiological survey. Due to the placement of the stockpile and ongoing excavation, the area encompassed by the radiological survey was restricted to the eastern half of the 7A area. Figure 3-7, *Initial Excavation Confirmation Survey*, is topographical map that shows soil depth after the excavation of the eastern access road and eastern sections of the 7A area, including the approximate extent of the excavation. After an on-site meeting with AFSC and DLA on August 9, 2004, it was determined that the additional soils needed to be removed. A change order authorizing the additional excavation was issued on August 28, 2004.

As the load-out of the stockpiled soils continued, it became necessary to relocate the stockpile outside area 7A. Discussion with onsite DLA management resulted in selection of an area southwest of 7A adjacent to the section of rail spur saved for loading of gondola cars. The ground was covered with tarps to prevent migration of contamination to the adjacent soils. Initial work scope was completed on August 25, 2004. The estimated in-situ volume of the initially excavated soils was approximately 1982 cubic yards with a soil density of 1.44 tons per yard. The density was determined using representative soils types loaded into a container and weighed on a scale provided by the DLA facility.

The change order authorized excavation of contaminated areas to a maximum depth of 9 inches. The additional scope was initially estimated to generate an additional 600 yards of soil excavation. These soils were segregated and accounted for separately from soils generated by the initial scope of work. The soils were loaded with the use of a front-end loader for transport to the stockpile. An estimated 2.5 cubic yards of material was loaded into each bucket load. The total number of loads generated by change order activities was 144 buckets, which equates to approximately 360 cubic yards of material.

When the additional soil excavation started on August 31, 2004, contamination was found at depths below the 9-inch depth. Test pits dug in these areas showed contamination to depths exceeding 3 feet. DNSC, DLA and AFSC were notified of the findings. Pangea was instructed to continue the excavation in accordance with the change order to a maximum depth of 9 inches. As loading and shipment of wastes to US Ecology progressed it was determined that the number of gondola railcars required would exceed the quantity that was mobilized for the project. Based on discussions with AFSC it was decided to excavate only the most contaminated areas until they were less than 2 times background or until the gondolas on site were filled. All areas determined to contain residual contaminated material were subsequently excavated to less than 2 times background and all excavated wastes were loaded into the remaining railcars. This additional effort resulted in a total estimated volume for the change order work of 521 yards of waste material. The resultant total estimated volume of waste material was 2503 cubic yards. Load-out was completed on September 8, 2004.

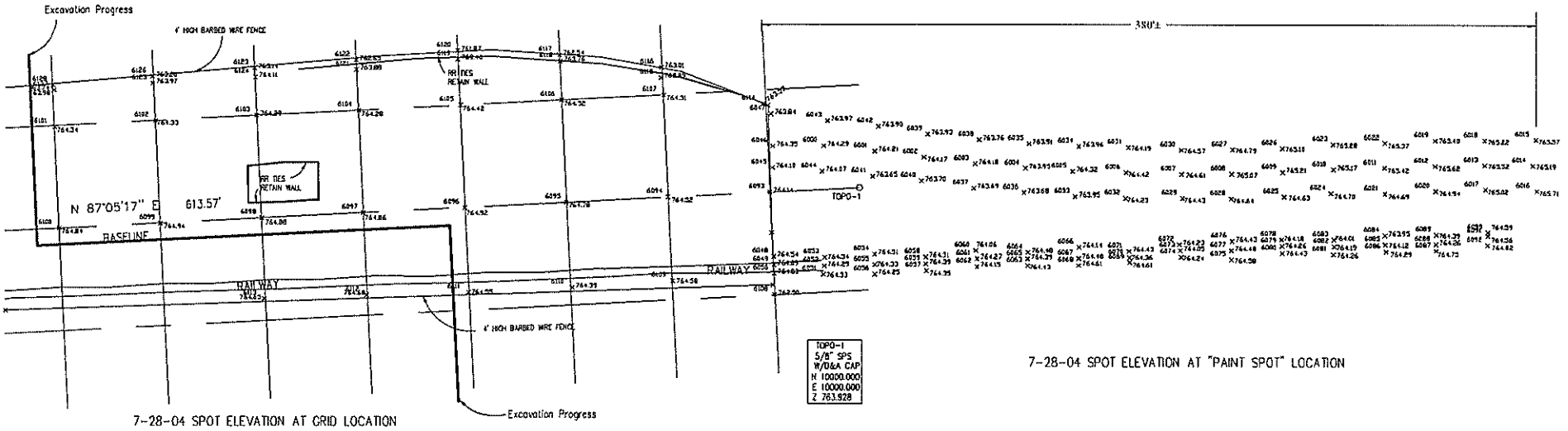


Figure 3-7 Initial Excavation Confirmation Survey

3.6 Track Improvements

Prior to the mobilization of gondola railcars to the facility, Pangea contracted with Landrail, Inc. to inspect the rail siding and the tracks servicing the siding. The rail siding servicing the stockpile area was determined to be in an acceptable condition; however, the tracks servicing the siding were found to be in need repair to allow safe loading of the gondolas. Track stays and spacers were installed and several switches were serviced. The DLA facility managers authorized all improvements before implementation.

3.7 Waste Packaging and Loading

Waste packaging was accomplished using nominal 100-ton gondola railcars lined with a 60-mil gondola liner ("burrito wrap"). After load-out was complete, the liners were sealed, the cars were subjected to a radiological release survey, and tarps were secured over the top of the railcars. No specification packaging was required as determined by Pangea or its logistics subcontractor, Cavanaugh Services. The waste was shipped as "Non DOT regulated material (Soil, Debris, Chip seal)" per Department of Transportation regulations. Initial loading was delayed by a shortage of available gondola railcars, resulting in railcar mobilization times of greater than 90 days. Railcar load-out began on August 4, 2004. Railcar load-out, including all change order derived material, was completed on September 8, 2004.

3.8 Disposal at U.S. Ecology – Grandview, ID

A total of 39 gondola railcars were sent to the Grandview, ID US Ecology facility for disposal. The total weight of disposed soil and debris was reported as 3298 tons and contained approximately 1.2 Curies of Uranium and Thorium. The total disposal volume was approximately 2290 cubic yards, with a railcar utilization rate exceeding 85%. The first shipment was placed on a bill of lading on August 18, 2004. The last waste shipment was accepted for disposal on October 8, 2004. No waste profile discrepancies or regulatory violations were noted during the shipping campaign. All railcars were surveyed for free release before leaving the US Ecology transload facility. Bills of lading and certificates of disposal for the shipments are included in this report in Appendix A.

3.9 Radiological Clearance Survey

The excavation area was laid out originally in fifty-foot grids for excavation tracking. The grid was alphanumeric starting in the northwest corner with A1, then easterly B, C, D, etc. and southerly 1, 2, 3, etc. Using the same grid system, the 50-foot squares were divided in half for 25-foot grids. A health physics technician then scanned the entire grid recording the highest reading found in each grid square in units of counts per minute. The instrument used was a Ludlum Model 44-10 2" x 2" NaI detector attached to a Ludlum Model 2221 ratemeter/scalar. The stockpile area located southwest of area 7A was also surveyed in 25-foot grids. All areas were shown to be less than less than 2 times background. Field background for the final radiological clearance surveys was measured as 9,000 – 13,000 cpm. The highest measurement was 23,000 cpm. Documentation of the final site radiological survey is included in Appendix B.

A validation of the Pangea radiological clearance survey was performed by ERS Solutions, the DLA health physics oversight contractor.

3.10 Post-excavation topographical survey

To confirm removal of the top six inches of soil, and to determine depths in areas where change order work was performed, a topographic survey was performed on August 28, 2004. Final elevations with differential heights (in decimal feet) are shown in Figure 3-8, *Final Elevations*. Figures 3-9 and 3-10 have been included to show additional detail. In addition, full size engineer's drawings have been included in Appendix C.

3.11 Demobilization

Demobilization was completed on September 24, 2004

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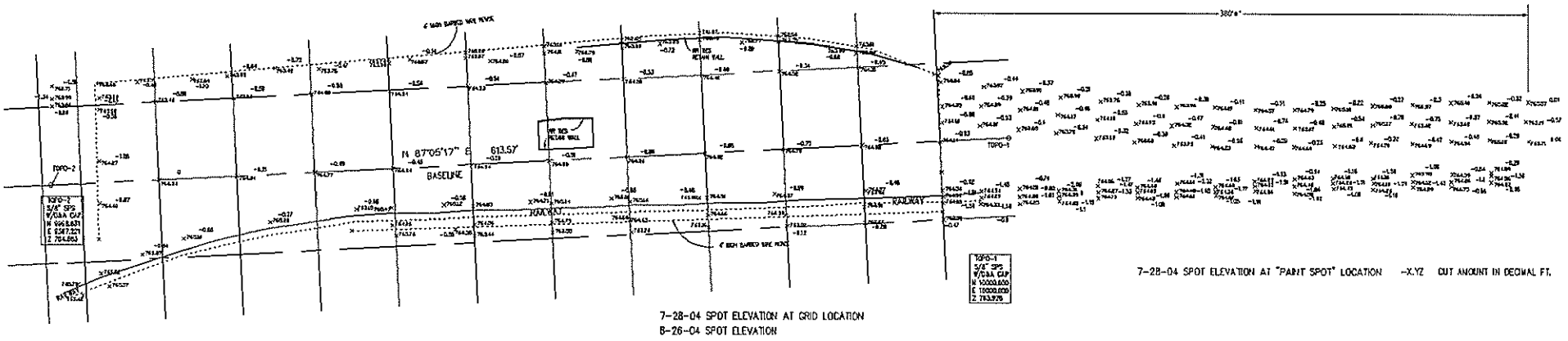

Figure 3-8 Final Elevations

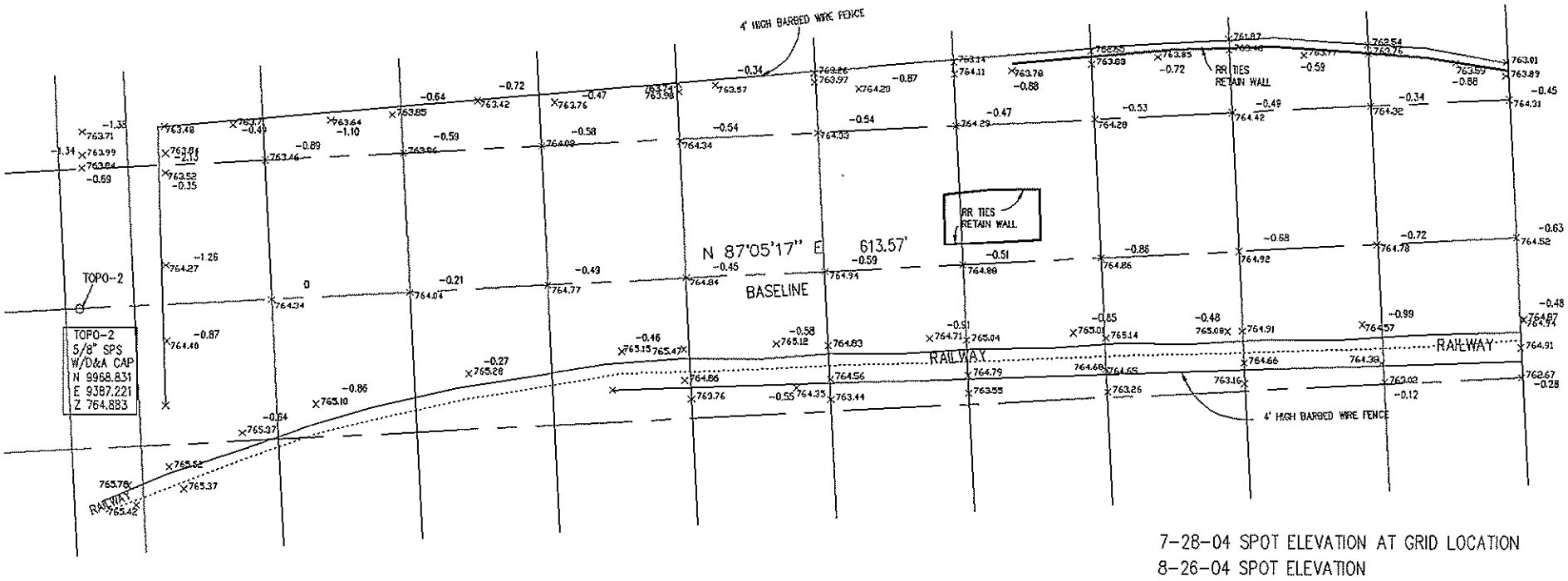

Figure 3-9 Final Elevations (Western Blowup)

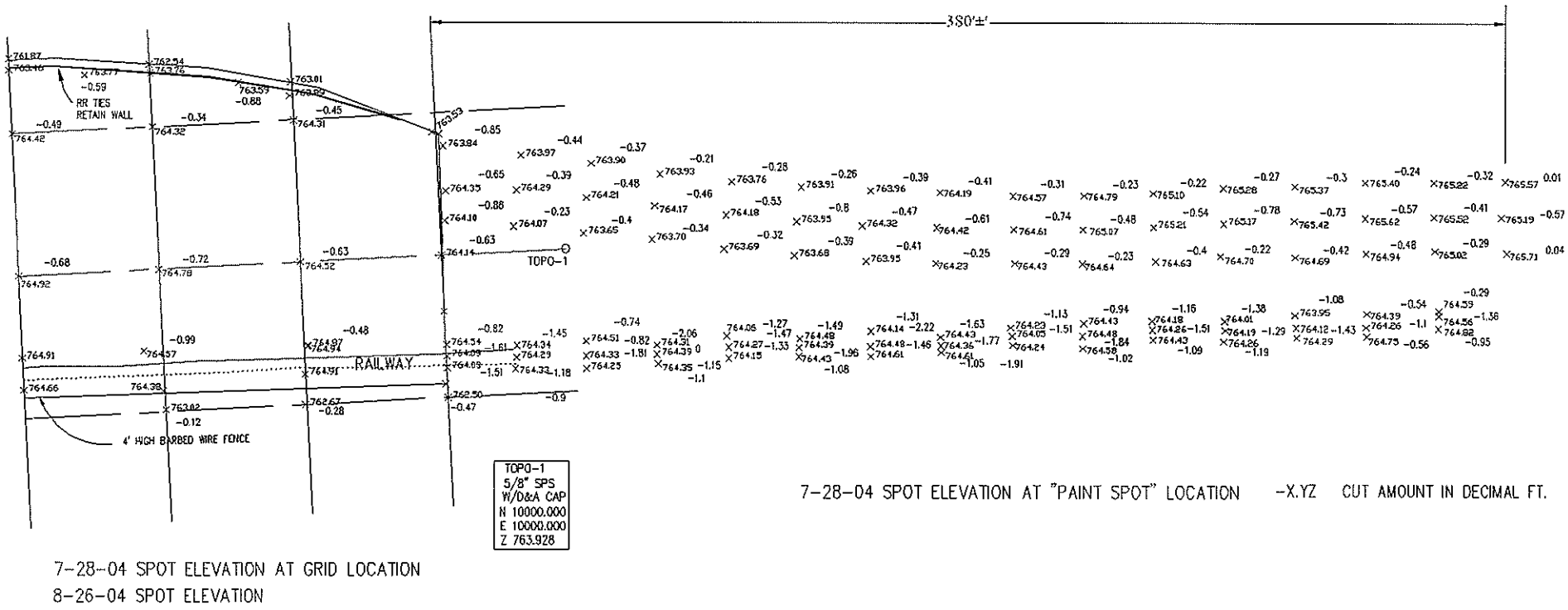

Figure 3-10 Final Elevations (Eastern Blowup)

4. Construction and Radiological Safety Summary

Safety on this project personnel was of paramount importance. There were no OSHA recordable injuries over the course of the project. In addition, airborne dust was minimized to the maximum practical extent with the use of water spraying equipment. As a result, airborne radioactivity levels were maintained as low as reasonably achievable and well below respirator action levels. A summary of construction and radiological safety issues dealt with is included below.

4.1 Construction Safety

All project personnel were subject to training requirements set forth in the contract Scope of Work, which included OSHA HAZWOPER training and radiation safety training. Due to the absence of local craft labor with the appropriate training, several staffing agencies were utilized for supplying qualified craft personnel. Pangea staff provided on-site health and safety training to address site-specific hazards and, in some cases, radiation safety training.

Changing conditions and possible hazards to the work crew were communicated during the daily safety briefings. Topics ranged from the use of personnel protective gear to moving safely on and around railcars.

All personnel in the field were required to wear personal protective equipment consisting of, at a minimum, hardhats, safety glasses, steel toe shoes, and a reflective safety vest. Personnel handling material by hand were also required to wear leather-palm gloves, or the equivalent.

All heavy equipment used on site was inspected daily, prior to use. Records of the inspections were reviewed and maintained by the Project Manager.

4.2 Radiation Safety

Radiation safety was integral to the planning and execution of the project. In addition to the required general radiation safety training, all workers received a site-specific radiation safety briefing prior to beginning work, including training in the use of radiological instrumentation and the radiation work permit system.

Access to the contaminated areas was controlled through the use of Radiological Control Areas (RCAs). Personnel were required to sign onto a RCA access register before entering the RCA, and unescorted access inside the RCA was limited to personnel with the proper training. Initially, all personnel working inside the RCA were required to wear Tyvek overalls, gloves, and shoe covers or overshoes in addition to PPE necessary for construction safety. After several weeks of observation and contamination control surveys, this requirement was eliminated. All personnel exiting from the RCA were required to perform an exit scan with a Ludlum 44-9 GM or equivalent. All equipment used within the RCA was also subject to radiological survey before being released. No contamination incidents occurred during the course of the project.

While exposure rates in a few small areas of the 7A area exceeded 40 uR/hr, as measured with the use of a Micro R meter, the greatest potential for exposure to workers was from the

inhalation or ingestion of contaminated materials. Based on the low external dose rates, external radiation dosimetry was not required for this project. As identified in the Radiological Work Plan, a comprehensive air-sampling program was set up to monitor for potential airborne radioactivity. General air monitor stations were set up inside the work area, and breathing zone pumps were set up inside the cabs of the heavy equipment. A perimeter monitor was set up at the northern boundary of the RCA in order to measure airborne radioactivity outside the work zone, and was moved along the northern boundary in order to parallel ongoing activities. Dust control was maintained by the application of water to the roads, excavation area, and stockpiles via a 2000-gallon water truck. A high efficiency Alpha/Beta ZnS swipe counter, Ludlum Model 43-10-1, was used to count the air samples. Over the course of the project, the maximum concentration recorded was 3.4% of the Derived Air Concentration (DAC) and the maximally exposed worker whole body dose was determined to be less than 2 mRem CEDE. Based on these results, no radiation dose was assigned to project personnel.

5. Project Summary

Fieldwork on the DLA Remediation Waste Disposal Project began on May 18, 2004 and was completed on September 24, 2004. During that time, over 2500 cubic yards of radiological contaminated soils and debris were removed from the New Haven Facility for disposal at an offsite disposal facility. The project was completed without any accidents and radiation doses were maintained as low as reasonably achievable. The project was also completed in strict compliance with applicable regulatory and contract requirements.

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