Rock Cut Slopes
Portsmouth Bypass
Project SCI-823-10.13
Phase 2 – Stage I
Scioto County, Ohio

VOLUME 1 OF 2

November 16, 2007

DLZ

Report of:

Rock Cut Slopes
Portsmouth Bypass
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Phase 2 – Stage I
Scioto County, Ohio

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November 16, 2007

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REPORT

OF

ROCK CUT SLOPES

FOR

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PHASE 2 – STAGE I

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TABLE OF CONTENTS

APPENDIX A
Project Location Map
Project Alignment and Boring Plan

APPENDIX B
Boring Logs
Results of Slake Durability Index and Uniaxial Compressive Tests
Colorado Rock Fall Simulation Analysis Examples & Data Disk

APPENDIX C
ODOT General Earthwork Design Checklist - Centerline Cuts Checklist

APPENDIX D
Cut Slope Cross Sections

REPORT
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PHASE 2 – STAGE I
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1.0 INTRODUCTION

This report presents the methodologies and findings of the cut slope design performed by DLZ Ohio, Inc. (DLZ) for the Phase 2 portion of the SCI-823-10.31 Portsmouth Bypass project located in Scioto County, Ohio. The Phase 2 portion of the project will begin at Station 537+50 and ends at Station 904+79.54. The proposed alignment will extend in a north/northwesterly direction for approximately 7 miles from the proposed Lucasville Minford Road (CR 28) interchange to approximately 0.25 mile west of the US 23, north of the existing Lucasville Minford Road (CR 28) and US 23 intersection. The proposed alignment is illustrated on the general location map in Appendix A.

Based on the site plans included in Appendix A, rock cut slope design was required in certain areas of the proposed project alignment between Station 543+00 and Station 889+00. In considering the rock cut slopes, the areas requiring rock cut design were divided into 18 cut sections, namely, Rock Cuts #16 through #32. Rock cut design for Rock Cuts #1 through #15 are presented in separate reports for project Phases 1 and 3. The areas requiring rock cut slope design and their corresponding station ranges are shown in the following table. The stationing for the rock cuts are approximate and are based on roadway alignment and elevation information available at the time of this report.

Rock Cut	Station Range
16	543+00 - 575+00
17	580+50 - 597+00
18	603+00 - 609+00
19	611+50 - 616+00
20	619+50 - 221+00
21	625+50 - 633+50
22	637+50 - 657+00
23	661+00 - 670+50
24	674+50 - 681+00

Rock Cut	Station Range
25	682+00 - 697+50
25A	682+00 - 697+50
26	702+00 - 714+50
27	725+00 - 745+50
28	753+00 - 761+00
29	775+00 - 798+50
30	779+00 - 818+00
31	818+50 - 848+50
32	853+00 - 889+00

A subsurface exploration program was conducted for the proposed alignment. The purpose of the subsurface exploration was to: 1) determine the subsurface conditions to the depths of the borings, 2) evaluate the engineering characteristics of the subsurface materials, and 3) provide information to assist in designing the cut slopes, roadway embankments and pavements.

This report pertains to the rock cut slope design only. The findings of the roadway embankment and pavement evaluation are presented in separate documents. Note that information specific to soil cut slopes is also present in their respective roadway embankment reports.

The geotechnical engineer has planned and supervised the performance of the geotechnical engineering services, has considered the findings, and has prepared this report in accordance with generally accepted geotechnical engineering practices. No other warranties, either expressed or implied, are made as to the professional advice included in this report.

2.0 PHYSICAL SETTING

The project is located in the Shawnee-Mississippian Plateau of the unglaciated portion of the Appalachian Plateau Physiographic Region. This area is not highly developed and contains limited secondary roadways. The area is characterized by rough, steep, broken, and severely dissected topography. The natural slopes are generally very steep, rising abruptly from the valley bottoms. The maximum topographic relief along project centerline is on the order of 275 feet and occurs between a high point at approximate Station 523+70 (approximate elevation 890 feet) and a low point near Station 353+80 (approximate elevation 615 feet). The maximum vertical relief along the proposed finished grade is approximately 130 feet, with the highest point at approximate Station 352+00 (elevation 645 feet) and the lowest point near Station 519+30 (elevation 775 feet).

3.0 GEOLOGICAL CONSIDERATIONS

3.1 Site Geology

The lithology of the project area is primarily composed of Pennsylvanian and Upper Mississippian age rocks including shale, siltstone, and sandstone.

The Pennsylvanian age rocks in the project area are in the Pottsville Group and mapped as the Pennsylvanian Breathitt Formation according to the bedrock geology maps prepared by the Ohio Department of Natural Resources' Division of Geologic Survey (ODNR-DGS). The Breathitt Formation is found as thin bands generally following the topographic contours of the higher ridgelines. Due to the regional dips, this rock formation generally exists above elevations between 760 and 850 feet in the project area. The Breathitt Formation consists of conglomerate, coal, shale, thin limestone, sandstone, and ironstone. Generally, shale and sandstone are the dominant lithologies with occasional thin, bony coal beds or blossoms.

The predominant marker beds found with the Breathitt Formation are the Harrison Ore, located immediately above the Mississipian age Maxville Limestone, the Sciotoville Clay, the Sharon Ore, and the Anthony Coal. Of these members, the Harrison Ore is the only marker bed that is relatively continuous within the project area.

The Upper Mississippian age rocks from the Waverly Series, Logan, and Cuyahoga Formations generally exist below the Pennsylvanian age Breathitt Formation. However, the Maxville Limestone, overlying the Logan Formation, marks the contact with the

Breathitt Formation. The Maxville Limestone consists of isolated, discontinuous pockets of limestone. The discontinuous nature is due to an erosional unconformity at the upper surface. Where the Maxville Limestone is absent, the Logan Formation marks the upper contact with the Breathitt Formation.

The Logan Formation varies in thickness in part due to the erosional unconformity at its upper boundary and consists primarily of gray to brown fine-grained sandstone, siltstone, and sandy shale. However, the Logan Formation is characterized by the dominance of sandstone. Three members of the Logan are identified within the project area, namely, the Byer Sandstone, the Allensville Conglomerate, and the Vinton Sandstone. Occasional iron bearing zones, identified as ironstones and ferric bands, are present within the Logan Formation, but are usually thin, isolated, and nodular. Generally, the Vinton member is a fine-grained sandstone which can be finely interbedded with sandy shale and often contains zones of fossils and ironstone concretions. The Byer member is generally a fine-grained sandstone which can be finely interbedded with sandy shale or massive sandstone. The Allensville member is a fine-grained sandstone which can be finely interbedded with sandy shale with small pebbles beds (1 to 2 inches) throughout. This member is not easily distinguishable from the Byer member and is often missing within the sequence.

The Logan Formation is the dominant rock stratum found within the project area with the exception of the Pennsylvanian Breathitt Formation capping the higher ridgelines in some areas.

Soils found within the study corridor can be divided into three groups; residual and colluvial soils derived from weathering of underlying rock and downslope transport; lacustrine and outwash deposits of glacial origin; and recent alluvial deposits. The residual and colluvial soils are found along the ridge tops and hillsides; glacial soils are typically found within the major stream valley and their tributaries; and recent alluvial deposits are found along and within stream channels and valleys.

Within the project area, residual and colluvial soils are generally thin to moderately deep, covering moderate to very steep slopes. Residual and colluvial soils on the hillsides are prone to landslides.

The two types of glacial soils encountered within the study corridor are lacustrine deposits and glacial outwash deposits. The lacustrine soils are commonly known as the 'Minford Silts' or the Minford Complex. The Minford Complex soils are generally found between elevations 650 and 780 feet. The thickness of the Minford Complex soils varies considerably throughout the project area, partially due to the nature of original deposition and geological changes since the time of formation. When present, these materials usually lie on or near bedrock. The Minford Complex soils have no regular succession. Typically sands and sandy silts are found near the bedrock and fine laminated silts and clays are found at the higher levels of the sequence. Occasionally, the Minford Complex contains sandstone cobbles and boulders or chert and quartz pebbles in the lower parts of the sequence. These cobbles, boulders and pebbles within the sequence are believed to be of local origin. The glacial deposits are late Wisconsinan in age and consist of sand

and gravel deposits with small isolated peat deposits. Generally, these deposits are saturated at shallow depths with high recharge rates.

Alluvial soils, to some extent, are found along all of the creeks and rivers within the project area. Generally alluvial deposits range from silty clay to coarse sand. Where bedrock is shallow, alluvial deposits may contain coarse sand, gravel, and cobbles.

3.2 Landslide Susceptibility

The dominant rock type along the proposed alignment is sandstone of the Mississippian aged Logan Formation. Siltstone and shale are commonly found interbedded with the sandstone. These siltstones and shales generally weather to clay with low shear strength over time. The steeper slopes are prone to gradual movement known as soil creep. The low shear strength of the residual and colluvial soils combined with the steep topography makes some of the hillsides within the proposed limits of construction prone to shallow surficial landslides and soil creep. Generally these conditions are easily corrected by removal of the unstable slope materials. No deep-seated landslides were observed along the proposed Phase 2 alignment.

In the steep terrain of Scioto County, soil creep is common. Areas of slope instability were first identified using survey data and aerial photography and then verified during the fieldwork. Thirteen areas showed indications of significant instability near or within the limits of construction. Most slope instability appeared to be relatively shallow soil creep contained within the overburden. In most cases this slope instability was less than 10 feet deep even though drilling in several of these landslide areas indicated significantly deeper overburden. These areas of slope instability are shown on the field notes and proposed centerline in Appendix A of the *Report of Geology and Field Reconnaissance for Project SCI-823-6.81, Phase 2-Stage II, dated November 16, 2007.* The following is a summary of those findings.

Station 616+80 to 618+00
This area is steep and hummocky, and appeared to be a shallow landslide based on visual observation. An intermittent stream had undercut the toe of the slope and there appeared to be considerable erosion from previous logging operations.

Station 623+50
This area has slopes of 2(H):1(V) or steeper and appeared to be a shallow landslide. Two intermittent streams had eroded the slope. Erosion from past logging operations was also evident.

Station 646+75 to Station 650+00
This area appeared to be a shallow landslide. A small intermittent stream had eroded the slope. Logging operations might have contributed to the slope movement in this area.

Station 656+00 to Station 664+00
This is a large area of instability, encompassing most of the steep valley. The valley had slopes of 2(H):1(V) or steeper. A perennial stream that drains the valley, had undercut

the slopes on both sides in several places. Several intermittent streams and previous logging activities might have also contributed to slope erosion on both sides of the valley. Because borings drilled in the valley indicate the presence of overburden up to 30 feet at mid slope locations, two inclinometers were installed. No measurable movement was observed during the monitoring period between July 2005 and May 2006.

Station 670+50 to Station 673+50
This area is steep and hummocky. The area of instability encompasses most of a small drainage basin. An intermittent stream had eroded the toe of the slopes. An inclinometer was installed at station 673+36.1, 44.1 feet left of the proposed centerline and showed no movement during the monitoring period between July 2005 and May 2006.

Station 680+00 to Station 682+00
This area has slopes steeper than 2(H):1(V). Two small intermittent streams had eroded the slope. Erosion from previous logging operations was also evident. An inclinometer was installed at station 680+71.2, 152.5 feet left of the proposed centerline and showed no movement during the monitoring period between July 2005 and May 2006.

Station 689+00 to Station 695+00
This area is also steep and hummocky. The area of instability encompassed most of the small drainage basin. An intermittent stream had eroded the toe of the slopes in this area. Erosion from previous logging operations also appeared to be evident.

Station 696+50 to Station 702+75
This area has slopes of steeper than 2(H):1(V) and included a relatively large drainage basin. A perennial stream had eroded the toe of the slopes in the area. Extensive erosion from previous logging operations was also evident. Inclinometers were installed at station 698+18.9, 70.9 feet left of the proposed centerline and at station 700+67.2, 80.3 feet left of the proposed centerline. No movement was detected during the monitoring period between August 2005 and May 2006

Station 760+50 to Station 766+10 and Station 760+50 to Station 766+10
This is a large area of instability that was possibly caused by extensive construction of logging roads and the resulting erosion. The areas of instability appeared to be shallow and confined within the relatively thin overburden in the area.

Station 779+00 to Station 786+50
This area of instability might have also been caused by extensive construction of logging roads and the resulting erosion. The areas of instability appeared to be shallow and confined within the relatively thin overburden in the area.

Station 790+75 to Station 796+75
This steep area of instability appeared to be caused by extensive construction of logging roads, clear cutting, and the resulting erosion. The areas of instability appeared to be shallow and confined within the relatively thin overburden in the area.

Station 808+75 to Station 828+25
This large area of instability has slopes of 3(H):1(V) or steeper and appeared to be a shallow landslide. Extensive construction of logging roads and the resulting erosion might have been contributing factors to the instability in this area. A perennial stream had also undercut the toe of the slopes in the area.

Station 834+50 to Station 848+75
This large area of instability had slopes of 2(H):1(V) or steeper and appeared to be a shallow landslide. Several small intermittent streams had eroded the slope. In addition, erosion that appears to have been caused by previous logging operations may be a contributing factor to the instability in this area.

3.3 Mining Activities

Scioto County has been mined extensively for a variety of materials including sand and gravel, sandstone, clay, and coal. However, neither large sand and gravel operations nor large clay pit were reported within the project area.

Strip and drift mining for coal are common within the Pennsylvanian rocks along the far eastern portions of the county in Bloom, Vernon, and Green Townships outside of the project area. Coal seams do not appear in significant enough thickness or quality within the study corridor to have warranted extensive mining. Small-scale local coal mining operations are suspected to have occurred historically within the Pennsylvanian Breathitt Formation found in the project area.

Quarries are found throughout Scioto County for mining dimension blocks of sandstone and limestone for aggregate or flux. However, the sandstones of the Mississippian Logan Formation, the dominant rock in the study corridor, are unsuitable for dimension stone. Consequently, quarries for sandstone or limestone were not reported or observed within the project area.

Iron deposits are found throughout the region and were reported to have been locally mined within Scioto County. The extent of ore mining within the project area is unknown, but estimated to be very small.

3.4 Seismic Considerations

Compared to seismically active areas of the United States (California or Alaska), Ohio has relatively few earthquakes. The most frequent and damaging earthquakes in the state of Ohio originated from the City of Anna, Shelby County, in the vicinity of western Ohio. During the last 100 years this area has experienced more than 30 earthquakes with the decade of the 1930's being the most active period. Among these 30 earthquakes, only 23 events were recorded, including the most severe shock ever recorded in Ohio. This severe earthquake, occurred on March 9, 1937, had a reported intensity of VIII on the modified Mercalli scale (5.4 on the Richter scale) and was felt over an area of 150,000

square miles. Considerable damage to windows and walls and extensive cracking of masonry occurred in several large buildings in Anna and nearby communities.

Earthquakes were also reported in northeastern, southeastern, and other western portions of Ohio. One earthquake, measured between 4.0 and 4.9 on the Richter scale, reportedly centered near Portsmouth, Ohio in 1901. Lesser magnitude quakes have been recorded in southern Ohio, outside of Scioto County. These earthquakes were of minor intensity (<3.9 magnitude), causing little or no damage.

This project is located in excess of 200 miles away from the City of Anna and any of the above-mentioned areas of historical earthquakes. It is estimated that the levels of seismic acceleration from any of the previous earthquake locations would be small and that the effect of seismic loadings, if any, due to the potential earthquakes from these areas can be considered minimal on the design of rock cut slope design.

3.5 Existing Cut Slope Features in the Region

Existing rock cut slopes are present along the CSX Railroad line, existing roadways, and in isolated locations of the project area. The field observations of the rock cut slopes within the project area are presented in the following paragraphs.

A large cut exists in the northwestern portion of the proposed Portsmouth Bypass corridor on Fairground Road behind M&J Welding, a moderately-sized industrial facility. The base of the cut is at an approximate elevation of 620 feet. The property behind and adjacent to the M&J Welding main building appears to be in the preliminary stages of development for an industrial park. The approximately lower two-thirds of the hillside behind the building is composed of the Portsmouth Shale member of the Cuyahoga Formation while the remaining one-third is composed of sandstone of the Logan Formation. The cut directly behind the building appears to be entirely within the Portsmouth Shale at approximately 1.5H:1V to 2H:1V slope. It is uncertain whether the cut was made for original construction of the building or to mitigate a landslide that might have developed after the building was constructed since the cut appears to be recent. The shale exposed in the cut showed evidence of moderate erosion and softening and appeared to be weathering quickly to clay. Road construction leading to a residence on the ridge top had exposed shale in the ditches that had become soft and plastic upon exposure. A prominent cut in the sandstone of the Logan Formation is present along the residential driveway at an approximate elevation of 820 feet. The sandstone exposed in this location was cut nearly vertical. Two prominent joint sets were observed in the rock cut, both nearly vertical with one trending approximately east-west and the other trending approximately north-south. The cut appeared to be performing well; however, it is suspected that the cut might have been recently constructed.

Large road cuts are present east and west of State Route 140, near the intersection of US 52. The cut to the west of State Route 140 is heavily vegetated with little rock exposure while the cut located east of State Route 140 is a sparsely vegetated slope consisting of mixed material ranging from shale to sandstone in thin to medium beds at an approximate roadway elevation of 560 feet. The rock strata in this cut belong to the Mississippian

aged Logan Formation. The cut is approximately 1,500 feet long and 150 feet high, with a slope of approximately 1H:1V. A 20-foot wide horizontal bench was cut approximately 100 feet above SCI-CR503 and US 52 (Service Road Y on 1961 SCI-52-25.62 plans) and the other 20-foot wide horizontal bench at the base of the cut. At the time of the field observation, the slope appeared to be performing well with minor amounts of rock fall at the base. However, the bench at the base of the cut appeared to have been recently cleaned.

A large rock cut is also present along State Route 335 between Swauger Valley Road and the CSXT Rail Bridge over the Little Scioto River. The cut is on the north side of the road at an approximate roadway elevation of 660 feet. The exposed rock is a hard sandstone that is pitted and black in appearance overlying a medium hard siltstone layer which is just above the road elevation at the east end of the cut. The sandstone is jointed and is believed to be the Byer Member of the Logan Formation. The major joint set is trending east-west, parallel with the cut face. The cut appeared to be sloped at approximately 1/2H:1V. Overall, the cut appeared to be stable producing only occasional rockfall. At some locations the rock face appeared to slough off in large sheets probably due to freeze thaw action within the joints over time. At the intersection of Swauger Valley Road and State Route 335 the west face had been recently cut back with a high cut at an approximate roadway elevation of 530 feet. The cut appeared to be over 100 feet high consisting primarily of sandstone. A weak zone approximately 20 feet thick was evident about 40 feet above the base of the cut. The cut appeared to be approximately 1/2H:1V to 1/3H:1V with a bench approximately 40 to 50 feet wide at the base of the cut. Several large blocks of rock were present on the bench at the time of the field observation and were likely rock fall.

Along State Route 335, south of Wheelers Mill Road, a small cut was observed on the western side of the roadway around a bend at an approximate roadway elevation of 560 feet. This cut is a mixed slope of interbedded sandstone, siltstone and minor shale with a 1/2H:1V slope. The slope appeared to be performing poorly with large amounts of sloughed rock accumulating at the base of the cut.

Along State Route 139 between Minford and Clarktown, two rock cuts was observed along the north side of the roadway at an approximate roadway elevation of 640 feet. These rock cuts were at approximate mile markers 9.8 and 9.9 and were approximately 10 to 20 feet high with near vertical slopes in massive sandstone of the Logan Formation. The cuts appeared to be old with minimal or no recent maintenance. However, the cuts appeared to be performing well with very minimal rock fall along the base of the cuts.

4.0 FIELD EXPLORATION

DLZ personnel conducted an initial field reconnaissance and reviews of published data in February 2002. The results were compiled in a report titled *Phase I Subsurface Investigation, Portsmouth Bypass Transportation Study, Geotechnical Literature Review and Field Reconnaissance, SCI-823-0.00,* dated February 25, 2002.

A preliminary geotechnical investigation was performed by DLZ Ohio, Inc. as part of the Portsmouth Bypass Transportation Study. A total of twenty-one borings were drilled throughout the study corridor to develop preliminary geotechnical information to aid in the selection of feasible alternative alignments. A summary of the preliminary geotechnical investigation was presented in DLZ Ohio, Inc.'s report titled *Phase 1-Stage II Subsurface Investigation, Portsmouth Bypass Transportation Study, Preliminary Boring Program, SCI-823-0.00,* dated June 21, 2002.

Using the information collected during the geotechnical overview and the Phase 1-Stage II subsurface investigation, and upon review of preliminary plans, profiles and cross-sections, DLZ prepared a boring plan for geotechnical exploration. Upon review and approval of the boring plan by ODOT Office of Geotechnical Engineering (OGE) personnel, DLZ personnel performed the subsurface exploration between April 28, 2004 and September 1, 2006. The subsurface exploration consisted of drilling 530 mainline roadway borings, R-15 through R-2676, using both truck-mounted and ATV-mounted, rotary-type drill rigs. Drilling efforts included auger borings, sample borings, and rock core borings. The borings were generally spaced 300 to 600 feet apart and were advanced to depths between 15 and 230 feet. The borings generally were drilled a minimum of 10 feet below the anticipated finished grade of the roadway.

5.0 DESIGN PROCEDURE FOR CUT SLOPE RECOMMENDATIONS

On January 13, 2006, ODOT issued the Geotechnical Bulletin GB-3 "Rock Cut Slope & Catchment Design" to provide guidance on the design of rock cut slopes, rockfall catchment, and rockfall controls. During the February 3, 2006 project meeting with ODOT, an alternate roadside ditch design was selected to be used. The alternate road side ditch design does not strictly adhere to the GB-3 requirements but reduces the width of proposed rock cuts and lessens the amount of property to be taken by the cut excavations that standard designs would require. As a result, the design of rock cut slopes for the Phase 2 of the Portsmouth Bypass project slightly deviate from the GB-3.

Note that information specific to soil cuts are presented in their respective roadway embankment report.

In general, the approach to the design of cut slopes consisted of four phases. The details of each of the design phases are discussed in the following sections.

5.1 Existing Data Evaluation

The first phase involved evaluations of available geologic data, which included surface mapping, data and information gathered from USGS, ODNR, and other relevant resources, and field reconnaissance. A summary of the existing data evaluation is presented in Section 3 of the report.

5.2 Field Investigation and Laboratory Testing

The second phase involved subsurface exploration, which included soil and rock sampling and laboratory testing of selected samples. Geotechnical information including,

but not limited to, soil strength, rock structure, rock hardness, degree of weathering, and rock fabric were developed by visual descriptions of soil and rock cores, and hand penetration tests of soil samples. Slake durability tests (ASTM D4644) and point load strength index tests (ASTM D5731) were also performed on selected rock cores. Note that a factor of 21 was applied to the point load test result of a rock core to determine the equivalent uniaxial compressive strength of the rock core. According to a study, titled *Using the Point Load Test to Determine the Uniaxial Compressive Strength of Coal Measure Rock,* performed by Mr. John Rusnak of the Peabody Group for the National Institute for Occupational Safety and Health, the conversion factor of 21 worked well for a variety of rock types and geographic regions.

5.3 Slope Evaluation, Design, and Layout

The third phase was to determine the cut slope configuration based on the information gathered from the first two phases of the design procedure. In designing the rock cut slope configurations, significant consideration was given to the point load strength, rock quality designation (RQD) values, rock structure and hardness, degree of weathering, and slake durability test, if available.

Cut slope benches were provided according to the following guidelines:

1. Soil overburden benches: Slopes in the soil overburden zone (where the zone is over 10 feet thick) typically had a slope of 2H:1V. At the interface between soil overburden and bedrock, a 10-foot wide bench was provided. If the overburden zone was less than 10 feet thick or the natural slope was 1H:1V or steeper, rounding of the top of the cut to blend into the natural slope was considered.

2. Geotechnical benches: These benches, generally 10-foot wide, were placed at locations where a competent lithologic rock overlies an incompetent/weathered rock. The slope of these benches longitudinally followed the base of the competent rock with an outslope having positive drainage at a maximum grade of 10%, and a minimum grade of 3%. Note that geotechnical benching must be field adjusted during construction to follow any changes in bedding surface.

3. Construction benches: For slopes steeper than 1H:1V, 5-foot wide horizontal construction benches were placed at a maximum of 30-foot vertical intervals of a rock cut slope where no geotechnical benches were required.

Note that variations in the actual construction bench widths are expected. Bench widths may need to be modified to maintain a temporary working bench, accommodate relief in the existing sloping face and overburden thickness, and minimize the amount of water flow across the cut slope face.

5.4 Quantitative Analysis of Rock Cut Slopes

The fourth phase was to evaluate the failure potential of the cut slope configuration using the Colorado Rockfall Simulation Program (CSRP), Version 4.0. This program uses

slope and rock geometry and material properties to calculate falling rock bounce height, velocity and travel distance. Results of the CSRP analyses were used to verify the appropriateness of the cut slope configuration, break in slope angles, and catchment ditch geometry. Based on the CSRP analysis, barriers were recommended in some areas to provide the necessary rockfall mitigation measure. Given the existing site conditions and the results of the preliminary CSRP analyses, it appears that a minimum slope height of 80 feet is necessary for any falling rock to reach beyond the catchment ditch. Consequently, the CSRP analysis was performed only for the cut slopes 80 feet or higher.

6.0 SUBSURFACE CONDITIONS

The following sections present the generalized subsurface conditions encountered by the borings. For more detailed information, refer to the Rock Cut Boring Location Plans in Appendix A and the Boring Logs presented in Appendix B. Laboratory test results including the slake durability indices and uniaxial compressive strengths are shown on the Boring Logs and also included in Appendix B.

The overburden encountered in the borings primarily consisted of varying thicknesses of cohesive soils including Sandy Silt (A-4a), Silt (A-4b), Silt and Clay (A-6a), Silty Clay (A-6b), and Clay (A-7-6). Occasionally, granular materials consisting of Coarse and Fine Sand (A-3a), Gravel with Sand (A-1-b) and Gravel with Sand and Silt (A-2-4), and Gravel with Sand, Silt and Clay (A-2-6) were also encountered.

Bedrock encountered in the borings correlates well with the available geologic references. The cores obtained consisted primarily of sandstone and occasionally shale, siltstone, and clayshale with varying degrees of weathering and different number of fractures. During the rock coring operation, some water was lost into the voids in the rock. The final water levels in the borings varied widely at the completion of rock coring.

Based on the site plans provided, rock cut slope is only required in certain areas of the proposed alignment between Station 543+00 and Station 889+00. In considering the rock cut slopes, these areas were divided into 16 cut sections, namely Rock Cuts #16 through #32, as shown in the table in Section 1.0 of this report.

The sections that follow present the generalized subsurface conditions encountered by the borings within the anticipated rock cut sections, which was used to construct the rock cut profiles for the sections.

For detailed information, refer to the boring logs in Appendix B. The boring logs are separated by divider tabs according to the associated rock cut number.

6.1 Rock Cut #16 Station (543+00 to Station 575+00)

The subsurface conditions generally consisted of less than 12 inches of topsoil underlain by soils including Silt (A-4b), Silt and Clay (A-6a), Silty Clay (A-6b), and Sandy Silt (A-4a). Silt (A-4b) was the most common soil type encountered. Occasionally, Clay (A-7-6) was also encountered. Coarser grained materials including sand and gravel were not

encountered in the borehole drilled from this rock cut. Overburden thicknesses generally ranged from less than 1 foot to 34 feet.

Below the topsoil and overburden, a layer of severely weathered rock ranging in thicknesses between 1 and 10 feet was encountered in most of the borings. This severely weathered rock consisted of sandstone and sandstone with shale. Generally the severely weathered rock was similar to the type of intact bedrock encountered immediately below it. The competent bedrock generally consisted of sandstone.

Bedrock was confirmed by coring in all borings. Bedrock primarily consisted of medium hard to hard, very fine to fine-grained sandstone. Interbedded sandstone and sandstone with shale were also contained in the collected rock cores. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the rock cores are summarized in the table below.

Groundwater seepage was noted at a depth of 1.0 foot in Borings R-475 and R-480; however, no appreciable amount water was observed in the borings prior to coring. Seepage was also reported at a depth of 10.5 feet in Boring R-495. A water level at a depth of 22.5 feet was present in Boring R-495 at the completion of drilling. Note that no water was added to Boring R-495. Seepage was not reported in other boreholes drilled for this rock cut, prior to coring. Water levels at completion, which are recorded on the boring logs, may include the water used for drilling and are identified as such.

Dominant Rock Types	**RQD, %**	**Point Load Strengths*, psi**	**Equivalent Compressive Strengths*, psi**	**Uniaxial Compressive Strengths**, psi**	**SDI, %**
Sandstone	6 – 100	90-1,349	1,890 – 28,329	8,597-11,170	77.3-98.1
Sandstone with varying amounts of interbeded Siltstone and Shale	65-100	203-806	4,263-16,926	3,111-14,400	43
Sandstone and Shale interbedded	89-93	148-1,082	3,108-22,722	NM	NM

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.2 Rock Cut #17 (Station 580+50 to Station 597+00)

Generally, areas between Station 580+50 and Station 597+00 consisted of a layer of topsoil over the native soils. The thicknesses of the topsoil were typically less than a foot while the underlying soils ranged in thickness from 4 to 14 feet. The overburden in this rock cut area generally consisted of Gravel and Stone Fragments with Sand and Silt (A-2-4), Silty Clay (A-6b), Silt (A-4b) and Silt and Clay (A-6a) were reported.

Below the topsoil and soil overburden, a layer of severely weathered rock, between 1.5 and 4 feet thick, was encountered in most of the borings. The severely weathered rock consisted of sandstone and generally was similar to the type of intact bedrock encountered immediately below it.

Bedrock was confirmed by coring in all borings. Bedrock primarily consisted of medium hard to hard, very fine to fine-grained sandstone. Occasionally, argillaceous laminations and finer grained zones were interspersed with the sandstone. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the rock cores are summarized in the table below.

Prior to coring, no groundwater was present in Borings R-506 and R-509; however, groundwater seepage was noted at a depth of 1.0 foot in both borings. Groundwater and seepages were not reported in other boreholes drilled for this rock cut prior to coring.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	63-100	65-520	1,365-10,920	9,929	97.6
Sandstone and Shale with varying amounts of interbedding	80-89	76-133	1,596-2,793	NM	NM

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.3 Rock Cut #18 (Station 603+00 to Station 609+00)

The near surface soil conditions within this rock cut section contained thin topsoil layer, typically less than a few inches thick, followed by soil or highly weathered bedrock. Silt and Clay (A-6a) and Sandy Silt (A-4a) were the only soil types in this area, with thicknesses of approximately three feet or less.

The bedrock encountered by the borings was primarily very fine to fine-grained sandstone. A layer of severely weathered sandstone was mostly encountered in the upper 1 to 2 feet of the bedrock strata. Below the severely weathered layer, the sandstone was mostly medium hard to hard. Argillaceous sediments were occasionally mixed with the sandstone from local variations in the depositional environments and yielded rocks with slightly lower SDI values and point load values than those from similar depths. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

Seepage was only encountered in Boring R-521 and R-522 at one foot below ground surface. However, prior to coring, appreciable amount of water was not observed in any of these borings or other borings drilled for this rock cut.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	13-100	29.8-1,493	626-31,353	NM	NM
Sandstone with varying amounts of interbedding	59-83	322-335	6,762-7,035	NM	NM

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.4 Rock Cut #19 (Station 611+50 to Station 616+00)

The soil conditions between Station 611+50 to Station 616+00 generally consisted of less than 1 foot of topsoil at ground surface. However, the thickness of topsoil on the hilltop was reported to be very thin to non-existent. The thickness of the overburden ranged between 6 and 12 feet. Silt and Clay (A-6a) and Sandy Silt (A-4a) were the two most prominent soil types identified in the soil overburden samples. Highly weathered bedrock was generally encountered below the soil.

The bedrock encountered by the borings was primarily very fine to fine-grained sandstone. Layers of decomposed to highly weathered sandstone, approximately 5 to 15 feet thick, were encountered above the competent rock. The competent bedrock mostly consisted of medium hard to hard sandstone. Sandstone containing moderate amounts of argillaceous laminations was observed in two rock core runs from Boring R-533. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone are summarized in the table below.

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	23-100	177-518	3,717-10,878	9,140-10,714	94.1,98.4
Sandstone with varying amounts of interbedding	32-75	45-388	945-8,148	1,874-2,138	45-62

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.5 Rock Cut #20 (Station 619+50 to Station 221+00)

The subsurface conditions generally consisted of less than 12 inches of topsoil underlain by soils including Sandy Silt (A-4a), and Silt and Clay (A-6a). However, Sandy Silt (A-4a) was the most prevalent soil type reported in the borings. These soils appeared to be derived from the underlying bedrock. The thickness of the overburden ranged from less than 3.5 feet to as much as 16 feet.

The bedrock encountered by the borings was primarily very fine to fine-grained sandstone. All borings were completed 10 feet into the bedrock. A layer of severely weathered sandstone was mostly encountered in the upper 1.5 to 3 feet of the bedrock. Below the severely weathered layer, the sandstone was mostly medium hard to hard. Sandstone with argillaceous laminations, sandstone interbedded with shale, and shale were also encountered to a lesser degree. Shale was encountered in Boring R-542. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	51-96	266-345	5,586-7,245	NM	NM
Sandstone with varying amounts of Shale interbedding	47-71	NM	NM	NM	NM
Shale	56	NM	NM	1,888	35.7

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.6 Rock Cut #21 (Station 625+50 to Station 633+50)

A thin layer of topsoil was generally encountered across the rock cut area and was typically less than 1 foot thick. Silt and Clay (A-6a) was the major type of soil encountered in Boring R-554. Sandy Silt (A-4a) and smaller amounts of Silty Clay (A-6b), Silt (A-4b) as well as Silt and Clay (A-6a) were found in other borings drilled for the rock cut. These soils were generally thin, generally present at depths of 3 to 8 feet below ground surface. Significantly thicker soils were encountered in Boring R-554 where the soil was approximately 28 feet thick.

A layer of severely weathered rock was encountered below the soils but was usually only a few feet thick and rapidly gave way to the more competent rock below it. The primary bedrock in the area was a medium hard to hard sandstone. Due to variations in the local depositional environments this bedrock could also contain moderate to abundant argillaceous laminations. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

Seepage was encountered in Boring R-554 at a depth of 16.0 feet. The other borings drilled for this rock cut did not encounter any water seepage or measurable water levels prior to rock coring.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	44-100	66-2,002	1,386-42,042	7,770-9,899	86-98.3
Shale, Siltstone and Sandstone with varying amounts of interbedding	39-100	70-467	1,470-9,807	NM	NM

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.7 Rock Cut #22 (Station 637+50 to Station 657+00)

The thicknesses of topsoil typically ranged from 1 to 3 inches with some areas reaching as much as 8 inches in thickness. Soil cover within the investigation area between stations 637+50 and 657+00 ranged from less than 6-inches to as much as 14 feet thick. Typical soil depths were approximately five feet or less in most areas while little to no soil cover was encountered in others. Where soils were present, Silt and Clay (A-6a) were mostly encountered. Sandy Silt (A-4a) and Silt (A-4b) were encountered less often. Coarser grained soils, Gravel and/or Stone Fragments with Sand (A-1-b), were encountered in Boring R-596.

A thin layer of decomposed bedrock was encountered below the soil. With few exceptions, all borings encountered bedrock consisting of medium hard to hard sandstone. Softer shale and siltstone were encountered in a few borings and sandstone with moderate to abundant argillaceous laminations was only encountered in one boring. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	44-100	66-2,002	1,386-42,042	7,770-9,899	86-98.3
Shale, Siltstone and Sandstone with varying amounts of interbedding	39-100	70-467	1,470-9,807	NM	NM

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.8 Rock Cut #23 (Station 661+00 to Station 670+50)

Borings for Rock Cut 23 encountered varying soil thicknesses across the cut area. Typical topsoil thicknesses were around 1 to 4 inches. Overall soil thicknesses observed in the boreholes were between 5 to 21 feet. However, Borings R-610 and R-2610 contained no soil cover over the bedrock. Sandy Silt (A-4a) was the most common soil encountered and Silt (A-4b) was encountered less often. These soils appeared to be derived from the decomposed bedrock. Silt and Clay (A-6a) soils were also reported, but were typically less than three feet thick when encountered.

A layer of severely weathered rock was located over the competent bedrock and was typically 4 to 5 feet thick. Generally, the competent bedrock type encountered was sandstone. One notable difference of the bedrock in this cut area was the abundance of argillaceous (shaley) zones in the sandstone and more interbedding of shale with the sandstone.

The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	32-100	237-1,639	4,977-34,419	6,005-11,452	94.4-97.3
Sandstone with varying amounts of Shale interbedding	22-100	67-1,740	1,407-36,540	1,679-8,705	70.1-70.1

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.9 Rock Cut #24 (Station 674+50 to Station 681+00)

Borings encountered a less than 12 inches of topsoil over approximately 5 to 21 feet of native soil. The soils in this area appeared to correlate directly to the underlying bedrock. Sandy Silt (A-4a) and Silt (A-4b) appeared to be derived from sandstone, sandstones with argillaceous laminations and siltstone. Silt and Clay (A-6a) soils appeared to be derived from the underlying shales. Note that native soils were not encountered above the bedrock in Boring R-620. The thickness of severely weathered rock ranged from approximately 3 to 13 feet with sandstones and siltstones typically exhibiting deeper weathered zones than shales.

Generally the bedrock was primarily sandstone with some areas containing argillaceous laminations. Shale and sandstone interbedded with shale was also encountered in Borings

R-622 and R-623, respectively. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	38-100	31-5,314	651-111,594	7,133-10,850	97.9-98.6
Sandstone with varying amounts of Shale interbedding	3	NM	NM	2,142-2,469	64.6-79.8
Sandstone and Shale interbedded	85	394	8,274	NM	NM
Shale	77	NM	NM	1,888	35.7

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.10 Rock Cut #25 (Station 682+25 to Station 698+25)

Borings drilled between stations 682+25 to Station 698+25 indicate the presence of less than three inches of topsoil. Soils encountered by the boreholes were Sandy Silt (A-4a) and Silt and Clay (A-6a). Where soil was encountered, the thicknesses were approximately 3 to 10 feet. Boring R-633 encountered no native soil overlying the bedrock. Severely weathered bedrock, approximately 4 to 12 feet thick, was encountered beneath the soils and consisted of sandstone or shale, similar to the underlying bedrock.

Bedrock generally consisted of sandstone or sandstone with varying amounts of shale interbedding or argillaceous laminations. Interbedded bedrock appeared to be most prominent at elevations above elevation 670 and might be indicative of the boundary between the Pennsylvanian age Breathitt formation and the underlying Mississippian Age Logan formation. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

Seepage was encountered in Boring R-632 at depth of between 17.0 and 22.0 feet. However, no appreciable moisture was present prior to coring. Seepage or measurable water levels were not observed in any other borings drilled for this rock cut prior to rock coring.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	43-100	104-552	2,184-11,592	8,887-10,116	97.2-98.4
Sandstone and Shale interbedded	71-100	35-283	735-5,943	2,069-3,645	13.2-91.4

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.11 Rock Cut #25A (Station 694+75 to Station 697+50)

Rock Cut 25A will be approximately 1500 feet in length. Two borings drilled for this cut indicate that the area was covered with approximately 4 to 8 inches of topsoil at the ground surface. The thicknesses of the soil in this area were between 6 and 8 feet thick. Two soil types were identified, Sandy Silt (A4-a) and Silt and Clay (A-6a). Below the soil layer, 8 to 10 feet of severely weathered sandstone and shale was encountered.

Generally medium hard to hard sandstone was encountered in the higher elevations, approximately elevation 840, and shales and interbedded sandstones and shales below elevation 840. Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	0-100	187-426	3,927-8,946	NM	NM
Shale Sandstone and Shale interbedded	31-90	257-278	5,397-5,838	NM	NM

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.12 Rock Cut #26 (Station 702+00 to Station 714+50)

The topsoil encountered in this rock cut area was generally less than 6 inches thick. Silt and Clay (A-6a) and Sandy Silt (A-4a) were the most common soil types encountered. A small amount of silt (A-4b) was also encountered. However, Boring R-658 encountered no native soil overlying the bedrock. Where soils were present, the thicknesses of the soils were generally between 4 and 10 feet thick. However, Boring R-654 reported a soil thickness of approximately 19 feet. Generally severely weathered bedrock was encountered below the soil and was less than a 10 feet thick.

The dominant rock type in this rock cut area was sandstone. Sandstone with argillaceous laminations and interbedded with shale were the other generalized rock types encountered by the borings. Pennsylvanian age bedrock consisting of mixed facieses sandstones and shales appeared to be present in the upper elevations of Boring R-658. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	0-100	170-1,418	3,570-29,778	6,074-7,969	82.2-99
Sandstone, Sandstone with siltstone containing varying amounts of Shale interbedding	82-100	27-650	567-13,650	5,299-6,752	66.8
Shale	23-100	72-373	1,512-7,833	NM	NM

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.13 Rock Cut #27 (Station 725+00 to Station 745+50)

This area was covered by less than 10 inches of topsoil. Where present, overburden soils were mostly thin, generally less than 10 feet thick. The soils encountered were Sandy Silt (A-4a), Silt and Clay (A-6a), Silty Clay (A-6b), Silt (A-4b) and Coarse and Fine Sand (A-3a). Severely weathered sandstone and shale were present below the soil layer. The thickness of the severely weathered bedrock varied based on formation and parent materials in the area but was generally less than 10 feet in thickness.

Bedrock encountered within the area consisted of bedrock from the Pennsylvanian age Breathitt Formation. The Breathitt Formation was located on the hilltops and was encountered in Boring R-682. This unit was generally soft and contains a mix of sandstones, siltstone, shales and sandstones with varying amounts of shale interbeds. Below the Breathitt Formation is the Logan Formation. The Logan Formation, encountered in Borings R-675, R-677, R-679, R-680, R-682, R-683, R-685 and R-688, generally consisted of durable, hard, very fine to fine grained sandstones with occasional shale interbedding. However, due to depositional variations, sandstones with almost no interbedding were encountered in Borings R-677 and R-688. Moderately weathered to unweathered that contained lower amounts of argillaceous components were typically harder and more durable than those that contained shales and highly interbedded shales and sandstones. Highly weathered interbedded bedrock encountered near the existing ground surface exhibited lowered durability. The ranges of Rock Quality Designation

(RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the rock cores are summarized in the table below.

Seepage was observed in Borings R-672 at a depth of 38 feet and R-675 at depths of 30 and 39 feet. Seepage was not observed in the other borings drilled for this rock cut.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	0-100	49-518	1,029-10,878	8,786-12,043	89.6-98.5
Sandstone with varying amounts of Shale interbedding, Shale and Siltstone	10-100	1-615	21-12,915	5,116-9,517	76.8-80.6

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.14 Rock Cut #28 (Station 753+00 to Station 761+00)

Borings for this rock cut generally encountered less than 6 inches of topsoil. The soils encountered were generally Sandy Silt (A-4a), Silt (A-4b) and Gravel with Sand and Silt (A-2-4) that appeared to be derived from the underlying parent rock. The soils were between 3 and 12 feet thick.

Bedrock encountered in the borings was sandstone containing little argillaceous interbedding. With the exception of the first few feet of decomposed to highly weathered bedrock, the sandstone exhibited good strength and durability. The near surface weathered bedrock generally showed good strength with moderate durability. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone are summarized in the table below.

Seepage was reported in Boring R-703 at a depth of 23 feet. Seepage was not reported in any other borings drilled for this rock cut.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	64-100	165-419	3465-8799	9776	98

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).

6.15 Rock Cut #29 (Station 775+00 to Station 798+50)

Seven borings were drilled between stations 775+00 and 798+50 to characterize the subsurface conditions for this rock cut. Generally, topsoil was found to be less than 6 inches thick. Soils encountered by the boreholes were Sandy Silt (A-4a), Silt (A-4b),

Gravel with Sand and Silt (A-2-4) and Silt and Clay (A-6a). The soil thicknesses varied but were generally less than five feet thick. Borings R-732 and R-734 encountered approximately 5 feet of severely weathered sandstone and shaley sandstone overlying the more competent bedrock.

Bedrock within this proposed rock cut appeared to be from the Breathitt Formation and the Logan Formation. The Breathitt Formation contains a mix of sandstones, shales and shaley sandstones and was found on the hilltops in this area. Borings that encountered the Breathitt Formation were R-731, R-734, R-728 and R-724. When encountered this formation ranged from 20 to 60 feet in thickness. Generally this included the shales, sandstones with interbedded shales and highly weathered sandstones. With few exceptions the Breathitt Formation was found to consist of weaker less durable rocks. Sandstones from the Breathitt Formation preformed the best in quantitative testing of rock cores while the shales and shaley sandstones exhibited lower strength and durability. The Logan formation, located in the rock cut area, consists of sandstones with little to no shale laminations. All of the borings within the limits of the rock cut encountered the Logan Formation. The sandstones from this Logan Formation typically exhibited good strength and durability.

The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the rock cores are summarized in the table below.

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	27-100	14-516	294-10,836	3,562-12,267	90.9-98.8
Sandstone with varying amounts of Shale interbedding	39-82	75-258	1,575-5,418	516-2,858	3.7-18.9
Shale	62	NM	NM	NM	NM

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.16 Rock Cut #30 (Station 779+00 to Station 818+00)

A thin layer of topsoil, less than 4 inches in thickness, generally covered the ground surface in the area of this rock cut. Soil thickness varied significantly from no reported soil in Boring R-747 to approximately 31 feet in Boring R-751. Silt and Clay (A-6a) was the predominant soil type encountered. Sandy Silt (A-4a) and Gravel with Sand and Silt (A-2-4) were encountered less often and occasional occurrences of Silty Clay (A-6b), Clay (A-6a) Silt and Silt (A-4b) were also observed.

A layer of severely weathered was generally encountered below the soil. This weathered rock layer was generally only a few feet thick and rapidly gave way to more competent bedrock below. The primary bedrock in the area was medium hard to hard sandstone. However, weaker sandstones, shales and interbedded sandstone, siltstone and shale from the Breathitt Formation were encountered above elevation 980. However, deeper deposits of shale and interbedded shales and sandstones resulting from variations in depositional environment of the Logan Formation sandstone were also encountered. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

Seepage was observed in Boring, R-751 at depths between 21 to 22.5 feet. Seepage was not observed in the other borings drilled for this rock cut.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	41-100	33-490	693-10,290	2886-15,368	70-98.2
Sandstone with varying amounts of Shale interbedding	13-100	92-407	1,932-8,547	2,933-8,181	78.9
Shale	55-100	335-569	7,035-11,949	NM	NM

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.17 Rock Cut #31 (Station 818+50 to Station 848+50)

The borings within these stations generally encountered up to 5 inches of topsoil underlain by relatively thick soils. The thicknesses of the soil generally ranged between 25 and 35 feet except that Borings R-767 and R-769 encountered soil thicknesses of 6 and 4 feet, respectively. Additionally, Boring R-779 encountered a soil thickness of approximately 42.5 feet. Soil types encountered included Silt and Clay (A-6a), Silt (A-4b), Sandy Silt (A-4a), Silty Clay (A-6b), and Gravel with Sand and Silt (A-2-4) and Clay (A-7-6).

A layer of severely weathered sandstone was typically encountered in the upper 2 feet of the bedrock strata. The competent bedrock encountered by the borings was primarily very fine to fine-grained sandstone with occasionally interbedding of varying amounts of shale. The sandstone was mostly medium hard to hard. Additionally, significant amount of shale beds were also encountered. Where present, shales generally were soft to medium hard depending on the amount of weathering that had occurred and the depth of sandstone interbedding. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the rock cores are summarized in the table below.

Seepage was encountered in Boring R-770 at depths between 21 and 21.5 feet, in Boring R-774 at depths between 8.5 and 10.0 feet, between 18.5 and 20.0 feet and between 26.5

and 27.5 feet, and in Boring R-775 at depths between 7 and 7.5 feet, and 8.5 feet. Seepage was not encountered in any other borings drilled for this rock cut area.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	22-100	14-531	294-11,151	4,932-10,868	86.2-98.2
Sandstone with varying amounts of Shale interbedding	53-100	109-440	2,289-9,240	5,774-7,214	73-79.6
Shale	0-100	109-440	2,415	NM	NM

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).
NM = not measured.

6.18 Rock Cut #32 (Station 853+00 to Station 889+00)

Borings located between stations 818+50 and 848+50 report a thin layer of topsoil of less than 8 inches thick. As in rock cut 31, the soil layers in this rock cut area were generally thicker when compared to other rock cut boreholes in other portions of this project. The thickness of soil overlying the bedrock typically ranged from 20 to 40 feet. In descending order of prevalence, the soils observed in the boreholes were Silt (A-4b), Silt and Clay (A-6a) Silty Clay (A-6b), Sandy Silt (A-4a) and Clay (A-7-6).

Generally the bedrock was primarily sandstone with some areas containing argillaceous laminations. Shale and sandstone interbedded with shale was also observed in the borings. The ranges of Rock Quality Designation (RQD) values, point load strengths, uniaxial compressive strengths, and slake durability indices (SDI) of the sandstone cores are summarized in the table below.

The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Rock Types	RQD, %	Point Load Strengths*, psi	Equivalent Compressive Strengths*, psi	Uniaxial Compressive Strengths**, psi	SDI, %
Sandstone	32-97	195-584	4,095-12,264	1,627-11,268	19.2-99
Sandstone with varying amounts of Shale interbedding	81-96	260-397	5,460-8,337	2,009-10,521	92.8-92.8
Shale	20-100	295-452	6,195-9,492	961-3,534	3.8-54.9

*Point Load Strength (psi) times 21 = Equivalent Compressive Strength, psi.
**Uniaxial Compressive Strengths of selected rock cores by ASTM (D7012-04).

7.0 ROCK EXCAVATION AND CUT SLOPE RECOMMENDATIONS

7.1 Rock Excavation Recommendations

The rippability of the bedrock is estimated to be fair to good for the upper 10 to 15 feet due to its weathered condition. Below the upper 10 to 15 feet of weathered material the rippability is estimated to be poor to fair and rock blasting will be required to achieve the roadway template. Blasting efforts should conform to Item 208 of the current CMS. All blasting operations should also be performed in accordance with applicable federal, state, and local laws and regulations.

7.2 Cut Slope Recommendations

Cut slope recommendations were based upon visual observations of the rock cores obtained, the presence and angles of joints and/or fractures within the cores, depths to bedrock, point load strengths, uniaxial compressive strengths, laboratory SDI, regional and local lithology, results of the field reconnaissance, and DLZ's past experiences. In general, DLZ reviewed the profile and cross-section views of the cuts to determine the likely positions/elevations for bench locations. Benches were typically placed at lithology breaks where a more durable rock overlies a weaker rock unit. Upon identifying the bench positions, the lift height between benches was evaluated and additional benching used, if considered to be appropriate. The details of the cut slope design procedure are presented in Section 5.0 of this report.

In general, sandstone slope angles are recommended to be cut on 0.5H:1V slopes. Severely weathered sandstone should be cut on 1.5H:1V or flatter slopes. Shales, siltstones, clayshales, claystones, and siltshales were typically soft, severely to highly weathered and prone to rapid weathering once exposed and were typically recommended to be cut on 2H:1V slopes.

Specific recommended cut slope configurations are included in Appendix D of this report.

7.3 Groundwater Considerations

Generally, groundwater was not encountered in the unconsolidated materials or severely weathered bedrock along the project alignment except in a few locations. Seepage was generally encountered in thin zones less than 2 to 3 feet thick at the time of the investigation. As a result, large quantities of groundwater are not anticipated in the overburden. The amount seepage in the bedrock could not be readily determined because water was added to core the bedrock. Final water levels reported in the borings reflect water added for coring and are not indicative of the actual groundwater levels. It should be noted that groundwater conditions can change with time, seasonal changes and precipitation. The reported findings represent only the conditions encountered at the time of drilling and may not be indicative of the long-term groundwater conditions. The contractor should be prepared to perform dewatering to maintain reasonably dry

excavations and prepared to deal with unexpected seepage and precipitation entering any excavations. A summary of the groundwater findings is presented below.

Station 543+00 to Station 575+00
A low level of seepage was noted at a depth of 1.0 foot in Borings R-475 and R-480 and no appreciable amount of water was present in these borings prior to coring. On the basis of the field observations, this low level seepage is not anticipated to affect the ground conditions during construction. Seepage was also reported at a depth of 10.5 feet (approximate elevation 785 at Station 573+23.8, 70LT) in Boring R-495 in a gray SILT (A-4a) layer. At the completion of drilling, the water level was observed at a depth of 11.6 feet in the boring. Note that no drilling water was added to this boring. Although the groundwater level appears to be shallow, little, if any, groundwater or seepage is anticipated during construction since this area is in an embankment fill section..

Station 580+50 to Station 597+00
A low level of seepage was noted at depth of 1.0 foot in Borings R-506 and R-509 and no appreciable amount of water was present prior to coring. On the basis of the field observations, this low level seepage is not anticipated to affect the ground conditions during construction.

Station 603+00 to Station 609+00
A low level of seepage was noted at a depth of 1.0 foot in Borings R-521 and R-522 and no appreciable amount of water was present prior to coring. On the basis of the field observations, this low level seepage is not anticipated to affect the ground conditions during construction.

Station 611+50 to Station 616+00
The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Station 619+50 to Station 221+00
The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Station 625+50 to Station 633+50
Seepage was encountered in Boring R-554 (Station 624+86.4, 135LT) at a depth of 16.0 feet (elevation 614). This boring was located in an area outside the rock cut area and was on the down slope of a side hill rock cut that will be filled. As a result, the amount of excavation in this area is expected to be minimal. Little, if any, groundwater or seepage is anticipated during the construction.

Station 637+50 to Station 657+00
The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Station 661+00 to Station 670+50
The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Station 674+50 to Station 681+00
The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Station 682+25 to Station 698+25
Seepage was encountered in Boring R-632 (Station 683+15.8, 172.1 RT) at depths of between 17.0 and 22.0 feet (elevation 945.8 and 942.8). This seepage zone was within the highly weathered sandstone near the surface that will be cut. Seepage through joints or seams in this type of rock formation encountered by the borings is not uncommon. Depending on field conditions during constriction, special sloping and benching may be necessary to control and direct runoff during and after construction.

Station 694+75 to Station 697+50
The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Station 702+00 to Station 714+50
The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Station 725+00 to Station 745+50
Seepage was reported in Boring R-672 (Station 727+35.1, 54.1 RT) at a depth of 38 feet (elevation 778.6) and in Boring R-675 (Station 730+12.3, 95.5 RT) at depths of 30 and 39 feet (elevation 872.5 and 863.5). The seepage zones were within the sandstone of the rock cut. Seepage through joints or seams in this type of rock formations encountered by the borings is not uncommon. Depending on field conditions during constriction, special sloping and benching may be necessary to control and direct runoff during and after construction.

Station 753+00 to Station 761+00
Seepage was reported in Boring R-703 at a depth of 23 feet (Station 759+08.6, 56.3 RT, elevation 914.8). This seepage zone was within the sandstone of the rock cut. Seepage through joints or seams in this type of rock formation encountered by the borings is not uncommon. Depending on field conditions during constriction, special sloping and benching may be necessary to control and direct runoff during and after construction.

Station 775+00 to Station 798+50
The borings did not encounter any water seepage or measurable water levels prior to rock coring.

Station 779+00 to Station 818+00
Seepage was reported in Boring R-751 (Station 810+06.9, 67.9LT) between depths of 21.0 and 22.5 feet (elevation 839.9 and 838.4). This boring was located outside the rock

cut and was on the down slope of the cut that will be filled. As a result, the amount of excavation in this area is expected to be minimal. Little, if any, groundwater or seepage is anticipated during construction.

Station 818+50 to Station 848+50
A low level of seepage was encountered in Boring R-770 (Station 835+09.6, 112.6LT) between depths of 21.0 and 21.5 feet (elevation 838.4 and 837.9), in Boring R-774 (Station 837+16.8, 16.9.6RT) between depths of 8.5 and 10.0 feet (elevation 784.4 and 782.8), between depths of 18.5 and 20.0 feet (elevation 774.3 and 772.8), and between depths of 26.5 and 27.5 feet (elevation 766.3 and 764.8), as well as in Boring R-775 (Station 838+17.4, 74.4RT) between depths of 7.0 and 8.5 feet (elevation 759.4 and 757.9). However, appreciable amounts of water were not present in any of the borings prior to coring. On the basis of the field observations, these low levels of seepage are not anticipated to affect the ground conditions during construction. It is anticipated that any water in the excavations could be removed using common dewatering techniques

Station 853+00 to Station 889+00
The borings did not encounter any water seepage or measurable water levels prior to rock coring.

8.0 COLORADO ROCKFALL SIMULATION PROGRAM (CRSP) ANALYSES

The CRSP requires the input of a number of coefficients concerning the slope geometry, slope material properties, rock material properties and the assumption of rock geometry. In general, the ODOT Geotechnical Bulletin GB-3 "Rock Cut Slope & Catchment Design" was used as a guide for input data and catchment ditch configuration. Input data was also based on field observations and measurements of the existing rock cuts described in Section 3.5 of this report. The number of rocks simulated for the analyses was 500 and the shape of rock was assumed to be discoidal. Note that rounded rocks generally result in greater amounts of rock reaching the roadway since rounded rocks rolling gather a great deal more energy than angular blocks sliding. Based on the observations of the rock cores obtained, it is our opinion that the discoidal rocks can better describe the types of rocks encountered in the borings. The average rock size used in the analyses was a 1-foot tall and 1-foot diameter discoidal rock, while the maximum size used in the analyses was a 1.5-foot tall and 1.5-foot diameter discoidal rock. A summary of the input data for the CRSP analyses is presented in the following table.

Input Data for End of Construction Conditions

Rock Type	Rock Thickness	Rock Diameter	Surface Roughness (S.R.)	Tangential Coefficient (Rt)	Normal Coefficient (Rn)	Rock Density
Hard Sandstone and Siltstone	1.5	1.5	0.15	0.85	0.2	155
Shale	1.5	1.5	0.3	0.75	0.18	140
Sandstone with Shale interbeds	1.5	1.5	0.25	0.75	0.18	145
Hard Sandstone and Siltstone	1	1	0.12	0.85	0.2	155
Shale	1	1	0.15	0.75	0.18	140
Sandstone with Shale interbeds	1	1	0.14	0.75	0.18	145

Input Data for Long-term Conditions

Rock Type	Rock Thickness	Rock Diameter	Surface Roughness (S.R.)	Tangential Coefficient (Rt)	Normal Coefficient (Rn)	Rock Density
Hard Sandstone and Siltstone	1.5	1.5	0.3	0.8	0.18	155
Shale	1.5	1.5	0.6	0.68	0.15	140
Sandstone with Shale interbeds	1.5	1.5	0.5	0.6	0.15	145
Hard Sandstone and Siltstone	1	1	0.21	0.8	0.18	155
Shale	1	1	0.3	0.68	0.15	140
Sandstone with Shale interbeds	1	1	0.28	0.6	0.15	145

Given the existing site conditions and the results of the preliminary CSRP analyses, it appears that a minimum slope height of 80 feet is necessary for any falling rock to reach beyond the catchment ditch. Consequently, the CSRP analysis was performed only for the cut slope of 80 feet or higher along the proposed alignment. A summary of the CRSP analysis results is presented in the following table. The samples of the output from the CRSP analyses are included in Appendix B. A data disk that includes the data for all of the CRSP analysis conducted for these rock cuts is also included in Appendix B.

Rock Cut #	Stations	Left Slope	Right Slope
16	543+00 - 575+00	Passed*	Passed
17	580+50 - 597+00	Not Run, < 80’	Not Run, < 80’
18	603+00 - 609+00	Not Run, < 80’	Not Run, < 80’
19	611+50 - 616+00	Not Run, < 80’	Not Run, < 80’
20	619+50 - 221+00	Not Run, < 80’	Not Run, < 80’
21	625+50 - 633+50	Failed**	Failed
22	637+50 - 657+00	Failed	Failed
23	661+00 - 670+50	Passed	Failed
24	674+50 - 681+00	Passed	Failed
25	682+00 - 697+50	Failed	Failed
25A	682+00 - 697+50	Not Run, < 80’	Failed
26	702+00 - 714+50	Failed	Failed
27	725+00 - 745+50	Not Run, < 80’	Failed
28	753+00 - 761+00	Passed	Passed
29	775+00 - 798+50	Passed	Passed
30	779+00 - 818+00	Failed	Failed
31	818+50 - 848+50	Failed	Failed
32	853+00 - 889+00	Not Run, < 80’	Not Run, < 80’

*Passed = Greater than or equal to 95% rockfall catchment achieved at analysis point 2.
**Failed = Less than 95% rockfall catchment achieved at analysis point 2.

Based on the results of the CRSP analyses, a Type D barrier placed at the edge of the catchment ditch is recommended as a rockfall mitigation measure for the following locations:

Left Slope

Cut	Beginning Station	End Station
21	628+00	630+00
22	649+50	653+50
25	685+50	687+00
26	703+50	709+00
30	801+00	808+50
31	828+00	835+50

	Right Slope	
Cut	**Beginning Station**	**End Station**
21	627+00	631+00
22	638+50	640+00
22	643+50	644+50
22	651+00	654+50
23	663+00	664+50
24	676+00	679+50
25	684+00	688+00
26	704+00	711+00
27	729+00	741+50
30	800+50	802+50
30	803+50	808+00
31	827+50	834+50

9.0 ODOT GENERAL EARTHWORK DESIGN CHECKLIST

The ODOT General Earthwork Design Checklist – Centerline Cuts Checklist is included in Appendix C of this report.

CLOSING REMARKS

We appreciate having the opportunity to be of service to you on this project. Please do not hesitate to call if you have any questions concerning this report.

Respectfully submitted,

DLZ OHIO, INC.

Eric W. Tse, P.E.
Senior Geotechnical Engineer

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Geologist

Brian E. Mott
Senior Geologist, P.G.

BEM/aj/ewt

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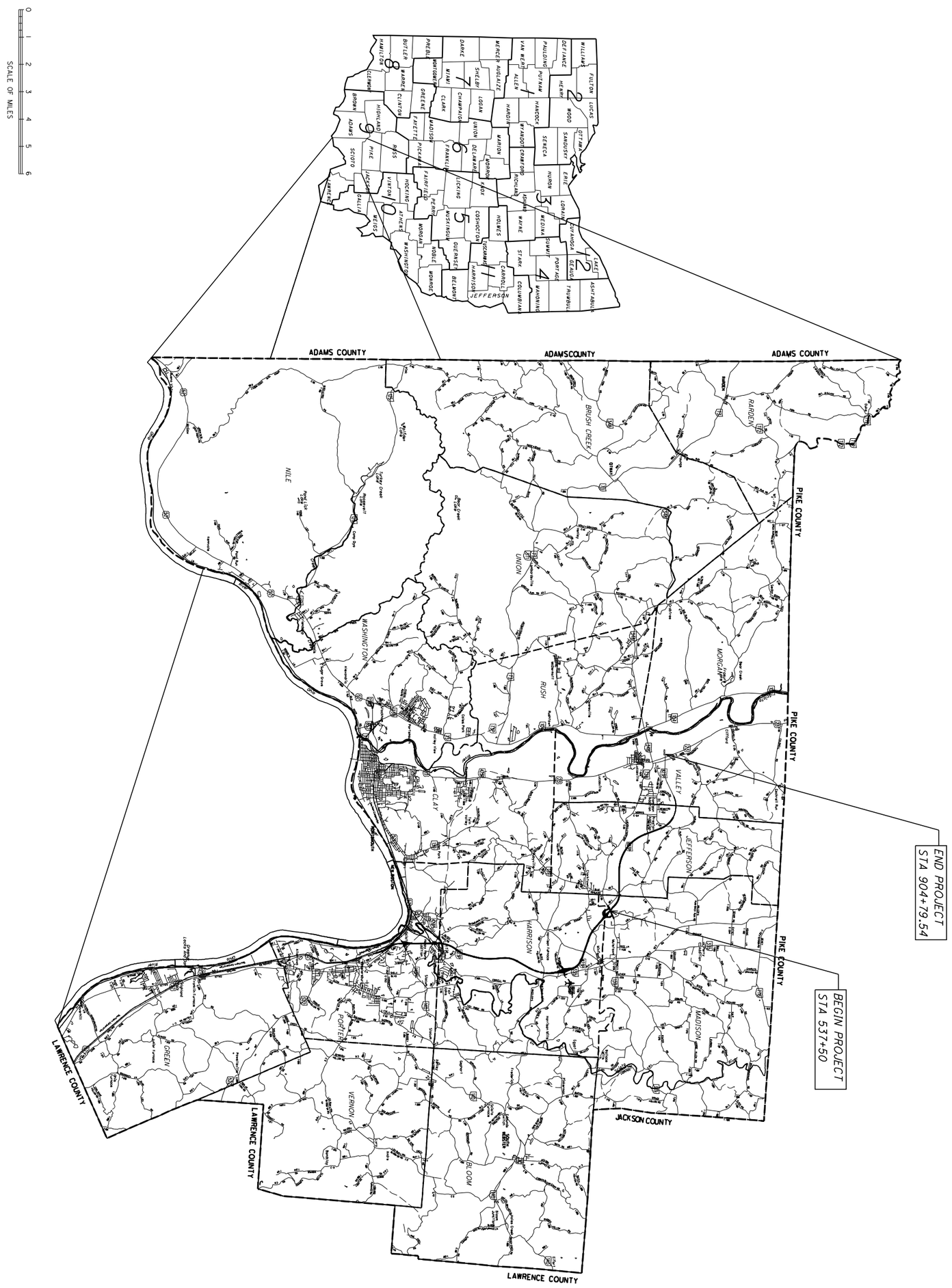
APPENDIX A

Project Location Map
Project Alignment and Boring Plan

Project Location Map



	1 / 1	SCI-823-10.13	LOCATION MAP PORTSMOUTH BYPASS PHASE 2	DRAWN AMJ CHECKED	DLZ

Project Alignment and Boring Plan

APPROXIMATE BEGINNING OF CUT 16
STA. 542+25

℄ S.R. 728

℄ S.R. 823

BEGIN PHASE II
STA. 537+50

C-60
BI201
C-58
BI209
C-59
BI203
BI202
R-467
TRI4
BI204
TRI2
TRI3
TRI1
R-468
R-471
R-469
BI205
C-63
C-62
R-473
R-476
R-478
R-2475
R-482
R-2480
R-484

540+00
545+00
550+00
555+00
560+00

MATCHLINE STA. 562+00 SHEET 2

HORIZONTAL SCALE IN FEET
0 50 100 200

DRAWN RLS
CHECKED AMJ

ROCK CUT BORING PLAN
S.R. 823 STA. 537+50 TO STA. 562+00

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1/15

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HORIZONTAL SCALE IN FEET
0 50 100 200

DRAWN RLS
CHECKED AMJ

ROCK CUT BORING PLAN
S.R. 823 STA. 562+00 TO STA. 578+00

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2 / 15

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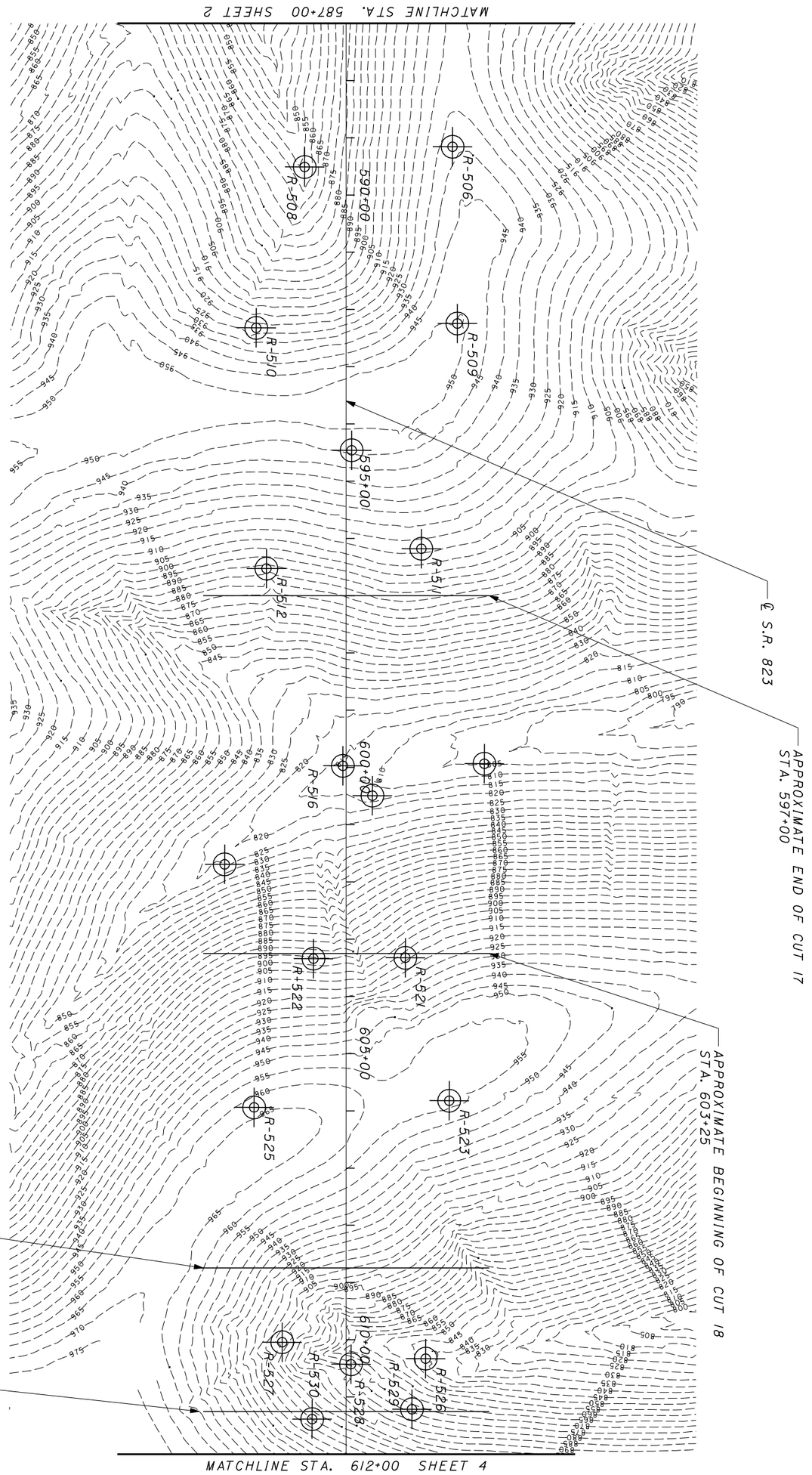

3/15	SCI-823-10.13	ROCK CUT BORING PLAN S.R. 823 STA. 578+00 TO 612+00	DRAWN RLS CHECKED AMJ	0 100 50 200 HORIZONTAL SCALE IN FEET	N

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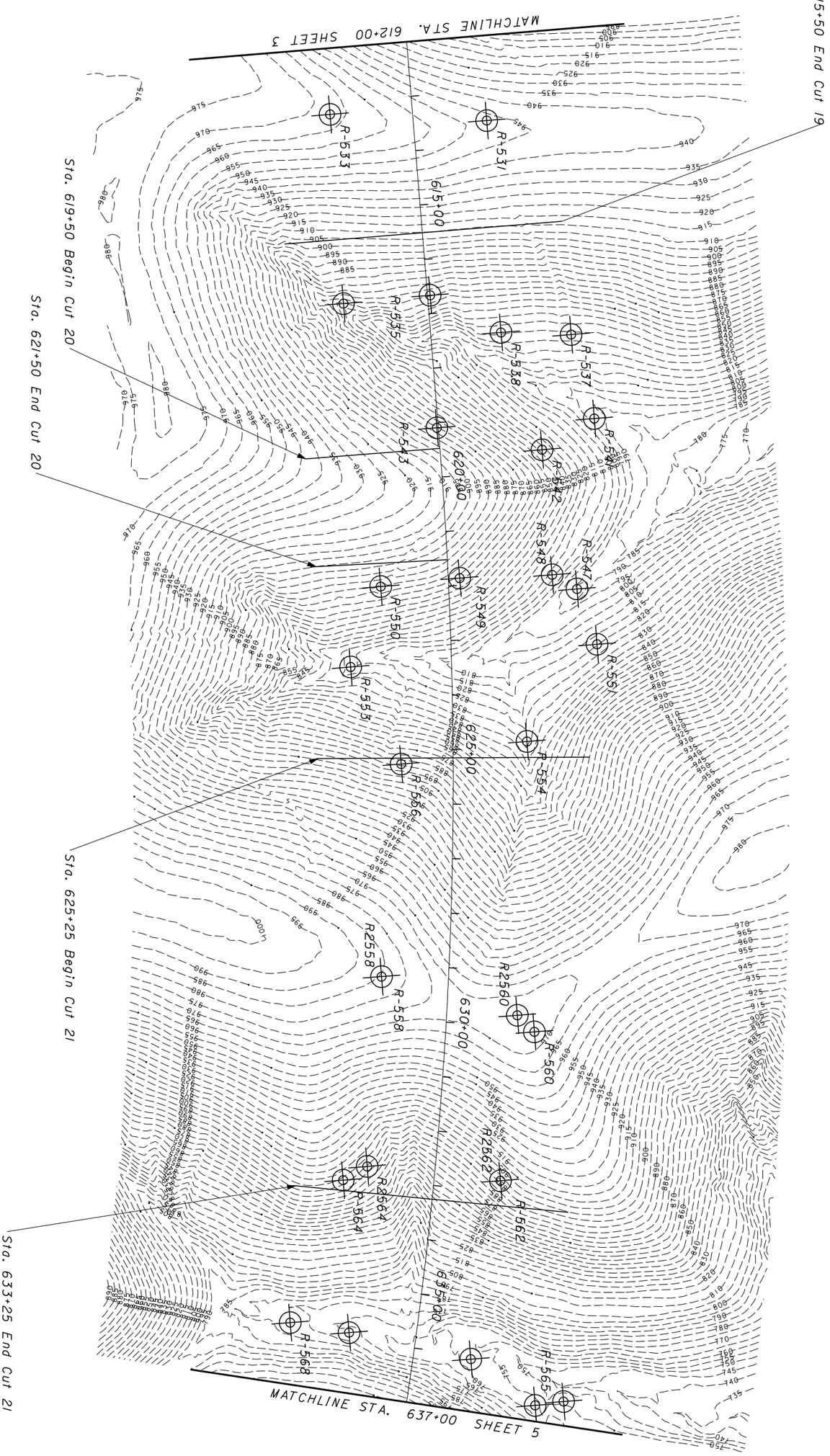

4/15	SCI-823-10.13	ROCK CUT BORING PLAN S.R. 823 STA. 612+00 TO STA. 637+00	CADD DRAWN: RLS CHECKED: AMJ	0 100 50 200 HORIZONTAL SCALE IN FEET	N

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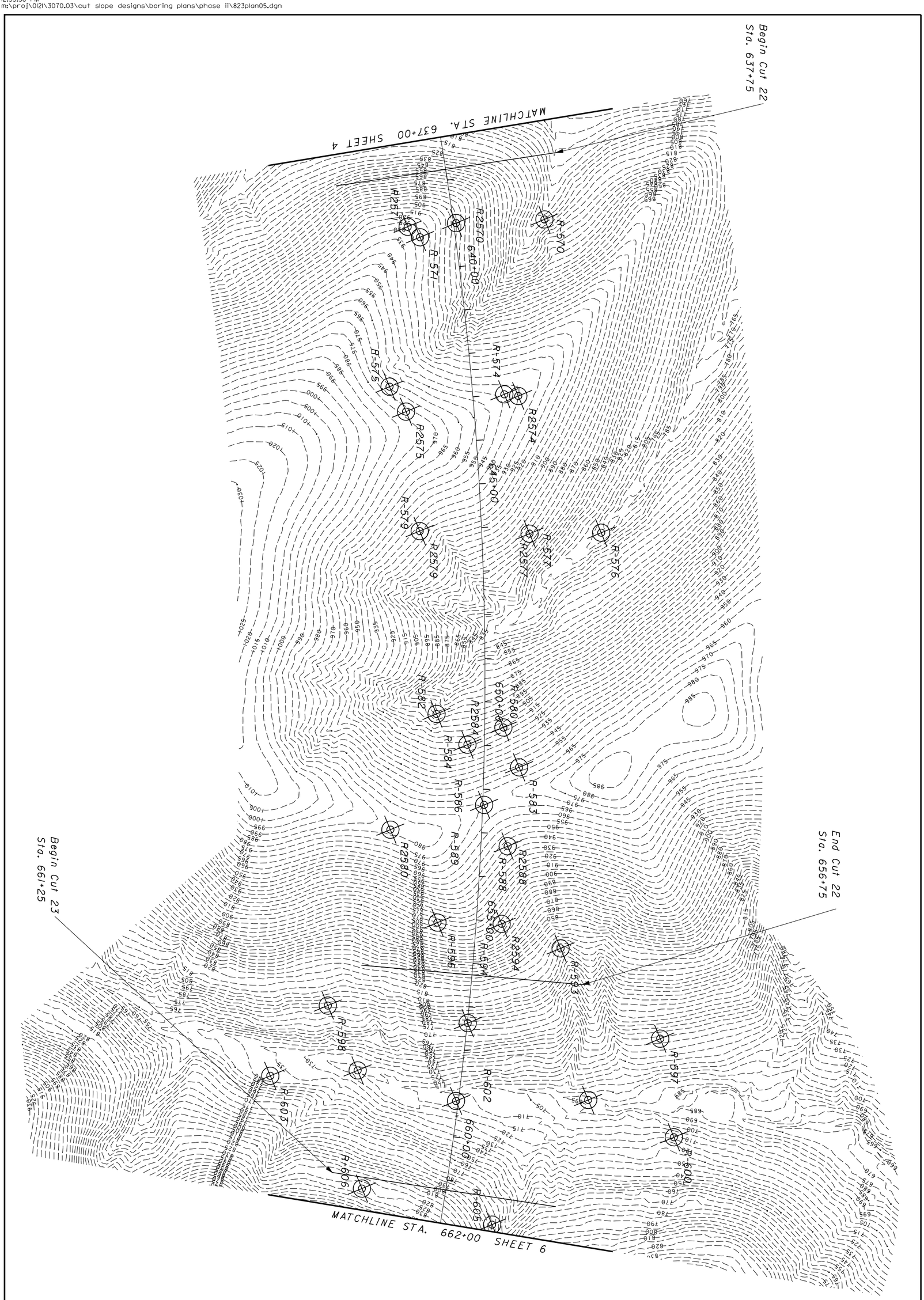

	5/15	SCI-823-10.13	ROCK CUT BORING PLAN S.R. 823 STA. 637+00 TO STA. 662+00	DRAWN RLS CHECKED AMJ	0 100 50 200 HORIZONTAL SCALE IN FEET

End Cut 23
Sta. 661+25

Begin Cut 24
Sta. 674+25

End Cut 24
Sta. 681+25

℄ S.R. 823

R-604
R-606
R-611
R-612
R-618
R-620
R-623
R-624
R-627
R-628
R-629
R-630
R-633
R-635
R2610
R-615
R-610
R-608
R-622
R-626
R-632

665+00
670+00
675+00
680+00
685+00

MATCHLINE STA. 662+00 SHEET 05

MATCHLINE STA. 687+00 SHEET 7

Begin Cut 25
Sta. 689+25

NOTE: SCREENED BORINGS ARE SHOWN ON THE RESPECTIVE RAMP, SIDE ROAD, OR CROSS-SECTION SHEETS.

HORIZONTAL SCALE IN FEET
0 50 100 200

CALCULATED RLS
CHECKED AMJ

ROCK CUT BORING PLAN
S.R. 823 STA. 662+00 TO STA. 687+00

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6 / 15

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APPROXIMATE END OF CUT 25A
STA 697+50

APPROXIMATE BEGINNING OF CUT 25A
STA 694+75

R-639
R-640
R-636
R-641
R-645
R-647
R-648
R-649
R-650
R-652
R-654
R-656
R-658
R-659
R-661

690+00
695+00
700+00
705+00
710+00

MATCHLINE STA. 687+00 SHEET 6

MATCHLINE STA. 712+00 SHEET 8

APPROXIMATE BEGINNING OF CUT 26
STA. 702+25

APPROXIMATE END OF CUT 25
STA. 689+25

HORIZONTAL SCALE IN FEET
0 50 100 200

CALCULATED RLS
CHECKED AMJ

ROCK CUT BORING PLAN
S.R. 823 STA. 687+00 TO STA. 712+00

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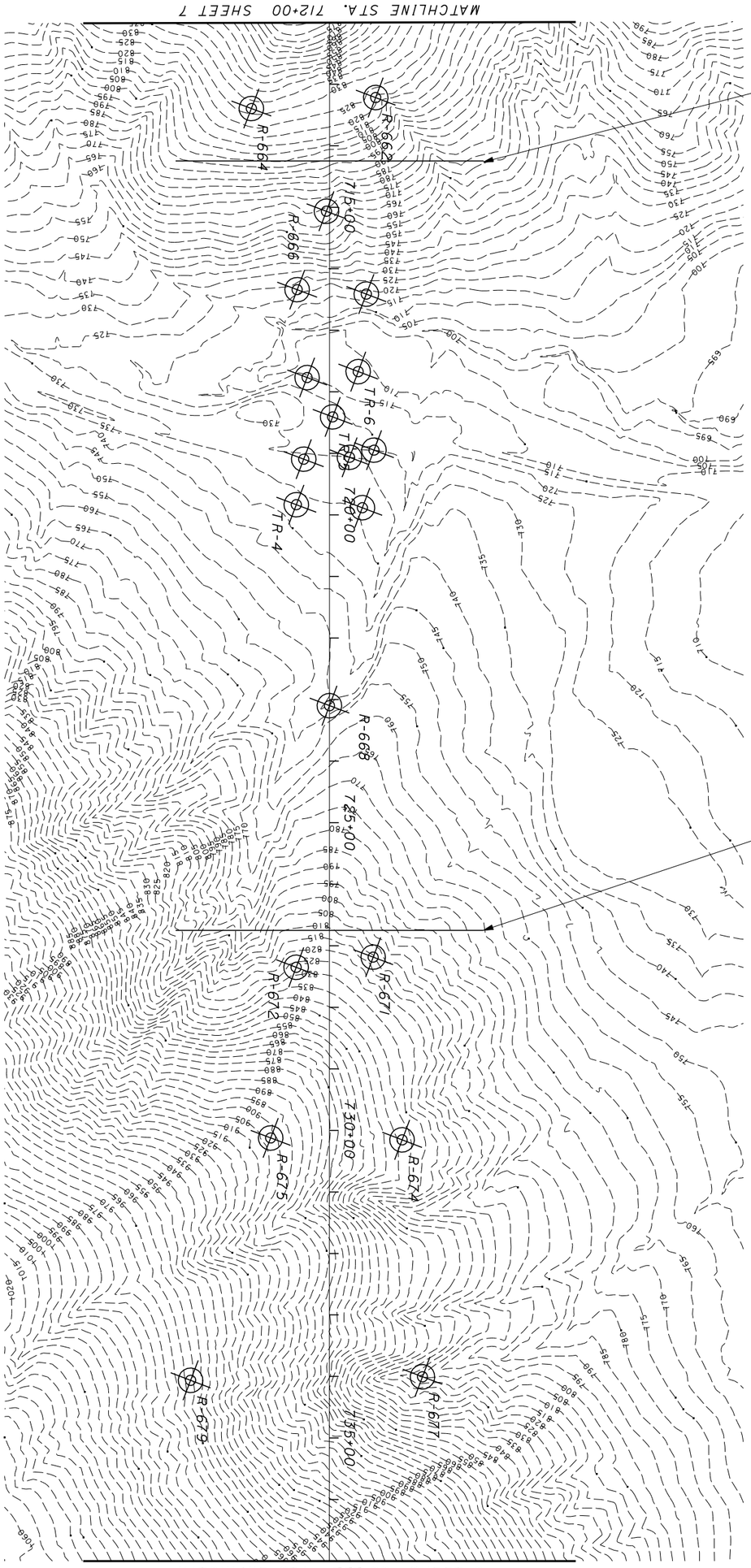

8/15	SCI-823-10.13	ROCK CUT BORING PLAN S.R. 823 STA. 712+00 TO STA. 737+00	CADD/DRAWN: RLS CHECKED: AMJ	0 100 50 200 HORIZONTAL SCALE IN FEET	N

APPROXIMATE END OF CUT 27
STA 745+25

APPROXIMATE END OF CUT 28
STA 760+75

MATCHLINE STA. 737+00 SHEET 8

MATCHLINE STA. 762+00 SHEET 10

B-1702
B-1701
B-1704
B-1703
B-1705
B-1706
B-28
TR-1
B-30
TR-3
B-1707
B-1709
C-108
R-680
R-683
R-686
R-689
R-690
R-694
R-688
R-685
R-682
R-696
R-697
R-701
R-703
R-704
740+00
745+00
750+00
755+00
760+00

APPROXIMATE BEGINNING OF CUT 28
STA 753+25

HORIZONTAL SCALE IN FEET
0 50 100 200

CALCULATED RLS
CHECKED AMJ

ROCK CUT BORING PLAN
S.R. 823 STA. 737+00 TO STA. 762+00

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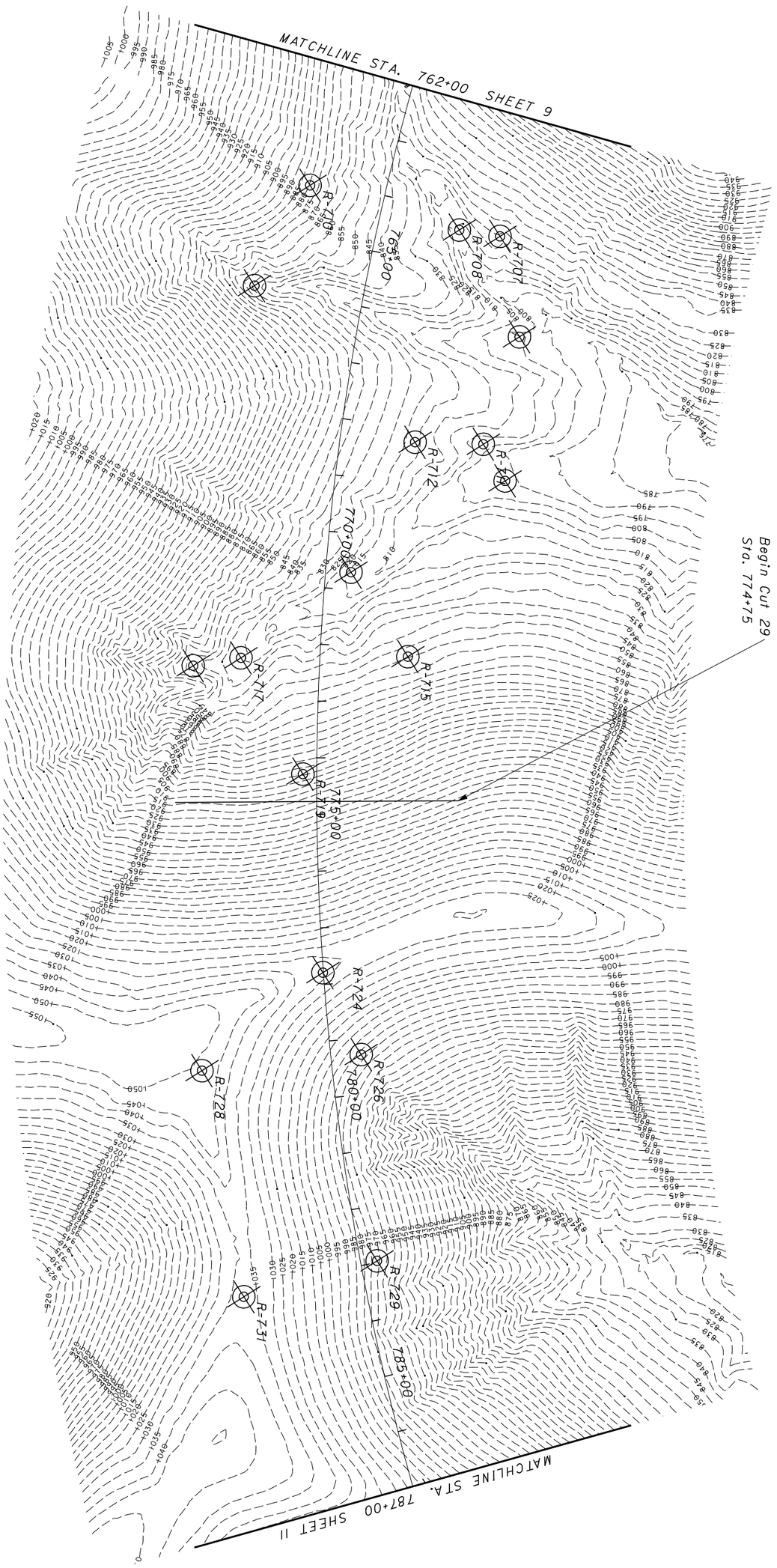

10/15	SCI-823-10.13	ROCK CUT BORING PLAN S.R. 823 STA. 762+00 TO STA. 787+00	DRAWN RLS CHECKED AMJ	0 100 50 200 HORIZONTAL SCALE IN FEET	

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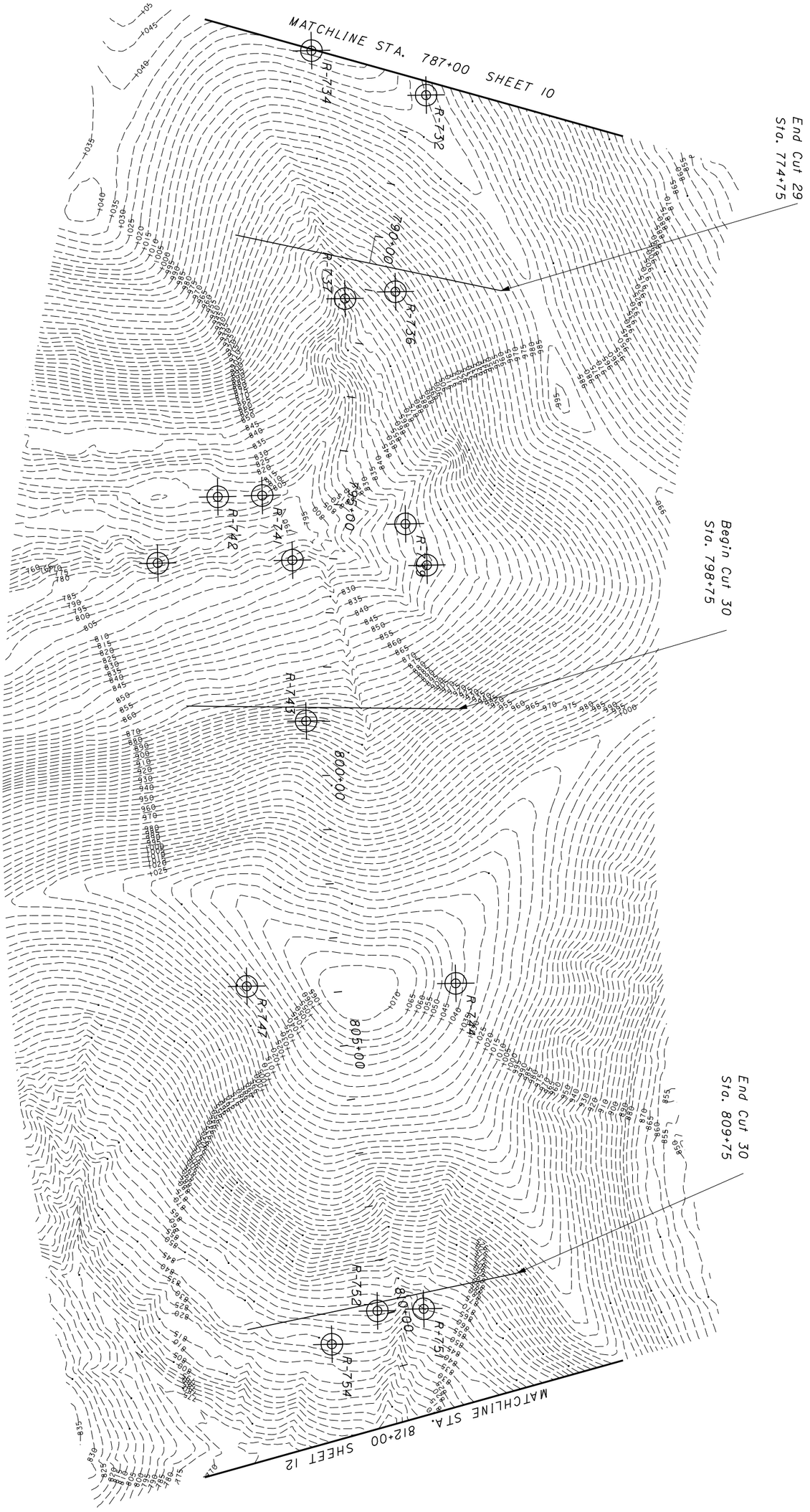

11/15	SCI-823-10.13	ROCK CUT BORING PLAN S.R. 823 STA. 787+00 TO 812+00	DRAWN RLS CHECKED AMJ	0 100 50 200 HORIZONTAL SCALE IN FEET

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	12/15	SCI-823-10.13	ROCK CUT BORING PLAN S.R. 823 STA. 812+00 TO STA. 837+00	DRAWN RLS CHECKED AMJ	0 100 50 200 HORIZONTAL SCALE IN FEET

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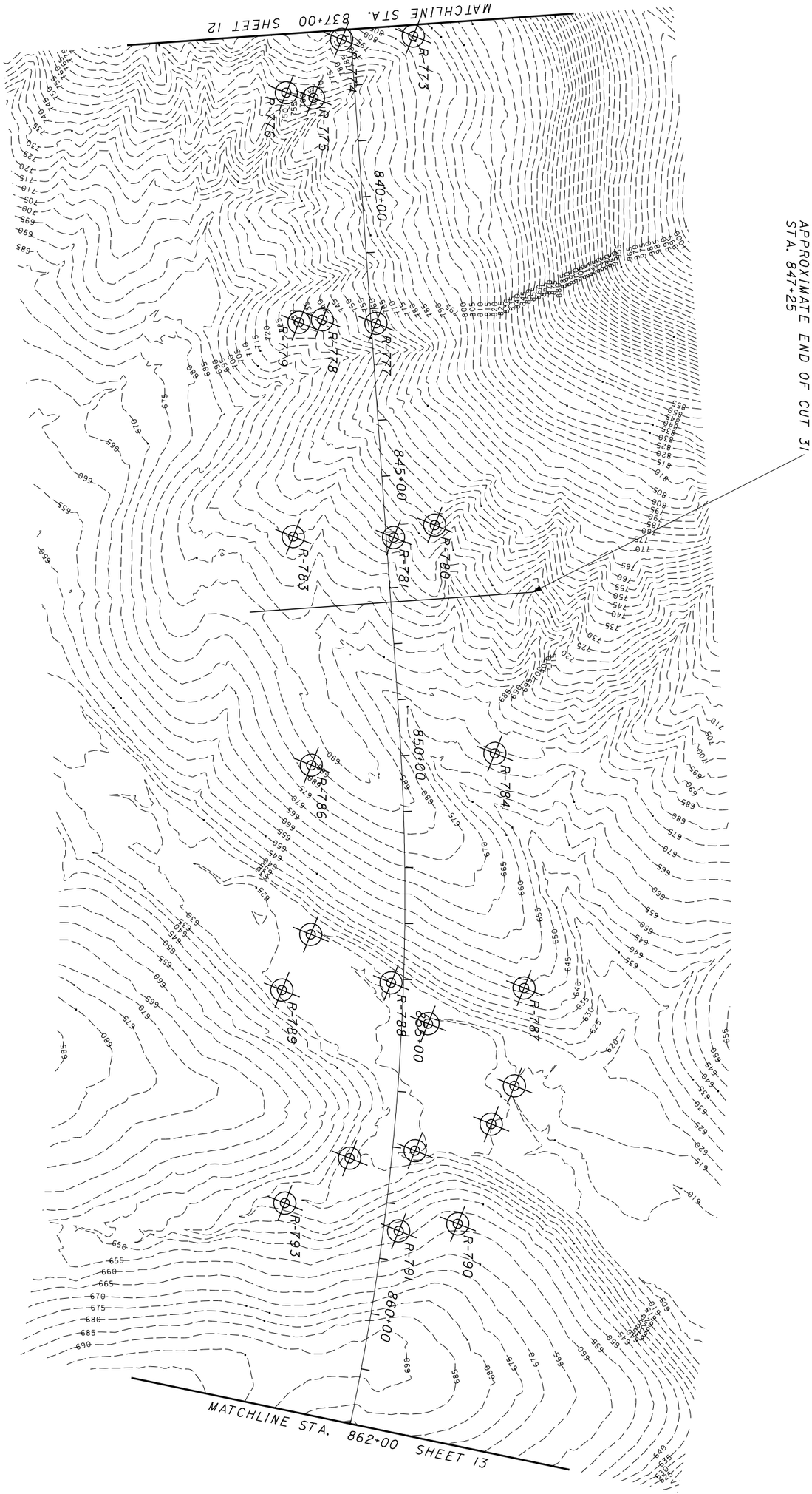

13/15	SCI-823-10.13	ROCK CUT BORING PLAN S.R. 823 STA. 837+00 TO STA. 862+00	DRAWN RLS CHECKED AMJ	0 100 50 200 HORIZONTAL SCALE IN FEET	N

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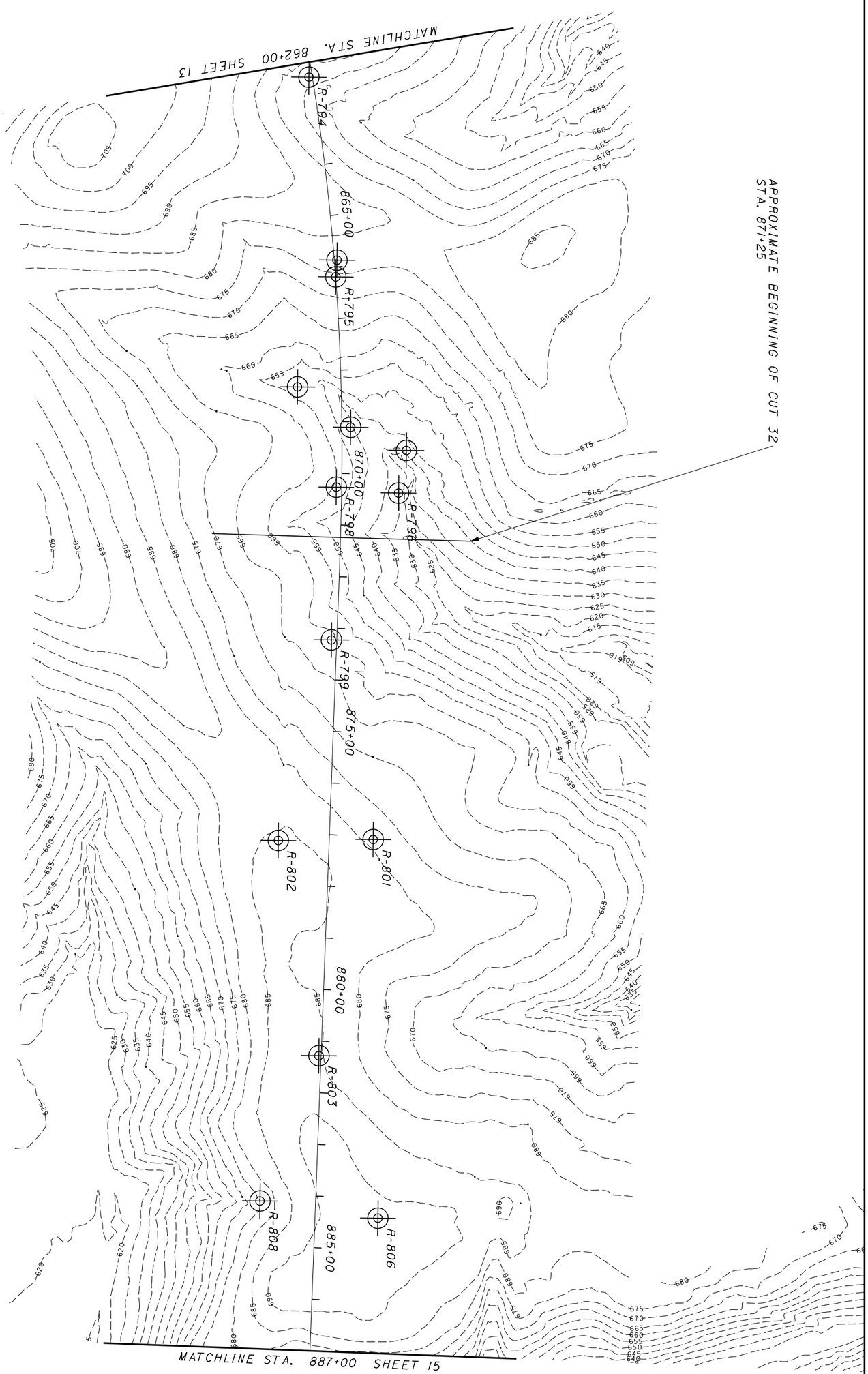

14/15	SCI-823-10.13	ROCK CUT BORING PLAN S.R. 823 STA. 862+00 TO STA. 887+00	DRAWN RLS CHECKED AMJ	0 100 50 200 HORIZONTAL SCALE IN FEET	N

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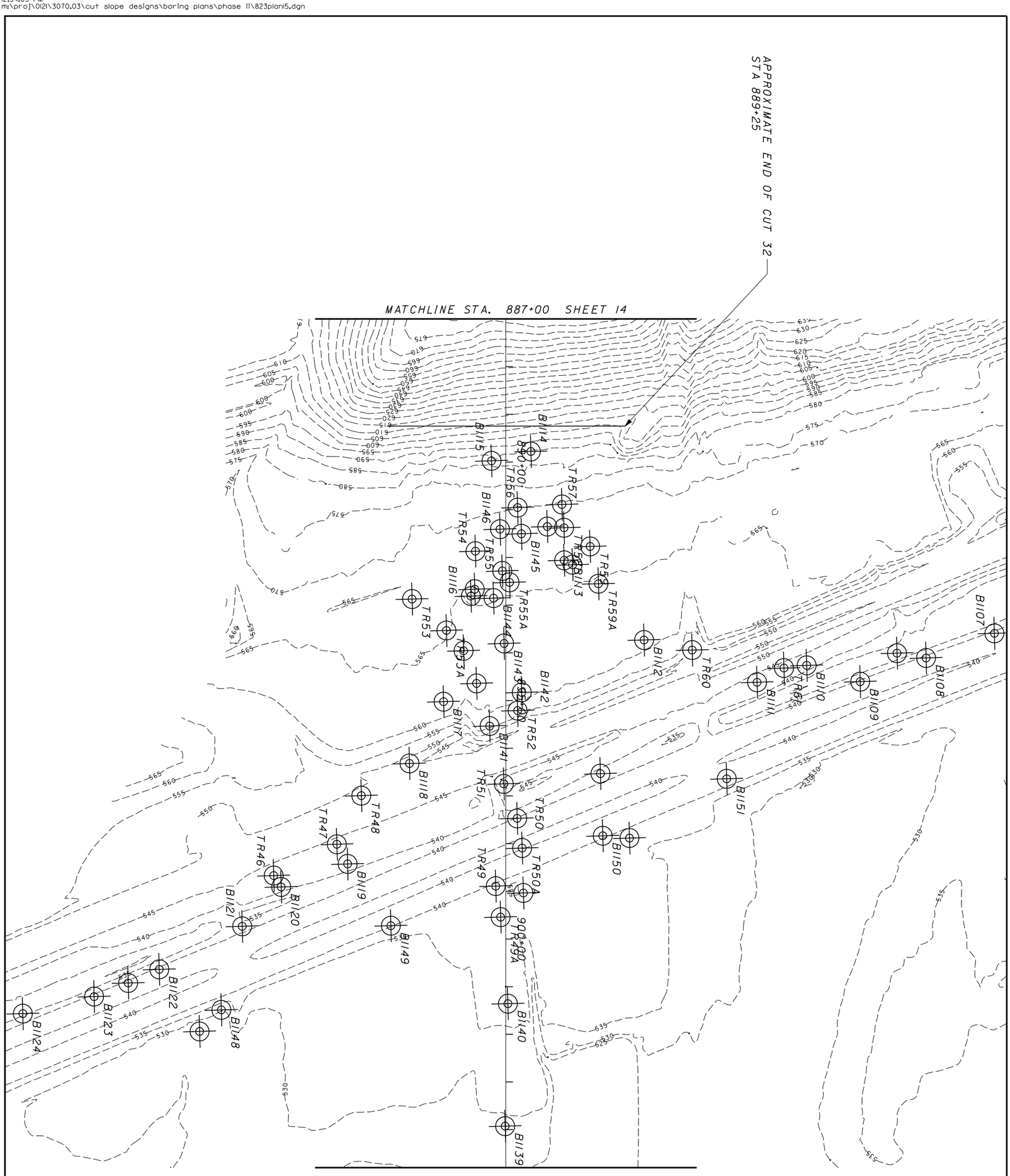


15/15	SCI-823-10.13	ROCK CUT BORING PLAN S.R. 823 STA. 887+00 TO STA. 904+79	DRAWN RLS CHECKED AMJ	0 100 50 200 HORIZONTAL SCALE IN FEET	N

APPENDIX B

Boring Logs
Results of Slake Durability Index and Uniaxial Compressive Tests
Colorado Rock Fall Simulation Analysis Examples & Data Disk

Boring Logs

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-471 | *Location:* Sta. 543+04.7, 2.2 ft. RT of SR 823 CL | *Date Drilled:* 04/21/05 to 04/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
8.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	782.4												
0.7	781.7	3 5 6	18	1		--	Topsoil - 8" Stiff reddish brown SANDY SILT (A-4a), some clay, trace gravel; contains sandstone fragments; damp.						
5		7 13 18	18	2		4.5+	@ 3.5'-5.0', hard brown and gray.	6	9	--	10	50	25
6.0	776.4	5 15 18	18	3			Severely weathered brown and gray SANDSTONE, argillaceous.						
		35 50/4	10	4									
10.0	772.4	Core 24"	Rec 24"	RQD 42%	R-1	*59	Medium hard brown SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, broken to hightly fractured.						
12.0	770.4						Medium hard to hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, laminated to thickly bedded, highly fractured; contains few to moderate argillaceous laminations.						
15		Core 120"	Rec 120"	RQD 65%	R-2	*182							
20													
22.0	760.4						Medium hard gray SANDSTONE; fine grained, moderately weathered, argillaceous, micaceous, thickly bedded, slightly fractured; contains few argillaceous laminations.						
25		Core 96"	Rec 96"	RQD 90%	R-3	*392							
30.0	752.4						Bottom of Boring - 30.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-473 | *Location:* Sta. 547+36.2, 155.7 ft. LT of SR 823 CL | *Date Drilled:* 04/21/05 to 04/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
37.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	855.8												
0.4	855.4						Topsoil - 5"						
		2 4 7	8	1		2.75	Very stiff brown SANDY SILT (A-4a), little clay, trace gravel; contains sandstone fragments; damp.						
3.5	852.3	8 42 50/5	17	2			Severely weathered grayish brown SANDSTONE, argillaceous, rust-stained.						
5													
6.0	849.8	Core 48"	Rec 30"	RQD 18%	R-1		Hard brown SANDSTONE; very fine to fine grained, highly weathered, micaceous, thinly bedded, highly fractured, fractures with rust staining and clay infilling observed; contains few argillaceous laminations.						
10							@ 10.4'-10.6', near vertical fracture.						
14.0	841.8	Core 120"	Rec 120"	RQD 77%	R-2	*187	Medium hard to hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, micaceous, argillaceous, medium bedded to thickly bedded, slightly to moderately fractured, fractures along bedding planes horizontal.						
15							@ 15.7'-15.9', fractured and discolored.						
20							@ 19.1'-22.3', highly fractured and discolored, moderate to highly fractured.						
25		Core 120"	Rec 117"	RQD 65%	R-3	*276							
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-473 | *Location:* Sta. 547+36.2, 155.7 ft. LT of SR 823 CL | *Date Drilled:* 04/21/05 to 04/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
37.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	825.8	Core 120"	Rec 120"	RQD 98%	R-4	*229	Medium hard to hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, micaceous, argillaceous, medium bedded to thickly bedded, slightly to moderately fractured, fractures along bedding planes horizontal. @ 31.5'-33.5', vertical fracture, no infilling.						
35													
40		Core 120"	Rec 120"	RQD 96%	R-5	*144	@ 37.9'-39.2', few to moderate argillaceous laminations.						
45							@ 46.7'-47.4', rust stained high angle fracture.						
50		Core 120"	Rec 120"	RQD 82%	R-6	*240	@ 52.0'-52.2, gray clay seam. @ 52.1'-52.7', vertical fracture. @ 52.7-59.3', rust stained.						
55													
60							@ 58.0'-59.3', broken, high angle fracture.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-473 | *Location:* Sta. 547+36.2, 155.7 ft. LT of SR 823 CL | *Date Drilled:* 04/21/05 to 04/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
37.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
60.0	795.8	Core 120"	Rec 120"	RQD 80%	R-7	*270	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, micaceous, argillaceous, thickly bedded, fractures along bedding planes, near horizontal, moderately fractured with clay infilling.							Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
65							@ 62.8'-80.0', pyritic, thinly laminated to medium bedded; contains few to moderate argillaceous laminations.							
70		Core 120"	Rec 120"	RQD 92%	R-8	*60								
75														
80.0	775.8	Core 12"	Rec 12"	RQD 100%	R-9	*311	Bottom of Boring - 80.0'							
85														
90														

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-475 | *Location:* Sta. 547+07.8, 151.0 ft. RT of SR 823 CL | *Date Drilled:* 04/25/05 to 04/26/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: 7.5' (prior to coring)
16.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	860.4													Natural Moisture Content, % - ● PL ⊢——⊣ LL Blows per foot - ○ 10 20 30 40
0.6	859.8	1 1 2	9	1		0.75	Topsoil - 7" Medium stiff brown SANDY SILT (A-4a), little clay, trace gravel; contains sandstone fragments; damp.							
3.5	856.9	7 11 22	18	2			Severely weathered brown SANDSTONE, argillaceous, rust stained.							
5		14 40 47	16	3										
7.5	852.9	Core 78"	Rec 69"	RQD 51%	R-1	*88	Medium hard brown and gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, medium bedded to thickly bedded, moderately fractured to broken; contains few argillaceous laminations. @ 8.6', rust stained fracture.							87
10														
15		Core 120"	Rec 120"	RQD 71%	R-2	*166								
20							@ 19.7'-19.9', 21.9'-30. 0', high angle rust stained fractures.							
25							@ 24.0', transition to gray.							
30		Core 120"	Rec 117"	RQD 98%	R-3	*359								

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-475 | *Location:* Sta. 547+07.8, 151.0 ft. RT of SR 823 CL | *Date Drilled:* 04/25/05 to 04/26/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: 7.5' (prior to coring)
16.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	830.4						Medium hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, medium bedded to thickly bedded, unfractured to slightly fractured; contains few argillaceous laminations.						
35		Core 120"	Rec 120"	RQD 97%	R-4	*245							
40													
45							@ 46.4'-47.6', high angle rust stained fracture.						
50		Core 120"	Rec 120"	RQD 97%	R-5	*209	@ 49.7'-49.8', argillaceous band.						
55							@ 57.5'-60.1', high angle fracture.						
60		Core 120"	Rec 120"	RQD 96%	R-6	*224							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-475 | Location: Sta. 547+07.8, 151.0 ft. RT of SR 823 CL | Date Drilled: 04/25/05 to 04/26/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: 7.5' (prior to coring)
16.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	800.4						Medium hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, medium bedded to thickly bedded, unfractured to slightly fractured; contains few argillaceous laminations.						
64.0	796.4						Medium hard gray SANDSTONE ; very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, pyritic, slightly fractured; contains few to moderate argillaceous laminations.						
65		Core 120"	Rec 120"	RQD 89%	R-7	*314							
70													
75		Core 72"	Rec 72"	RQD 100%	R-8	*254							
80.0	780.4						Bottom of Boring - 80.0'						
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-476 | *Location:* Sta. 551+29.9, 147.4 ft. LT of SR 823 CL | *Date Drilled:* 04/26/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
6.4' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	890.5												
0.7	889.8	2 2 3	18	1		3.5	Topsoil - 8" Very stiff brown CLAY (A-7-6), "and" silt, trace fine to coarse sand, trace gravel; damp.	6	4	--	3	44	43
3.5	887.0	50/0	0	2			Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, medium bedded to thickly bedded, highly fractured.						
5		Core 84"	Rec 84"	RQD 61%	R-1	*276	@ 5.1'-5.9', rust stained vertical fracture. @ 6.3'-6.8', vertical fracture filled with brown and gray clay.						
10							@ 9.0', clay filled fracture.						
15		Core 120"	Rec 120"	RQD 86%	R-2	*262	@ 13.8', 14.3', clay filled fractures. @ 15.1', clay filled iron stained fracture.						
19.8	870.7						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured to unfractured; contains turbidity bedding in zones.						
25		Core 120"	Rec 120"	RQD 100%	R-3	*534							
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-476 | *Location:* Sta. 551+29.9, 147.4 ft. LT of SR 823 CL | *Date Drilled:* 04/26/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
6.4' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30	860.5						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured to unfractured; contains turbidity bedding in zones.							Natural Moisture Content, % - ● PL ⊢——⊣ LL; Blows per foot - ○ 10 20 30 40
35		Core 120"	Rec 120"	RQD 100%	R-4	*370								
40														
45		Core 120"	Rec 120"	RQD 100%	R-5	*389								
50														
55		Core 120"	Rec 120"	RQD 100%	R-6	*418								
60														

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-476 | *Location:* Sta. 551+29.9, 147.4 ft. LT of SR 823 CL | *Date Drilled:* 04/26/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
6.4' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢—⊣ LL / Blows per foot - ○
60	830.5						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured to unfractured; contains turbidity bedding in zones.							10 20 30 40
65		Core 120"	Rec 120"	RQD 100%	R-7	*258								
70														
75		Core 120"	Rec 120"	RQD 100%	R-8	*238								
80							@ 79.8'-80.5', medium hard to hard, pyritic, contains few argillaceous laminations.							
85		Core 120"	Rec 120"	RQD 100%	R-9	*370								
90														

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-476 | *Location:* Sta. 551+29.9, 147.4 ft. LT of SR 823 CL | *Date Drilled:* 04/26/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
6.4' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	800.5	Core 54"	Rec 54"	RQD 94%	R10	*376	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured to unfractured; contains turbidity bedding in zones. @ 93.8', contains few to moderate argillaceous laminations.						
95.0	795.5						Bottom of Boring - 95.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-478 | *Location:* Sta. 550+94.4, 77.0 ft. RT of SR 823 CL | *Date Drilled:* 04/25/05 to 04/26/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
8.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	854.3													Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ (10 20 30 40)
0.7	853.6	4 2 3	3	1		--	Topsoil - 8" Stiff brown SILT AND CLAY (A-6a), trace fine to coarse sand, little gravel; contains sandstone fragments; damp.							
3.5	850.8	6 46 50/3	15	2			Severely weathered brown and gray SANDSTONE.							50+
5		50/1	1	3										50+
7.0	847.3	Core 60"	Rec 60"	RQD 63%	R-1	*292	Medium hard brown SANDSTONE; highly weathered, argillaceous, micaceous, thickly bedded, highly fractured to broken, contains several high angle fractures.							
10														
12.0	842.3	Core 120"	Rec 120"	RQD 83%	R-2	*357	Medium hard gray SANDSTONE; moderately weathered, argillaceous, micaceous, thickly bedded, highly fractured. @ 12.2', 12.3', 12.6', 13.5', 17.6', low angle, rust stained fractures. @ 12.9'-13.0', high angle fracture.							
15														
17.6	836.7						Medium hard to hard gray SANDSTONE; slightly weathered, argillaceous, micaceous, pyritic, thickly bedded, slightly fractured, contains few argillaceous laminations.							
20														
25		Core 120"	Rec 120"	RQD 100%	R-3	*497								
30														

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-478 | *Location:* Sta. 550+94.4, 77.0 ft. RT of SR 823 CL | *Date Drilled:* 04/25/05 to 04/26/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
8.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	824.3						Medium hard to hard gray SANDSTONE; slightly weathered, argillaceous, micaceous, pyritic, thickly bedded, slightly fractured, contains few argillaceous laminations.						
35		Core 120"	Rec 120"	RQD 100%	R-4	*330							
40													
42.6	811.7						Medium hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured, contains few to moderate argillaceous laminations.						
45		Core 120"	Rec 120"	RQD 88%	R-5	*316							
50							@ 51.6', low angle fracture.						
52.2	802.1						Medium hard to hard gray SANDSTONE; fine grained, slightly weathered, argillaceous, micaceous, pyritic, thickly bedded, slightly fractured, contains few argillaceous laminations.						
55		Core 96"	Rec 96"	RQD 93%	R-6	*356	@ 53.1'-53.7', high angle fracture.						
							@ 58.9', contains moderate argillaceous laminations.						
60.0	794.3						Bottom of Boring - 60.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-480 | *Location:* Sta. 555+20.8, 4.6 ft. LT of SR 823 CL | *Date Drilled:* 04/26/05 to 04/27/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: None (prior to coring)
32.4' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	936.0												
0.4	935.6						Topsoil - 5"						
		WOH 12 2	10	1		1.0	Stiff brown SILT AND CLAY (A-6a), little fine to coarse sand; contains sandstone fragments; damp to moist.	5	5	--	3	62	25
		9 10 9	18	2		4.5+	@ 3.5'-5.0', very stiff to hard.						
5		2 5 9	18	3		3.5							
8.5	927.5	41 50/3	9	4			Severely weathered brown SANDSTONE, argillaceous.						
10													
10.5	925.5	Core 108"	Rec 105"	RQD 62%	R-1	*45	Medium hard light gray to brown SANDSTONE; very fine to fine grained, decomposed to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured to broken, rust staining in fractures; contains numerous high angle fractures.						
15													
19.5	916.5												
20		Core 120"	Rec 120"	RQD 85%	R-2	*244	Soft to medium hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, micaceous, thinly bedded to medium bedded, slightly fractured; contains few to moderate argillaceous laminations.						
25													
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-480 | *Location:* Sta. 555+20.8, 4.6 ft. LT of SR 823 CL | *Date Drilled:* 04/26/05 to 04/27/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: None (prior to coring)
32.4' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	906.0						Soft to medium hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, thinly bedded to medium bedded, slightly fractured, contains few to moderate argillaceous laminations.						
		Core 120"	Rec 120"	RQD 98%	R-3	*68	@ 31.8' to 32.7' contains abundant argillaceous laminations.						
35													
							@ 38.3', rust stained fractures.						
40													
		Core 120"	Rec 120"	RQD 100%	R-4	*337	@ 45.0'-45.1', ironstone band.						
45.1	890.9						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured to unfractured.						
50													
		Core 120"	Rec 120"	RQD 100%	R-5	*389							
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-480 | *Location:* Sta. 555+20.8, 4.6 ft. LT of SR 823 CL | *Date Drilled:* 04/26/05 to 04/27/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: None (prior to coring)
32.4' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	876.0						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured to unfractured.						
65		Core 120"	Rec 120"	RQD 100%	R-6	*347							
70													
75		Core 120"	Rec 120"	RQD 100%	R-7	*382							
80													
85		Core 120"	Rec 120"	RQD 100%	R-8	*417							
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-480 | *Location:* Sta. 555+20.8, 4.6 ft. LT of SR 823 CL | *Date Drilled:* 04/26/05 to 04/27/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: None (prior to coring)
32.4' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	846.0						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured to unfractured.						
95		Core 120"	Rec 120"	RQD 100%	R-9	*398							
100													
105		Core 120"	Rec 120"	RQD 100%	R10	*342							
110													
115		Core 120"	Rec 120"	RQD 100%	R11	*487							
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-480 | *Location:* Sta. 555+20.8, 4.6 ft. LT of SR 823 CL | *Date Drilled:* 04/26/05 to 04/27/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: None (prior to coring)
32.4' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	816.0						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured to unfractured.						
125		Core 120"	Rec 120"	RQD 100%	R12	*366							
130		Core 66"	Rec 66"	RQD 100%	R13	*353							
135.0	801.0						Bottom of Boring - 135.0'						
140													
145													
150													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-482 | *Location:* Sta 558+97.4, 133.9 ft. LT of SR 823 CL | *Date Drilled:* 04/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
4.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	880.2												
0.3	879.9						Topsoil - 4"						
		2 2 15	18	1		2.25	Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand, little gravel; contains sandstone fragments; damp.						
3.5	876.7	9 50/4	10	2			Severely weathered brown SANDSTONE, argillaceous.						
5.0	875.2						Medium hard brown SANDSTONE; fine to medium grained, slightly weathered, argillaceous, micaceous, medium bedded, iron stained fractures.						
7.7	872.5	Core 84"	Rec 84"	RQD 73%	R-1	*407	Hard dark gray SANDSTONE; fine to medium grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured, rust stained fractures.						
12.0	868.2	Core 120"	Rec 120"	RQD 97%	R-2	*341	Medium hard to hard dark gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured to unfractured, @ 14.5'-15.0', rust staining.						
		Core 120"	Rec 120"	RQD 100%	R-3	*391							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-482 | Location: Sta 558+97.4, 133.9 ft. LT of SR 823 CL | Date Drilled: 04/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
4.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL — LL / Blows per foot - ○
30	850.2						Medium hard to hard dark gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured to unfractured,							10 20 30 40
35		Core 120"	Rec 120"	RQD 98%	R-4	*459	@ 37.3'-37.5', argillaceous bands.							
40							@ 39.5', fossiliferous zone.							
45		Core 120"	Rec 120"	RQD 100%	R-5	*468	@ 48.1'-50.8', high angle calcite filled fracture.							
50														
55		Core 120"	Rec 120"	RQD 100%	R-6	*487	@ 58', pyritic.							
60														

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-482 | *Location:* Sta 558+97.4, 133.9 ft. LT of SR 823 CL | *Date Drilled:* 04/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
4.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	820.2						Medium hard to hard dark gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured to unfractured,						
65		Core 96"	Rec 96"	RQD 100%	R-7	*310	@ 66.3', turbidity bedding.						
70.0	810.2						Bottom of Boring - 70.0'						
75													
80													
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-484 | *Location:* Sta. 559+09.2, 167.0 ft. RT of SR 823 CL | *Date Drilled:* 04/27/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
11.4' (ncludes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	919.7												
0.8	918.9	3 6 9	18	1		4.5	Topsoil - 9" Hard mottled brown and gray SANDY SILT (A-4a), some clay, trace gravel; contains sandstone fragments; damp.	5	12	--	8	47	28
5		8 13 20	18	2		4.5+							
6.0	913.7	13 35 45	18	3			Severely weathered brown SANDSTONE, argillaceous.						
		50/5	3	4									
10.0	909.7	Core 24"	Rec 24"	RQD 21%	R-1	*68	Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thinly bedded to medium bedded, highly fractured to broken, contains some clay seams and iron staining in some fractures.						
12.8	906.9						Medium hard to hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, medium bedded to thickly bedded, highly fractured. @ 13.8'-14.0', ferric bed.						
15		Core 120"	Rec 120"	RQD 83%	R-2	*256							
20													
22.0	897.7						Soft to medium hard gray SHALE; highly to moderately weathered, arenaceous, thinly to medium bedded, highly fractured; contains few clay seams and moderate arenaceous laminations.						
25													
26.4	893.3	Core 120"	Rec 120"	RQD 87%	R-3	*356	Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, medium bedded to massive. @ 26.4'-27.2', 29.2'-29.7', rust staining.						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
80
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-484 | *Location:* Sta. 559+09.2, 167.0 ft. RT of SR 823 CL | *Date Drilled:* 04/27/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
11.4' (ncludes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	889.7						Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, highly to moderately weathered.						
32.0	887.7						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, pyritic (halos), thickly bedded to massive, slightly fractured to unfractured.						
35		Core 120"	Rec 120"	RQD 97%	R-4	*385							
40													
45		Core 120"	Rec 120"	RQD 100%	R-5	*415							
50													
55		Core 120"	Rec 120"	RQD 100%	R-6	*408							
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-484 | *Location:* Sta. 559+09.2, 167.0 ft. RT of SR 823 CL | *Date Drilled:* 04/27/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
11.4' (ncludes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	859.7						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, pyritic (halos), thickly bedded to massive, slightly fractured to unfractured.						
65		Core 120"	Rec 120"	RQD 100%	R-7	*365							
70													
75							@ 73.5', 74.8', 75.3', 75.5', low angle fractures.						
		Core 120"	Rec 120"	RQD 98%	R-8	*532							
80													
85													
		Core 120"	Rec 120"	RQD 100%	R-9	*411							
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-484 | *Location:* Sta. 559+09.2, 167.0 ft. RT of SR 823 CL | *Date Drilled:* 04/27/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
11.4' (ncludes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	829.7						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, pyritic (halos), thickly bedded to massive, slightly fractured to unfractured.						
95		Core 96"	Rec 96"	RQD 100%	R10	*510							
100.0	819.7						Bottom of Boring - 100.0'						
105													
110													
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-487 | *Location:* Sta. 563+29.4, 182.9 ft. RT of SR 823 CL | *Date Drilled:* 04/27/05 to 04/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
24.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION
0	923.7						
0.4	923.3						Topsoil - 5"
		2 6 7	14	1		4.5+	Hard brown SILTY CLAY (A-6b), little fine to coarse sand; contains sandstone fragments; damp.
3.5	920.2	16 12 18	17	2			Severely weathered grayish brown SANDSTONE, argillaceous.
5		20 42 50/5	17	3			
		16 50/3	9	4			
10.0	913.7	Core 120"	Rec 118"	RQD 59%	R-1		Medium hard light brown SANDSTONE; fine grained, highly weathered to decomposed, argillaceous, micaceous, thinly bedded to medium bedded, highly fractured, rust staining in fractures. @ 11.6',15.7',17.3', low angle fractures. @ 14.3',19.2', high angle fractures.
15							
20							@ 22.7',25.0', low angle fractures with rust staining. @ 23.3'-23.8', ferric band.
24.3	899.4	Core 120"	Rec 120"	RQD 72%	R-2		Medium hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, laminated to medium bedded, moderately fractured, contains few to moderate argillaceous laminations. @ 29.8'-30.2', gray shale seam, arenaceous.
25							
30							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-487 | *Location:* Sta. 563+29.4, 182.9 ft. RT of SR 823 CL | *Date Drilled:* 04/27/05 to 04/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
24.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢—⊣ LL / Blows per foot - ○ (10 20 30 40)
30.2	893.5						Hard brown SANDSTONE ; very fine to medium grained, highly weathered, argillaceous, micaceous, massive, slightly fractured to unfractured, some gypsum in vugs.							
35		Core 120"	Rec 120"	RQD 93%	R-3									
36.5	887.2						Hard gray SANDSTONE; fine to medium grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured to unfractured; contains zones of turbidity bedding.							
40							@ 40.2', pyritic.							
45		Core 120"	Rec 118"	RQD 98%	R-4									
50														
55		Core 120"	Rec 120"	RQD 100%	R-5									
60														

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-487 | *Location:* Sta. 563+29.4, 182.9 ft. RT of SR 823 CL | *Date Drilled:* 04/27/05 to 04/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
24.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	863.7						Hard gray SANDSTONE; fine to medium grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured to unfractured; contains zones of turbidity bedding.						
65		Core 120"	Rec 120"	RQD 100%	R-6								
70													
75		Core 120"	Rec 119"	RQD 99%	R-7								
80													
85		Core 120"	Rec 120"	RQD 100%	R-8		@ 87.8', rust staining.						
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-487 | *Location:* Sta. 563+29.4, 182.9 ft. RT of SR 823 CL | *Date Drilled:* 04/27/05 to 04/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
24.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	833.7	Core 60"	Rec 60"	RQD 100%	R-9		Hard gray SANDSTONE; fine to medium grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured to unfractured; contains zones of turbidity bedding. @ 93.0', rust staining.						
95.0	828.7						Bottom of Boring - 95.0'						
100													
105													
110													
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

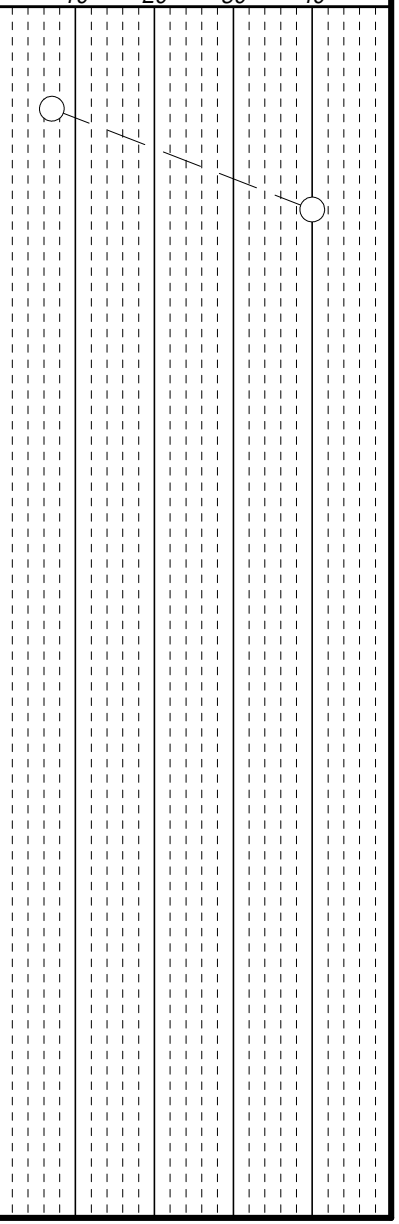
Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-488 | *Location:* Sta. 567+22.7, 76.8 ft. LT of SR 823 CL | *Date Drilled:* 04/28/05 to 05/02/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
4.1' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	866.0												
0.5	865.5						Topsoil - 6"						
		1 1 6	18	1		1.5	Stiff brownish gray SANDY SILT (A-4a), little clay, trace gravel; contains roots and twigs; moist.						
3.5	862.5												
		6 19 21	18	2			Severely weathered brown SANDSTONE, argillaceous.						
5													
6.0	860.0						Medium hard to hard brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded, moderately to highly fractured, rust staining.						
10		Core 96"	Rec 96"	RQD 67%	R-1	*274	@ 6.6'-6.8', high angle fracture. @ 11.1', gray with brown seams.						
15													
20		Core 120"	Rec 120"	RQD 86%	R-2	*241	@ 15.8', rust stained fracture. @ 16.2', high angle fracture, rust stained. @ 17.2',18.4', high angle fractures. @ 17.5',19.5', silt filled fractures. @ 18.5'-19.0', broken zone, vuggy, ironstone.						
25							@ 21.5', siltstone interbeds, thinly laminated. @ 22.3', gray, slightly weathered, slightly fractured.						
30		Core 120"	Rec 120"	RQD 100%	R-3	*373	@ 24.9'-26.0', siltstone interbeds, thinly laminated.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-488 | *Location:* Sta. 567+22.7, 76.8 ft. LT of SR 823 CL | *Date Drilled:* 04/28/05 to 05/02/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
4.1' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	836.0						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, massive, slightly fractured, rust staining.						
35							@ 34.0'-35.6', brownish gray.						
		Core 72"	Rec 72"	RQD 100%	R-4	*419	@ 37.0', slightly to moderately fractured, slightly weathered.						
40.0	826.0						Bottom of Boring - 40.0'						
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-490 | *Location:* Sta. 567+32.8, 150.2 ft. RT of SR 823 CL | *Date Drilled:* 04/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
60.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	902.0												
0.3	901.7						Topsoil - 3"						
		WOH 2 2	6	1		3.5	Very stiff to hard brown SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; damp.						
		4 8 14	15	2		4.5+							
5													
6.0	896.0	50/1	1	3			Severely weathered brown SANDSTONE, argillaceous.						
7.0	895.0						Medium hard to hard brown and gray SANDSTONE, very fine to fine grained, argillaceous, micaceous, thick to medium bedded, moderately to highly weathered, moderately fractured.						
10		Core 96"	Rec 96"	RQD 78%	R-1	*170	@ 9.9'-10.5',26.0', iron stained high angle fractures. @ 7.0'-13.0',15.0'-19.8',20.2'- 30.0', highly fractured.						
15							@ 13.9',18.6',18.8',19.3',20.8', 21.1', iron stained low angle fractures.						
20		Core 120"	Rec 120"	RQD 78%	R-2	*198							
25							@ 24.5', clay seam. @ 25.4',25.7',25.8', filled low angle fractures.						
26.0	876.0						Hard gray SANDSTONE; very fine to fine grained, argillaceous, micaceous, thick to massive bedding, slightly weathered, slightly fractured to unfractured.						
30		Core 120"	Rec 120"	RQD 88%	R-3								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-490 | *Location:* Sta. 567+32.8, 150.2 ft. RT of SR 823 CL | *Date Drilled:* 04/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
60.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	872.0					*421	Hard gray SANDSTONE; very fine to fine grained, argillaceous, micaceous, thick to massive bedding, slightly weathered, slightly fractured to unfractured.						
35													
40		Core 120"	Rec 117"	RQD 98%	R-4	*342							
45													
50		Core 120"	Rec 120"	RQD 100%	R-5	*418	@ 49.4'-49.6', ferric bands.						
55													
60		Core 120"	Rec 120"	RQD 79%	R-6		@ 57.0'-59.1',60.0'-62.0', several rust stained high angle fractures.						

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-490 | *Location:* Sta. 567+32.8, 150.2 ft. RT of SR 823 CL | *Date Drilled:* 04/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
60.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	842.0					*358	Hard gray SANDSTONE; very fine to fine grained, argillaceous, micaceous, thick to massive bedding, slightly weathered, slightly fractured to unfractured.						
65							@ 66.3'-69.2', brown, pyritic, highly fractured. @ 67.1'-67.7',68.7'-69.2', rust stained high angle fractures.						
70		Core 120"	Rec 117"	RQD 94%	R-7	*326							
75.0	827.0						Bottom of Boring - 75.0'						
80													
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-492 | *Location:* Sta. 571+01.2, 26.4 ft. LT of SR 823 CL | *Date Drilled:* 04/28/05 to 05/02/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
4.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	836.4													
0.5	835.9	4 24 25	18	1			Topsoil - 6" Severely weathered brown SANDSTONE, argillaceous.							
		50/4	4	2										50+
5.0	831.4	Core 84"	Rec 84"	RQD 75%	R-1	*149	Medium hard to hard brown SANDSTONE; very fine to fine grained, decomposed to highly weathered, argillaceous, micaceous, thickly bedded, moderately to highly fractured.							
10														
10.4	826.0						Hard brownish gray SANDSTONE; fine grained, slightly weathered, argillaceous, micaceous, pyritic, thickly bedded, slightly fractured.							
12.8	823.6	Core 96"	Rec 96"	RQD 59%	R-2	*214	Medium hard brown SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, thickly bedded, slightly fractured. @ 14.7', low angle fracture.							
15														
16.7	819.7						Medium hard gray SANDSTONE; fine grained, highly to moderately weathered, argillaceous, micaceous, thickly bedded, highly to moderately fractured; contains few argillaceous laminations.							
20.0	816.4						Bottom of Boring - 20.0'							
25														
30														

STANDARD PENETRATION (N): Natural Moisture Content, % - ● PL ⊢⊣ LL; Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

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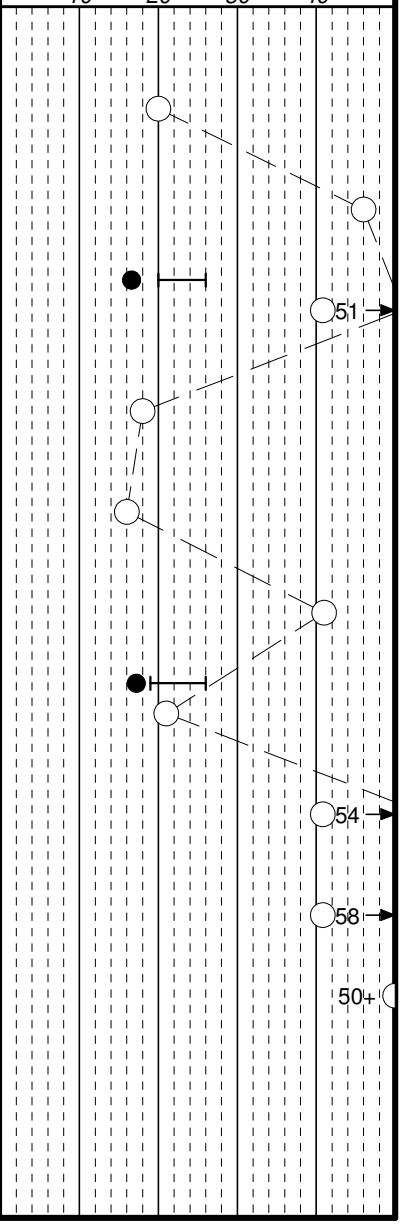
Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-494 | *Location:* Sta. 572+28.8, 0.6 ft. RT of SR 823 CL | *Date Drilled:* 05/02/05 to 05/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
2.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	807.0												
0.3	806.7						Topsoil - 3"						
		3 5 15	18	1		3.75	Very stiff to hard brown SILT (A-4b), little to some clay, trace to little fine to coarse sand, trace to little gravel; contains sandstone fragments; damp.						
		14 21 25	18	2		4.5+	@ 3.5'-7.5', contains pockets of rusty material.						
5		10 30 21	18	3		4.5+		16	9	--	6	52	17
		4 8 10	18	4		4.25							
10		7 7 9	18	5		3.0							
		6 20 21	18	6		2.75							
15		3 10 11	18	7		4.0		9	2	--	6	63	20
		11 19 35	18	8		4.5+	@ 18.5', reddish brown.						
20		25 27 31	18	9		4.5+							
		22 50/2	8	10		4.5+							
25		Core 60"	Rec 8"	RQD 0%	R-X		@ 25.0'-25.7', sandstone boulder. @ 25.7'-30.0', washed out clay.						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-494 | *Location:* Sta. 572+28.8, 0.6 ft. RT of SR 823 CL | *Date Drilled:* 05/02/05 to 05/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
2.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30	777.0	50/3	3	11		4.5+	Hard brown SILT (A-4b), little to some clay, trace to little fine to coarse sand, trace to little gravel; contains sandstone fragments; damp.							50+
		25 50/2	8	12		4.5+								50+
35														
38.5	768.5	50/2	2	13			Severely weathered gray SHALE, arenaceous.							50+
40.0	767.0	Core 60"	Rec 60"	RQD 100%	R-1		Medium hard dark gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly fractured, contains few to moderate argillaceous laminations.							
45.0	762.0						Bottom of Boring - 45.0'							
50														
55														
60														

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-495 | *Location:* Sta. 573+23.8, 69.5 ft. LT of SR 823 CL | *Date Drilled:* 05/03/05

WATER OBSERVATIONS:
Water seepage at: 10.5'
Water level at completion: 22.2' (prior to coring)
22.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	795.2												
0.3	794.9						Topsoil - 4"						
		3 3 5	18	1		2.25	Very stiff to hard brown and gray SILT (A-4b), little to some clay, trace to little fine to coarse sand, trace gravel; contains sandstone fragments; contains rust stains; damp.						
		4 8 12	18	2		3.75							
5		6 9 10	18	3		4.5+							
		6 8 8	18	4		2.25		0	1	--	3	79	17
10		12 35 37	11	5		3.75							
		10 14 18	18	6		4.0							
15		11 15 16	18	7		4.25							
18.5	776.7	15 50/2	8	8			Severely weathered brown SANDSTONE, argillaceous.						
20		50/2	2	9									
		14 50/2	8	10									
25		50/5	5	11			@ 26.0', gray.						
		50/5	5	12									
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

72 →
50+
50+
50+
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-495 | *Location:* Sta. 573+23.8, 69.5 ft. LT of SR 823 CL | *Date Drilled:* 05/03/05

WATER OBSERVATIONS:
Water seepage at: 10.5'
Water level at completion: 22.2' (prior to coring)
22.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30	765.2						Severely weathered gray SANDSTONE, argillaceous.							
33.8	761.4	50/4	4	13			Bottom of Boring - 33.8'							50+
35														
40														
45														
50														
55														
60														

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-497 | *Location:* Sta. 573+16.6, 3.8 ft. RT of SR 823 CL | *Date Drilled:* 05/03/05 to 05/04/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
5.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	808.0												
0.3	807.7						Topsoil - 3"						
		4 7 7	18	1		2.5	Very stiff to hard brown SILTY CLAY (A-6b), trace gravel, trace fine to coarse sand; contains sandstone fragments; contains rust stains; damp.						
		8 14 16	18	2		4.5		7	1	--	5	56	31
5													
5.5	802.5						Severely weathered reddish brown SANDSTONE, argillaceous.						
		15 26 34	18	3									
		12 19 24	18	4									
10													
		19 24 27	18	5									
		14 50/5	11	6									
15													
		35 50/2	8	7									
		25 50/3	9	8									
20													
		50/1	1	9			@ 21.0', gray.						
22.0	786.0						Medium hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly to moderately fractured, contains few argillaceous laminations.						
		Core 60"	Rec 60"	RQD 98%	R-1								
25													
27.0	781.0						Bottom of Boring - 27.0'						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
60
51
50+
50+
50+
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-498 | *Location:* Sta. 574+13.5, 63.6 ft. LT of SR 823 CL | *Date Drilled:* 05/04/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to adding water)
3.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	801.1													
0.4	800.7						Topsoil - 5"							
		3 3 4	18	1		2.0	Very stiff to hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp to moist.							
		9 13 16	18	2		4.5+		1	9	--	10	48	32	
5														
6.0	795.1	27 50/2	8	3		4.5+	Severely weathered brown SANDSTONE, argillaceous. @ 8.5', water added.							50+
		20 40 50/5	17	4										50+
10														
		43 50/3	9	5										50+
12.0	789.1						Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, moderately to highly weathered, thickly bedded, highly fractured to broken.							
15		Core 96"	Rec 96"	RQD 86%	R-1									
20.0	781.1						Bottom of Boring - 20.0'							
25														
30														

Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-499 | *Location:* Sta. 574+08.3, 38.3 ft. RT of SR 823 CL | *Date Drilled:* 05/04/05 to 05/05/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
3.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION
0	822.9						
0.5	822.4						Topsoil - 6"
		6 6 17	18	1			Severely weathered brown SANDSTONE, argillaceous, rust stained.
		18 46 50/5	17	2			
5.0	817.9						Medium hard light gray/orange SANDSTONE; fine grained, highly weathered to decomposed, slightly fractured.
6.2	816.7						Medium hard light brown SANDSTONE; very fine to fine grained, slightly to highly weathered to decomposed, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured to broken.
		Core 84"	Rec 84"	RQD 62%	R-1		
10							@ 10.6', contains moderate argillaceous laminations.
12.0	810.9						Very soft to medium hard brownish yellow SANDSTONE; fine grained, decomposed, broken, argillaceous, micaceous.
15		Core 96"	Rec 22"	RQD 6%	R-2		
							@ 19.0', lost recovery.
20.0	802.9						Medium hard dark gray SANDSTONE interbedded with SHALE; fine grained, moderately to highly weathered, argillaceous, micaceous, laminated, slightly to moderately fractured.
25		Core 120"	Rec 90"	RQD 75%	R-3		
30.0	792.9						Bottom of Boring - 30.0'

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-500 | *Location:* Sta. 574+21.7, 117.8 ft. RT of SR 823 CL | *Date Drilled:* 05/04/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
4.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	801.5												
0.8	800.7	3 6 7	18	1		4.5	Topsoil - 10" Hard brown SILTY CLAY (A-6b), little to some fine to coarse sand, trace gravel; contains rust stains; damp.						
5		10 16 21	18	2		4.5+		9	12	--	9	40	30
		15 50/3	9	3		4.5+							
8.0	793.5	50/5	2	4			Severely weathered brownish gray SANDSTONE argillaceous.						
10.0	791.5	Core 120"	Rec 107"	RQD 87%	R-1		Medium hard brown and gray SANDSTONE, very fine to fine grained, thinly to medium bedded, fractured along bedding planes, decomposed to highly weathered, contains few to moderate argillaceous laminations. @ 10.0'-10.1', broken zone. @ 10.4',10.5', low angle rust stained fractures. @ 11.9'-13.4', core loss; washed out clay. @ 13.9',16.5',16.9', low angle clay filled fractures.						
15													
17.9	783.6						Medium hard to hard brown and gray SANDSTONE, very fine to fine grained, argillaceous, micaceous, highly to moderately weathered. @ 19.1',19.4', low angle clay filled fractures.						
20.0	781.5						Bottom of Boring - 20.0'						
25													
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2473 | *Location:* Sta. 547+36.2, 155.7 ft. LT of SR 823 CL | *Date Drilled:* 11/9/05 to 11/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
31.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / PL — LL / Blows per foot
	855.8													
0.2	855.6						Topsoil - 2"							
		7 14 46	18	1			Very dense brown and gray SILT (A-4b), little fine to coarse sand, trace clay, trace gravel; contains sandstone fragments; dry to damp.							60
3.0	852.8						Severely weathered brown and gray SANDSTONE, argillaceous, micaceous.							
		35 50/5	11	2										50+
5.0	850.8						Hard brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded to massive, moderately to highly fractured, iron staining.							
8.5	847.3						@ 5.0'-5.2', 6.8'-7.3', broken zones with high angle fractures.							
		Core 102"	Rec 102"	RQD 66%	R1	*508	Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded to massive, moderately to highly fractured.							
10														
15							@ 14.2'-14.3', 15.6'-17.5', high angle rust stained fractures. @ 14.4', 15.2', low angle fractures. @ 15.3'-15.4', 15.6'-16.0', 16.9'-17.4', high angle fractures. @ 16.0'-16.6', broken zone (high angle fracture).							
18.3	837.5	Core 120"	Rec 120"	RQD 74%	R2	*560	Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured, turbidic. @ 20.7'-20.9', iron stone, highly weathered, vuggy.							
20														
25							@ 27.0', 30.2', low angle fractures.							
		Core 120"	Rec 120"	RQD 100%	R3	*719								
30														

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2473 | *Location:* Sta. 547+36.2, 155.7 ft. LT of SR 823 CL | *Date Drilled:* 11/9/05 to 11/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
31.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	825.8						Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured, turbidic.						
35		Core 120"	Rec 120"	RQD 100%	R4	*920							
40													
45							@ 44.7', 50.7', 51.2', 51.7', 51.9', low angle fractures. @ 45.2-45.4', 50.1'-50.3', 50.7'-50.8', high angle fractures.						
50		Core 120"	Rec 120"	RQD 92%	R5	*1224	@ 49.0'-49.4', healed fracture with gray staining.						
55							@ 53.9', 53.9', 54.1', low angle fractures. @ 54.1'-54.5', lost recovery, fracture likely. @ 54.5'-54.9', high angle fracture.						
60		Core 120"	Rec 112"	RQD 88%	R6	*975							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-2473 | Location: Sta. 547+36.2, 155.7 ft. LT of SR 823 CL | Date Drilled: 11/9/05 to 11/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
31.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	795.8						Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured, turbidic.						
62.6	793.2						@ 62.5', low angle fracture.						
65		Core 120"	Rec 120"	RQD 95%	R7	*273	Medium hard to hard gray SANDSTONE; very fine grained, slightly to moderately weathered, argillaceous, micaceous, pyritic, thinly bedded to very thinly bedded, slightly fractured, contains moderate to abundant argillaceous laminations.						
70													
75							@ 75.4', 75.8', low angle fractures.						
76.7	779.1	Core 120"	Rec 120"	RQD 100%	R8	*1175	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, pyritic, massive, slightly fractured to unfractured, contains few argillaceous laminae.						
80													
85							@ 87.0'-88.4', 88.6'-88.8', 89.3'-89.6', calcareous zones.						
90		Core 120"	Rec 120"	RQD 100%	R9	*1410							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2473 | *Location:* Sta. 547+36.2, 155.7 ft. LT of SR 823 CL | *Date Drilled:* 11/9/05 to 11/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
31.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	765.8						Medium hard to hard, gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, pyritic, massive, slightly fractured to unfractured, contains few argillaceous laminae.						
							@ 93.1', low angle fracture.						
95		Core 120"	Rec 120"	RQD 100%	R10	*1334							
100													
105		Core 120"	Rec 120"	RQD 100%	R11	*1781							
110													
		Core 18"	Rec 18"	RQD 100%	R12	*1192	@ 113.4'-113.5', calcareous zone.						
115.0	740.8						Bottom of Boring - 115.0'						
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2475 | *Location:* Sta. 547+07.8, 151.0 ft. RT of SR 823 CL | *Date Drilled:* 11/16/05 to 11/22/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
16.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	860.4												
0.6	859.8	2 3 5	18	1			Topsoil - 7"/6" soil removed before drilling Loose brown SILT (A-4b), some fine to coarse sand, little clay, trace gravel; contains sandstone fragments; dry to damp.	9	17	--	10	53	11
3.0	857.4	10 23 35	18	2			Severely weathered brown SANDSTONE argillaceous.						
7.0	853.4	33 50/3	9	3			Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, arenaceous, argillaceous, medium bedded to thickly bedded, moderately to highly fractured, abundant iron staining. @ 7.3'-7.4', 7.6'-7.7', 8.6'- 8.8', 12.0'-12.2', high angle fractures. @ 8.0', 8.3', 9.3', 10.1', 11.2', 13.7', low angle fractures.						
10		Core 84"	Rec 79"	RQD 70%	R1	*1024							
15							@ 14.6'-15.5', 18.2'-20.9', 21.3'-21.5', 22.3'-22.7', 23.1'-23.4', discoloration from gray to light brown to gray. @ 14.8', 15.0', 16.0', 18.2', 19.3', 20.7', 21.4', 22.5', 23.3', low angle fractures. @ 17.7'-18.2', qu = 7,525 psi.						
20		Core 120"	Rec 120"	RQD 90%	R2	*560	@ 19.6'-20.2', broken zone.						
23.4	837.0						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, massive, unfractured to slightly fractured. @ 24.1', low angle fracture.						
25													
30		Core 120"	Rec 120"	RQD 100%	R3	*1302							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
58
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2475 | *Location:* Sta. 547+07.8, 151.0 ft. RT of SR 823 CL | *Date Drilled:* 11/16/05 to 11/22/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
16.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	830.4						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, massive, unfractured to slightly fractured. @ 30.0'-31.5', qu = 9,833 psi SDI = 90.9%. @ 31.9'-32.1', 33.1'-33.4', vuggy, calcareous bands (shell fragments evident).						
35							@ 35.4'-40.1', iron staining.						
40		Core 120"	Rec 120"	RQD 100%	R4	*1342	@ 36.8', 37.2', low angle fractures.						
45							@ 44.7'-46.1', qu = 9,682 psi SDI = 97.6%.						
50		Core 120"	Rec 120"	RQD 93%	R5	*301	@ 51.6', 52.3', 53.1', low angle fractures. @ 53.3'-55.0', 56.5'-58.0, 56.4'-58.4', iron stained zones. @ 53.5'-54.0', high angle fracture.						
55													
60		Core 120"	Rec 120"	RQD 92%	R6	*702	@ 58.0', 60.5', low angle fracture. @ 58.5'-59.2', high angle fracture.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2475 | *Location:* Sta. 547+07.8, 151.0 ft. RT of SR 823 CL | *Date Drilled:* 11/16/05 to 11/22/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
16.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢—⊣ LL / Blows per foot - ○ (10 20 30 40)
60	800.4						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.							
65							@ 64.0'-65.3', 66.9'-68.0', fine grained sandstone bed.							
							@ 65.1'-66.5', qu = 9,144 psi SDI = 74.7%.							
							@ 66.9'-68.0', high angle fractures.							
68.0	792.4	Core 120"	Rec 120"	RQD 88%	R7	*864	Medium hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, pyritic, argillaceous, micaceous, laminated to thinly bedded, slightly fractured, contains few to moderate argillaceous laminations.							
70							@ 70.8', 71.9', 72.0', low angle fracture.							
75		Core 120"	Rec 120"	RQD 100%	R8	*629								
80														
85		Core 120"	Rec 120"	RQD 99%	R9	*1166								
89.7	770.7						@ 89.2'-90.6', qu = 10,492 psi SDI = 95.0%.							

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-2475 | Location: Sta. 547+07.8, 151.0 ft. RT of SR 823 CL | Date Drilled: 11/16/05 to 11/22/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
16.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	770.4						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured. @ 91.5'-92.3', 92.8'-93.5', calcareous zone. @ 92.4', 93.0', 93.1', low angle fractures.						
95		Core 120"	Rec 120"	RQD 100%	R10	*963	@ 94.0'-94.3', calcareous zone.						
100													
105		Core 72"	Rec 72"	RQD 100%	R11	*1094							
110.0	750.4						Bottom of Boring - 110.0'						
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2476 | *Location:* Sta. 551+29.9, 147.4 ft. LT of SR 823 CLoperty | *Date Drilled:* 11/14/05 to 11/15/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
5.8' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	890.5												
0.3	890.2						Topsoil - 3"						
		2 4 5	18	1		3.5	Very stiff brown SILTY CLAY (A-6b), trace to little fine to coarse sand, trace gravel; contains roots; damp.	6	5	--	5	40	44
3.0	887.5						Severely weathered grayish brown SANDSTONE micaceous.						
		50/3	3	2									
5.0	885.5						Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded, moderately fractured.						
		Core 60"	Rec 60"	RQD 72%	R1	*690							
10													
		Core 120"	Rec 120"	RQD 89%	R2	*960							
15							@ 17.4', high angle fracture.						
18.8	871.7						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
20													
		Core 120"	Rec 120"	RQD 100%	R3	*1004							
25							@ 25.8'-25.9', argillaceous band. @ 25.8', low angle fracture.						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2476 | *Location:* Sta. 551+29.9, 147.4 ft. LT of SR 823 CLoperty | *Date Drilled:* 11/14/05 to 11/15/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
5.8' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	860.5						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
35		Core 120"	Rec 120"	RQD 100%	R4	*1247							
40							@ 42.7', 44.9', low angle fractures.						
45		Core 120"	Rec 120"	RQD 100%	R5	*342							
50							@ 49.1'-49.4', thin argillaceous bands.						
							@ 51.1'-51.2', ferric band. @ 51.5'-51.7', ferric band, vuggy.						
55		Core 120"	Rec 120"	RQD 100%	R6	*1369							
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2476 | *Location:* Sta. 551+29.9, 147.4 ft. LT of SR 823 CLoperty | *Date Drilled:* 11/14/05 to 11/15/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
5.8' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	830.5						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
65		Core 120"	Rec 120"	RQD 100%	R7	*1155							
70													
75		Core 120"	Rec 120"	RQD 100%	R8	*1329	@ 75.7', argillaceous zone. @ 76.6'-76.7', contains few to moderate argillaceous laminations.						
80													
85		Core 120"	Rec 120"	RQD 100%	R9	*925	@ 85.2'-85.4', 86.1'-86.2', argillaceous bands.						
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2476 | *Location:* Sta. 551+29.9, 147.4 ft. LT of SR 823 CLoperty | *Date Drilled:* 11/14/05 to 11/15/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
5.8' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	800.5						Hard gray SANDSTONE.						
91.4	799.1						Medium hard to hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, slightly to moderately weathered, micaceous, pyritic, thinly laminated to thickly bedded, moderately fractured.						
95		Core 120"	Rec 120"	RQD 95%	R10	*1067	@ 92.8'-92.9', 93.3'-93.5', calcareous.						
100.0	790.5						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, pyritic, massive, unfractured to slightly fractured.						
105		Core 120"	Rec 120"	RQD 100%	R11	*64	@ 100.0'-105.5', thinly laminated to medium bedded, contains few to moderate argillaceous laminations. @ 101.7'-101.8', calcareous. @ 105.6'-110.0', calcareous.						
110													
115		Core 120"	Rec 120"	RQD 100%	R12	*1691	@ 116.4'-118.1', 118.3'-118.5', calcareous.						
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-2476 | Location: Sta. 551+29.9, 147.4 ft. LT of SR 823 CLoperty | Date Drilled: 11/14/05 to 11/15/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
5.8' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	770.5						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, pyritic, massive, unfractured to slightly fractured.						
125		Core 120"	Rec 120"	RQD 100%	R13	*2506	@ 120.0'-120.3', calcareous. @ 120.4', low angle fracture.						
130.0	760.5						Bottom of Boring - 130.0'						
135													
140													
145													
150													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2478 | *Location:* Sta. 550+94.4, 77.0 ft. RT of SR 823 CL | *Date Drilled:* 11/10/05 to 11/11/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
52.4' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	854.3												
0.6	853.7						Topsoil - 7"						
		4 4 2	4	1			Loose brown and black SANDY SILT (A-4a); contains organics; damp.						
3.0	851.3												
		7 9 12	18	2			Medium dense brown and gray SILT (A-4b), little fine to coarse sand; damp.						
5													
5.5	848.8												
		29 50/3	9	3			Severely weathered brown and gray SANDSTONE, argillaceous, micaceous.						
7.5	846.8												
10		Core 66"	Rec 66"	RQD 68%	R1	*1076	Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, highly fractured. @ 7.5'-8.0', broken zone. @ 8.1'-8.4', 11.8'-12.0', high angle fractures.						
12.3	842.0						Medium hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, micaceous, argillaceous, massive, slightly fractured. @ 12.3', 13.6', 14.6', 18.2', low angle fractures with iron stained bands.						
15													
		Core 120"	Rec 120"	RQD 100%	R2	*1137							
20													
25							@ 26.3', thin, argillaceous band.						
		Core 120"	Rec 120"	RQD 100%	R3	*1111	@ 29.9', low angle fracture.						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-2478 | Location: Sta. 550+94.4, 77.0 ft. RT of SR 823 CL | Date Drilled: 11/10/05 to 11/11/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
52.4' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	824.3						Medium hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, micaceous, argillaceous, massive, slightly fractured.						
33.0	821.3						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, massive, unfractured to slightly fractured, few argillaceous laminae.						
35		Core 120"	Rec 120"	RQD 100%	R4	*1697							
40							@ 39.2', low angle fracture.						
45													
50		Core 120"	Rec 120"	RQD 100%	R5	*1172	@ 50.3', few to moderate argillaceous laminations.						
55							@ 53.1'-53.5', high angle fracture with rust staining.						
58.0	796.3	Core 120"	Rec 120"	RQD 95%	R6	*368	@ 57.9', 62.1', low angle fracture.						
60							Medium hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, calcareous.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2478 | *Location:* Sta. 550+94.4, 77.0 ft. RT of SR 823 CL | *Date Drilled:* 11/10/05 to 11/11/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
52.4' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	794.3						Medium hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, calcareous, micaceous, pyritic, very thinly bedded to medium bedded, slightly fractured, weathered halos, moderate argillaceous laminae, limestone bands.						
65		Core 120"	Rec 120"	RQD 100%	R7	*734							
69.9	784.4						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, pyritic, laminated to massive, unfractured to slightly fractured.						
75							@ 73.6'-75.5', contains few to moderate argillaceous laminations.						
		Core 120"	Rec 120"	RQD 100%	R8	*1514							
80													
85							@ 85.3'-85.6', calcareous band.						
		Core 120"	Rec 120"	RQD 100%	R9	*775							
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2478 | *Location:* Sta. 550+94.4, 77.0 ft. RT of SR 823 CL | *Date Drilled:* 11/10/05 to 11/11/05

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
52.4' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
90	764.3						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, pyritic, laminated to massive, unfractured to slightly fractured.							Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
95		Core 120"	Rec 120"	RQD 100%	R10	*1767								
100														
105		Core 84"	Rec 84"	RQD 100%	R11	*1662								
110.0	744.3						Bottom of Boring - 110.0'							
115														
120														

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2480 | *Location:* Sta. 555+20.8, 4.6 ft. LT of SR 823 CL | *Date Drilled:* 11/15/05 to 11/16/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
10.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	936.0												
0.3	935.7						Topsoil - 3"						
		5 8 13	18	1			Very stiff brown and gray SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; dry to damp.	8	3	--	2	57	30
3.0	933.0												
		9 11 14	18	2		4.5+	Hard brown and gray CLAY (A-7-6), trace fine to coarse sand, trace gravel; contains sandstone fragments; damp.	3	3	--	2	46	46
5													
5.5	930.5												
		10 27 50/4	16	3			Severely weathered brown and gray SANDSTONE, argillaceous, micaceous.						
		34 50/3	9	4									
10.0	926.0						Soft to medium hard brown and gray SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thickly bedded, moderately fractured to broken, fracture infillings are in micaceous subsurface, iron staining. @ 10.0'-10.2', 11.1'-11.4', 15.5'-16.0', high angle fractures. @ 13.5'-15.0', qu = 1,243 psi SDI = 33.8%. @ 14.1', 14.6', 14.9', 15.2', 16.1', 16.5', 16.7', 17.1', 17.8', 18.5', low angle fractures. @ 16.3'-17.7', SDI = 95.9%.						
		Core 108"	Rec 108"	RQD 81%	R1	*73							
15													
20							@ 19.1', low angle fracture. @ 19.9'-26.5', 20.6'-21.0', 21.2'-21.3', high angle fractures.						
21.5	914.5						Medium hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded, moderately to highly fractured, contains few to abundant argillaceous laminations. @ 21.6', 26.7', 27.0', 27.3', 27.7', low angle fractures. @ 21.9'-23.4', qu = 14,400 psi SDI = 43.1%. @ 23.9'-25.9', high angle fractures with iron staining.						
		Core 120"	Rec 120"	RQD 65%	R2	*203							
25													
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

50+
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-2480 | Location: Sta. 555+20.8, 4.6 ft. LT of SR 823 CL | Date Drilled: 11/15/05 to 11/16/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
10.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	906.0	Core 120"	Rec 120"	RQD 100%	R3	*284	Medium hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded, moderately to highly fractured, contains few to abundant argillaceous laminations. @ 30.6', low angle fracture.						
35													
40							@ 41.0', low angle fracture.						
		Core 120"	Rec 120"	RQD 97%	R4	*1363	@ 42.8'-43.4', qu = 3,111 psi.						
44.3	891.7						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded to massive, unfractured to slightly fractured.						
45													
50													
55		Core 120"	Rec 120"	RQD 100%	R5	*1398	@ 53.5'-55.3', qu = 9358 psi SDI = 98.1%. @ 56.3'-57.1', limestone bed. @ 57.0', low angle fracture.						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2480 | *Location:* Sta. 555+20.8, 4.6 ft. LT of SR 823 CL | *Date Drilled:* 11/15/05 to 11/16/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
10.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢ LL / Blows per foot - ○
60	876.0						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded to massive, unfractured to slightly fractured. @ 60.0', calcareous clast.							10 20 30 40
		Core 120"	Rec 120"	RQD 100%	R6	*1285								
65														
70														
		Core 120"	Rec 120"	RQD 100%	R7	*1508								
75							@ 74.8'-76.2', qu = 11,352 psi SDI = 97.9%.							
80														
		Core 120"	Rec 120"	RQD 100%	R8	*1279								
85														
90														

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2480 | *Location:* Sta. 555+20.8, 4.6 ft. LT of SR 823 CL | *Date Drilled:* 11/15/05 to 11/16/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
10.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	846.0						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded to massive, unfractured to slightly fractured.						
		Core 120"	Rec 120"	RQD 100%	R9	*1703							
95							@ 95.4'-97.0', qu = 11,635 psi SDI = 94.4%.						
100		Core 120"	Rec 120"	RQD 100%	R10	*1825							
105													
110		Core 120"	Rec 120"	RQD 100%	R11	*1294	@ 111.5'-113.1', qu = 11,983 psi SDI = 94.2%.						
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2480 | *Location:* Sta. 555+20.8, 4.6 ft. LT of SR 823 CL | *Date Drilled:* 11/15/05 to 11/16/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
10.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	816.0	Core 120"	Rec 120"	RQD 98%	R12	*989	Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded to massive, unfractured to slightly fractured. @ 121.0'-128.2', contains few argillaceous laminations.						
125							@ 127.3'-127.4', high angle fracture.						
130		Core 120"	Rec 120"	RQD 100%	R13	*1041							
135							@ 134.8'-135.0', argillaceous laminations.						
137.5	798.5						Medium hard gray SANDSTONE; very fine grained, slightly weathered, argillaceous, pyritic, micaceous, thickly bedded to massive, unfractured to slightly fractured, contains fine grained sandstone beds.						
140		Core 120"	Rec 120"	RQD 100%	R14	*725							
145													
150													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2480 | *Location:* Sta. 555+20.8, 4.6 ft. LT of SR 823 CL | *Date Drilled:* 11/15/05 to 11/16/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
10.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
150	786.0	Core 120"	Rec 120"	RQD 100%	R15	*1445	Medium hard gray SANDSTONE; very fine grained, slightly weathered, argillaceous, pyritic, micaceous, thickly bedded to massive, unfractured to slightly fractured, contains fine grained sandstone beds.							Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
155														
160		Core 120"	Rec 120"	RQD 100%	R16	*1163								
165														
170.0	766.0	Core 12"	Rec 12"	RQD 100%	R17	*1256	Bottom of Boring - 170.0'							
175														
180														

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2482 | *Location:* Sta 558+97.4, 133.9 ft. LT of SR 823 CL | *Date Drilled:* 12/05/05 to 12/06/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
49.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	880.2												
0.3	879.9						Topsoil - 4"/11" soil removed before drilling						
		4 6 15	18	1			Medium dense brown SILT (A-4b), little fine to coarse sand, little gravel, trace clay; contains sandstone fragments; dry.						
3.0	877.2												
		33 50/4	10	2			Severely weathered brown SANDSTONE, argillaceous, micaceous.						
5.0	875.2						Medium hard to hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, massive, highly fractured to broken.						
9.0	871.2	Core 108"	Rec 108"	RQD 78%	R1	*1070	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, micaceous, argillaceous, massive, slightly fractured. @ 9.2'-9.6', broken and iron stained. @ 10.9'-11.0', decomposed, low angle fracture, iron stained. @ 11.7'-11.8', decomposed, high angle fracture, iron stained. @ 12.5'-13.2', iron stained. @ 12.8', low angle fracture. @ 13.9'-14.0', high angle, iron stained fracture. @ 14.2'-14.3', iron stained zone with low angle fracture. @ 15.4', unfractured to slightly fractured.						
20		Core 120"	Rec 120"	RQD 100%	R2	*1155							
30		Core 120"	Rec 120"	RQD 100%	R3	*1546							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2482 | *Location:* Sta 558+97.4, 133.9 ft. LT of SR 823 CL | *Date Drilled:* 12/05/05 to 12/06/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
49.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	850.2						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, massive, unfractured to slightly fractured, contains occasional argillaceous bands less than 0.05' thick.						
35		Core 120"	Rec 120"	RQD 100%	R4	*1648	@ 39.6'-39.7', ferric band.						
40							@ 42.1'-42.3', ferric band with vugs.						
45		Core 120"	Rec 120"	RQD 100%	R5	*1520							
50													
55		Core 120"	Rec 120"	RQD 100%	R6	*1372							
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2482 | *Location:* Sta 558+97.4, 133.9 ft. LT of SR 823 CL | *Date Drilled:* 12/05/05 to 12/06/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
49.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	820.2						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, massive, unfractured to slightly fractured, contains occasional argillaceous bands less than 0.05' thick.						
65		Core 120"	Rec 120"	RQD 100%	R7	*1343							
70							@ 73.9', calcareous. @ 74.0'-70.1', 79.8'-84.0', calcareous.						
75													
79.1	801.1	Core 120"	Rec 120"	RQD 100%	R8	*627	Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, pyritic, argillaceous, laminated to thinly bedded, slightly fractured, contains moderate to abundant argillaceous laminations.						
80													
85							@ 84.9', low angle fracture.						
90		Core 120"	Rec 120"	RQD 100%	R9	*806							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2482 | *Location:* Sta 558+97.4, 133.9 ft. LT of SR 823 CL | *Date Drilled:* 12/05/05 to 12/06/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
49.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	790.2						Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, pyritic, argillaceous, laminated to thinly bedded, slightly fractured, contains moderate to abundant argillaceous laminations.						
94.0	786.2												
95							Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, unfractured to slightly fractured.						
		Core 120"	Rec 120"	RQD 100%	R10	*1073							
100													
105		Core 72"	Rec 72"	RQD 100%	R11	*879	@ 106.7'-107.3', calcareous zone. @ 107.1'-107.4', larger pebble-sized, non-calcareous clasts.						
110.0	770.2						Bottom of Boring - 110.0'						
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2484 | *Location:* Sta. 559+09.2, 167.0 ft. RT of SR 823 CL | *Date Drilled:* 11/22/05 to 11/23/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
17.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	919.7												
0.4	919.3						Topsoil - 5"						
		4 7 10	18	1		--	Very stiff to hard brown SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; damp.	4	4	--	4	54	34
		10 13 23	18	2		--							
5													
5.5	914.2						Severely weathered gray and brown SANDSTONE.						
		18 23 30	18	3									
		20 35 50/4	16	4									
10.0	909.7						Hard gray and brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thinly bedded, broken.						
		Core 60"	Rec 60"	RQD 80%	R1	*461	@ 10.6', low angle fracture. @ 12.9'-13.1', decomposed, iron stained shale bed.						
14.7	905.0						Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, moderately weathered, very argillaceous, thinly bedded to medium bedded, moderately fractured, contains few argillaceous laminations.						
20		Core 120"	Rec 120"	RQD 62%	R2	*290	@ 15.4', 15.7',18.2', 19.1', 21.3', 22.2', low angle fractures. @ 19.4'-20.8', vertical fracture. @ 20.5'-22.1', abundant argillaceous laminations. @ 23.0'-23.7', moderate argillaceous laminations. @ 22.9'-24.4', rust stained vertical fracture.						
24.4	895.3						Soft to medium hard gray SHALE; moderately to highly weathered, thinly laminated to laminated, slightly fractured, contains moderate arenaceous laminations.						
25		Core 120"	Rec 120"	RQD 98%	R3		@ 27.1', 27.3', 28.6', low angle fractures. @ 27.3'-27.7',28.7'-29.2', red iron stained (ferric bands).						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
53
50+

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-2484 | Location: Sta. 559+09.2, 167.0 ft. RT of SR 823 CL | Date Drilled: 11/22/05 to 11/23/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
17.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30.0	889.7					*685	Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
							@ 33.0', grades to gray in color, moderately weathered. @ 33.2', low angle fracture.						
35													
40		Core 120"	Rec 120"	RQD 100%	R4	*1517							
45													
							@ 46.9', 50.9', low angle fractures.						
50		Core 120"	Rec 120"	RQD 100%	R5	*1413							
55													
							@ 58.0', 59.0', 60.8', 61.5', low angle fractures.						
60		Core 120"	Rec 120"	RQD 100%	R6								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-2484 | Location: Sta. 559+09.2, 167.0 ft. RT of SR 823 CL | Date Drilled: 11/22/05 to 11/23/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
17.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
60.0	859.7					*1062	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thickly bedded to massive, unfractured to slightly fractured.							
65														
70		Core 120"	Rec 120"	RQD 100%	R7	*1569								
75							@ 73.9', low angle fracture.							
80		Core 120"	Rec 120"	RQD 100%	R8	*1535								
85														
90		Core 120"	Rec 120"	RQD 100%	R9									

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2484 | *Location:* Sta. 559+09.2, 167.0 ft. RT of SR 823 CL | *Date Drilled:* 11/22/05 to 11/23/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
17.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	829.7					*1430	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thickly bedded to massive, unfractured to slightly fractured.						
95													
100		Core 120"	Rec 120"	RQD 100%	R10	*1682							
105													
110		Core 120"	Rec 120"	RQD 100%	R11	*1300							
115							@ 114.6'-114.7', shale zone. @ 115.3'-115.8', calcareous inclusion.						
117.2	802.5						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, calcareous, pyritic, laminated to medium bedded.						
120		Core 120"	Rec 120"	RQD 100%	R12								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2484 | *Location:* Sta. 559+09.2, 167.0 ft. RT of SR 823 CL | *Date Drilled:* 11/22/05 to 11/23/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
17.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
120	799.7					*893	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, calcareous, pyritic, laminated to medium bedded, unfractured to slightly fractured, contains few to moderate argillaceous laminations. @ 120.3'- 120.4', calcareous inclusion. @ 121.1'-125.0', limestone bands.							
125		Core 120"	Rec 120"	RQD 100%	R13	*1622								
130														
135		Core 120"	Rec 120"	RQD 100%	R14	*1280								
140														
145.0	774.7						Bottom of Boring - 145.0'							
150														

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-2487 | Location: Sta. 563+29.4, 182.9 ft. RT of SR 823 CL | Date Drilled: 12/07/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
27.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	923.7													
0.3	923.4						Topsoil - 3"							
		3 5 8	18	1		3.5	Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; contains sandstone fragments; damp to moist.							
		15 22 33	18	2										
5.0	918.7	Core 120"	Rec 120"	RQD 89%	R1	*148	Medium hard brown SANDSTONE interbedded with SHALE; fine grained, highly weathered to decomposed, thinly to medium bedded, highly fractured. @ 11.3'-11.7',13.8'-14.3', high angle fractures.							55
17.5	906.2	Core 120"	Rec 120"	RQD 86%	R2	*90	Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, laminated to medium bedded, moderately fractured, contains few argillaceous laminations. @ 19.8'-20.0', 20.4'-20.6', 23.5'-23.9', high angle fractures.							
25.3	898.4	Core 120"	Rec 120"	RQD 93%	R3		Soft to medium hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, moderately to highly weathered. @ 25.3', 26.1', 28.6', 29.5', 29.7', 31.1', low angle fractures.							
30														

STANDARD PENETRATION (N): Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ (10, 20, 30, 40)

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2487 | *Location:* Sta. 563+29.4, 182.9 ft. RT of SR 823 CL | *Date Drilled:* 12/07/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
27.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	893.7					*1082	Soft to medium hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, moderately to highly weathered.						
32.2	891.5						@ 31.9'-32.2', broken zone.						
							Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, massive, slightly fractured.						
35													
36.7	887.0						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
40		Core 120"	Rec 120"	RQD 100%	R4	*577							
45													
							@ 47.5'-47.8', calcareous zone. @ 48.0'-49.0', high angle fracture. @ 48.5'-49.3', calcareous zone.						
50		Core 120"	Rec 120"	RQD 100%	R5	*2500	@ 49.7', 54.2', low angle fractures.						
55													
							@ 58.0', low angle fracture.						
60		Core 120"	Rec 120"	RQD 100%	R6								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2487 | *Location:* Sta. 563+29.4, 182.9 ft. RT of SR 823 CL | *Date Drilled:* 12/07/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
27.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	863.7					*1146	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
65							@ 67.3', 69.6', 72.1', low angle fractures.						
70		Core 120"	Rec 120"	RQD 100%	R7	*1227							
75							@ 77.2'-77.3', calcareous zone. @ 77.9', 79.5', low angle fractures.						
80		Core 120"	Rec 120"	RQD 100%	R8	*588							
85													
90		Core 120"	Rec 120"	RQD 100%	R9								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2487 | *Location:* Sta. 563+29.4, 182.9 ft. RT of SR 823 CL | *Date Drilled:* 12/07/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
27.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	833.7					*1317	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
95							@ 94.2'-94.4', calcareous zone. @ 94.3', fracture with iron stain below.						
100		Core 120"	Rec 120"	RQD 100%	R10	*1287	@ 101.5'-101.6', 104.4'- 105.5', micaceous.						
105							@ 104.1'-104.4', high angle fracture.						
110		Core 120"	Rec 120"	RQD 100%	R11	*1215							
115							@ 116.1',116.7', thin shale beds.						
120		Core 120"	Rec 120"	RQD 100%	R12								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-2487 | Location: Sta. 563+29.4, 182.9 ft. RT of SR 823 CL | Date Drilled: 12/07/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
27.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	803.7						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured. @ 120.5'-120.8', calcareous zone.						
124.8	798.9						Medium hard gray SANDSTONE; very fine to fine grained, slightly weathered to moderately weathered, argillaceous, pyritic, micaceous, slightly fractured, contains few to modeate argillaceous laminations. @ 126.2'-126.6', 128.6'- 128.9', calcareous zones.						
130		Core 120"	Rec 120"	RQD 98%	R13	*737							
135		Core 60"	Rec 60"	RQD 100%	R14	*1050							
140.0	783.7						Bottom of Boring - 140.0'						
145													
150													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2488 | *Location:* Sta. 567+22.7, 76.8 ft. LT of SR 823 CL | *Date Drilled:* 12/09/05 to 12/12/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not Reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	866.0													Natural Moisture Content, % - ● PL ⊢——⊣ LL; Blows per foot - ○ 10 20 30 40
0.3	865.7						Topsoil - 3" /11" soil removed before drilling.							
		7 10 14	18	1			Medium dense brown SILT (A-4b), little fine to coarse sand, little gravel, trace clay; contains sandstone fragments; dry to damp.							
3.0	863.0						Severely weathered brown SANDSTONE, argillaceous.							50+
		43 50/3	9	2										
5.0	861.0						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, thickly bedded to massive, moderately to highly fractured. @ 5.0'-7.0', iron stained. @ 5.2',5.3',5.8',6.0',6.8', 7.0',7.3',8.0',9.2',10.5', 14.0', low angle fractures. @ 6.3'-6.7', broken zone. @ 8.5'-8.6', high angle fracture.							
10		Core 120"	Rec 120"	RQD 86%	R1									
15														
20		Core 120"	Rec 120"	RQD 97%	R2	*1076	@ 21.4',23.9', low angle fractures. @ 22.7',23.0', low angle fractures with iron staining.							
25														
30		Core 120"	Rec 120"	RQD 100%	R3									

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-2488 | Location: Sta. 567+22.7, 76.8 ft. LT of SR 823 CL | Date Drilled: 12/09/05 to 12/12/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not Reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30	836.0						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, thickly bedded to massive, moderately to highly fractured.							
							@ 33.4'-33.5', moderate argillaceous laminations, unfractured to slightly fractured.							
35							@ 34.5'-35.4', iron stained.							
							@ 34.6', low angle fracture.							
							@ 37.2'-37.3', argillaceous zone.							
40		Core 120"	Rec 120"	RQD 100%	R4	*1517								
45														
							@ 47.7'-48.5',49.0'-51.9', iron stained.							
50		Core 120"	Rec 120"	RQD 89%	R5	*1384	@ 49.6', 49.9', 52.4', low angle, rust stained fractures.							
							@ 50.5'-51.2', high angle, rust stained fracture.							
55														
60		Core 120"	Rec 120"	RQD 100%	R6									

STANDARD PENETRATION (N): Natural Moisture Content, % - ● ; PL ⊢—⊣ LL ; Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2488 | *Location:* Sta. 567+22.7, 76.8 ft. LT of SR 823 CL | *Date Drilled:* 12/09/05 to 12/12/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not Reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	806.0					*1631	Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, thickly bedded to massive, moderately to highly fractured. @ 62.3'-66.2', high angle fracture.						
65													
65.5	800.5	Core 60"	Rec 60"	RQD 95%	R7	*1088	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, pyritic, laminated to medium bedded, slightly fractured, contains few to moderate argillaceous laminations; fissile after desiccation in argillaceous zones.						
70.0	796.0						Bottom of Boring - 70.0'						
75													
80													
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2490 | *Location:* Sta. 567+32.8, 150.2 ft. RT of SR 823 CL | *Date Drilled:* 12/08/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
74.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	902.0												
0.3	901.7						Topsoil - 4"						
		2 2 5	8	1		--	Medium stiff brown CLAY (A-7-6), "and" silt, little fine to coarse sand, trace gravel; contains sandstone fragments; damp.	4	6	--	6	42	42
3.5	898.5	7 15 16	18	2			Severely weathered gray and brown SANDSTONE argillaceous, micaceous.						
5.0	897.0	Core 120"	Rec 120"	RQD 86%	R1	*322	Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, medium bedded to thickly bedded, moderately to highly fractured. @ 5.0'-5.2', 5.5'-5.6', 11.8'-11.9', broken zones. @ 5.7', 5.9', 9.5', 10.9', 11.1', 12.2', 13.0', 13.5', 14.6', 14.9', low angle fractures. @ 9.1'-11.0', qu = 8,610 psi SDI = 97.0%.						
15		Core 120"	Rec 120"	RQD 91%	R2	*844	@ 16.6', 17.8', 17.6', 18.9', 19.4', 19.9', 19.9', 20.7', 20.7', 20.9', 21.4', 21.4', 21.5', 21.55', 23.5', low angle fractures. @ 19.0'-19.1', broken zone. @ 20.7'-22.2', qu = 8,597 psi SDI = 96.4%.						
25		Core 120"	Rec 120"	RQD 88%	R3		@ 25.1'-25.2', 25.4'-25.5', argillaceous broken zones. @ 27.7'-28.1', high angle, rust stained fracture.						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2490 | *Location:* Sta. 567+32.8, 150.2 ft. RT of SR 823 CL | *Date Drilled:* 12/08/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
74.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	872.0					*1009	Medium hard to hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, medium bedded to thickly bedded, moderately to highly fractured.						
35.0	867.0						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, unfractured to slightly fractured.						
40		Core 120"	Rec 120"	RQD 100%	R4	*690	@ 40.6'-42.0', qu = 10,529 psi SDI = 77.3%.						
45													
50		Core 120"	Rec 120"	RQD 100%	R5	*728							
55							@ 55.6'-55.7', ferric band.						
60		Core 120"	Rec 120"	RQD 100%	R6		@ 57.9'-59.4', qu = 10,085 psi SDI = 96.7%.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2490 | *Location:* Sta. 567+32.8, 150.2 ft. RT of SR 823 CL | *Date Drilled:* 12/08/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
74.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	842.0					*1349	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, unfractured to slightly fractured.						
65							@ 64.9',65.0', calcareous. @ 65.9'-66.7', calcareous zone. @ 66.1'-66.3', slightly ferric, vuggy. @ 67.5'-68.4', iron staining.						
70		Core 120"	Rec 120"	RQD 100%	R7	*1308	@ 70.6'-72.1', qu = 11,170 psi SDI = 97.1%.						
75							@ 75.9'-76.1', calcareous zone.						
80		Core 120"	Rec 120"	RQD 100%	R8	*995							
85													
90		Core 120"	Rec 120"	RQD 100%	R9								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-2490 | Location: Sta. 567+32.8, 150.2 ft. RT of SR 823 CL | Date Drilled: 12/08/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
74.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	812.0					*307	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, unfractured to slightly fractured.						
95													
96.7	805.3						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, pyritic, slightly fractured, contains few to moderate argillaceous laminations, fissile after desiccation in argillaceous zones.						
100		Core 120"	Rec 120"	RQD 100%	R10	*1291							
105		Core 60"	Rec 60"	RQD 100%	R11	*464							
110.0	792.0						Bottom of Boring - 110.0'						
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:31 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-503 | *Location:* Sta. 585+03.5, 191.6 ft. LT of SR 823 CL | *Date Drilled:* 05/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
99.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	918.3												
0.8	917.5	1 3 3	9	1		3.0	Topsoil - 9" Very stiff to hard brown SILT (A-4b), trace fine to coarse sand, trace gravel; contains sandstone fragments; damp.						
5		5 10 20	18	2		4.5+		0	4	--	5	63	28
6.0	912.3	13 23 46	18	3			Severely weathered brown SANDSTONE, argillaceous.						
10		25 50/5	11	4									
12.0	906.3	31 50/2	8	5									
15		Core 84"	Rec 84"	RQD 68%	R-1	*128	Medium hard brown to brownish gray SANDSTONE, fine grained, micaceous, argillaceous, thin to thick bedded, moderately fractured to broken, rust staining on fractures; contains few argillaceous laminations. @ 14.5',17.0',25.8', high angle fractures.						
20							@ 19.0'-30.0', soft to medium hard. @ 21.2'-21.6',23.6'-24.0', argillaceous broken zones.						
25		Core 120"	Rec 120"	RQD 90%	R-2	*317							
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
69
50+
50+

FILE: 0121-3070-03 [11/5/2007 3:33 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-503 | *Location:* Sta. 585+03.5, 191.6 ft. LT of SR 823 CL | *Date Drilled:* 05/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
99.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	888.3												
31.7	886.6	Core 120"	Rec 120"	RQD 99%	R-3	*356	Medium hard to hard gray SANDSTONE, very fine to fine grained, argillaceous, micaceous, pyritic, thick bedded to massive, moderately fractured to unfractured, slightly weathered; contains few argillaceous laminations.						
40		Core 120"	Rec 120"	RQD 100%	R-4	*411							
50		Core 120"	Rec 120"	RQD 100%	R-5	*367	@ 56.7', rust staining.						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:33 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-503 | *Location:* Sta. 585+03.5, 191.6 ft. LT of SR 823 CL | *Date Drilled:* 05/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
99.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	858.3	Core 120"	Rec 117"	RQD 97%	R-6	*422	Medium hard to hard gray SANDSTONE, very fine to fine grained, argillaceous, micaceous, pyritic, thick bedded to massive, moderately fractured to unfractured, slightly weathered; contains few argillaceous laminations.						
65													
70		Core 120"	Rec 120"	RQD 100%	R-7	*350	@ 69.0'-89.0', gray to dark gray.						
75													
80		Core 120"	Rec 120"	RQD 100%	R-8	*434							
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-503 | *Location:* Sta. 585+03.5, 191.6 ft. LT of SR 823 CL | *Date Drilled:* 05/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
99.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	828.3	Core 120"	Rec 120"	RQD 96%	R-9	*324	Medium hard to hard gray SANDSTONE, very fine to fine grained, argillaceous, micaceous, pyritic, thick bedded to massive, moderately fractured to unfractured, slightly weathered; contains few argillaceous laminations. @ 89.0'-94.8', dark gray.						
95							@ 94.8'-106.9' brown, rust stained, highly to moderately weathered. @ 96.5'-96.7',98.3'-100.0', high angle fractures.						
100		Core 120"	Rec 120"	RQD 75%	R10	*271							
105							@ 106.9'-113.7', contains few to moderate laminations.						
110		Core 72"	Rec 72"	RQD 100%	R11	*314							
115.0	803.3						Bottom of Boring - 115.0'						
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-505 | *Location:* Sta. 585+25.6, 79.6 ft. RT of SR 823 CL | *Date Drilled:* 05/10/05 to 05/16/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
3.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	846.2												
0.7	845.5	3 5 7	18	1		3.5	Topsoil - 8" Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; contains sandstone fragments damp.						
3.5	842.7	11 27 42	18	2			Severely weathered brown SANDSTONE, argillaceous.						
5		21 50/5	11	3									
7.0	839.2	Core 60"	Rec 60"	RQD 63%	R-1	*153	Medium hard brown SANDSTONE; fine grained, slightly to moderately weathered, argillaceous, micaceous, thickly bedded, slightly to moderately fractured.						
10							@ 8.7', rust staining in fractures. @ 12.0'-15.5', brownish orange.						
15							@ 14.9', high angle fracture.						
15.5	830.7	Core 120"	Rec 120"	RQD 95%	R-2	*179	Medium hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured, contains few argillaceous lamintations.						
20							@ 21.2', clay filled fracture.						
25		Core 96"	Rec 96"	RQD 85%	R-3	*303	@ 23.4'-23.6', clay filled fracture. @ 23.4', 24.2', 25.5', 28.4', water flow through fractures. @ 23.6'-24.5', rust staining. @ 24.4', rust stained high angle fracture.						
30.0	816.2						Bottom of Boring - 30.0'						

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40
69
50+

FILE: 0121-3070-03 [11/5/2007 3:33 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-506 | *Location:* Sta. 589+15.7, 185.8 ft. LT of SR 823 CL | *Date Drilled:* 05/03/05 to 05/04/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: None (prior to coring)
28.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	925.4												
0.5	924.9						Topsoil - 6"						
		1 1 2	10	1		2.5	Very stiff to hard brown SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; contains sandstone fragments; damp.						
		3 8 9	18	2		4.5+							
5		7 11 13	18	3		4.5+							
		8 15 19	18	4		4.5+							
10													
11.0	914.4	16 50/5	11	5			Severely weathered brown SANDSTONE, argillaceous.						
12.0	913.4	Core 96"	Rec 93"	RQD 72%	R-1	*65	Soft to medium hard brown SANDSTONE, fine grained, argillaceous, micaceous, thin to thick bedded, slightly fractured to broken, decomposed to highly weathered; contains few to moderate argillaceous laminations.						
15													
20							@ 20.0'-28.0', brownish gray, slightly to moderately fractured, decomposed to moderately weathered.						
25		Core 120"	Rec 120"	RQD 88%	R-2	*242	@ 24.4', high angle fracture. @ 25.8'-26.4',26.6'-26.9', shale beds.						
26.9	898.5						Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, micaceous, argillaceous, thick to massively bedded, slightly fractured to unfractured.						
30							@ 28.0'-30.0', fossiliferous.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-506 | *Location:* Sta. 589+15.7, 185.8 ft. LT of SR 823 CL | *Date Drilled:* 05/03/05 to 05/04/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: None (prior to coring)
28.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	895.4						Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, micaceous, argillaceous, thick to massively bedded, slightly fractured to unfractured. @ 30.0'-34.8', slightly fossiliferous.						
34.8	890.6	Core 120"	Rec 120"	RQD 100%	R-3	*291	Medium hard to hard gray SANDSTONE; very fine to fine grained, micaceous, argillaceous, thick to massively bedded, slightly fractured to unfractured, moderately to slightly weathered; contains few argillaceous laminations. @ 34.8'-40.0', pyritic.						
40													
45		Core 120"	Rec 120"	RQD 100%	R-4	*372							
50													
55		Core 120"	Rec 120"	RQD 97%	R-5	*427							
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:33 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-506 | *Location:* Sta. 589+15.7, 185.8 ft. LT of SR 823 CL | *Date Drilled:* 05/03/05 to 05/04/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: None (prior to coring)
28.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	865.4						Medium hard gray SANDSTONE, fine grained, argillaceous, micaceous, thick bedded, slightly fractured to unfractured, slightly weathered; contains turbidity bedding; contains few argillaceous laminations.						
65		Core 120"	Rec 120"	RQD 100%	R-6	*322	@ 64.7'-64.9',65.1'-65.2', ferric bands.						
70							@ 72.4', rust stained fracture.						
75		Core 120"	Rec 120"	RQD 100%	R-7	*338							
80							@ 81.6', fossiliferous, rust staining.						
85		Core 120"	Rec 120"	RQD 98%	R-8	*421	@ 86.7', rust staining.						
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:33 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-506 | *Location:* Sta. 589+15.7, 185.8 ft. LT of SR 823 CL | *Date Drilled:* 05/03/05 to 05/04/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: None (prior to coring)
28.4' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	835.4						Medium hard to hard gray SANDSTONE; very fine to fine grained, argillaceous, micaceous, pyritic, thick bedded to massive, slightly fractured to unfractured, slightly weathered; contains turbidity bedding, contains few argillaceous laminations.						
95		Core 120"	Rec 113"	RQD 94%	R-9	*430							
100													
105		Core 120"	Rec 120"	RQD 100%	R10	*239							
110.0	815.4						Bottom of Boring - 110.0'						
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:33 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-508 | *Location:* Sta. 589+51.1, 72.6 ft. RT of SR 823 CL | *Date Drilled:* 05/11/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
4.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	844.3													
0.6	843.7						Topsoil - 7 "							
		2 3 3	18	1		1.75	Stiff to very stiff brown and gray GRAVEL WITH SAND AND SILT (A-2-4), trace clay; contains occasional rust stains; damp to moist.							
		4 4 9	18	2		3.0	@ 1.0'-2.5', contains roots.	50	9	--	6	28	7	Non-Plastic
5		15 15 10	18	3		3.5								
		10 11 15	18	4		3.75								
10		6 13 14	18	5		4.5+	@ 11.0', hard, contains sandstone fragments.							
13.5	830.8	10 22 24	18	6			Severely weathered brown SANDSTONE, argillaceous.							
15		50/5	3	7										50+
17.0	827.3	Core 60"	Rec 60"	RQD 85%	R-1	*240	Medium hard grayish brown SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, slightly fractured, iron staining in fractures.							
20														
23.4	820.9						Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, slightly fractured.							
25		Core 96"	Rec 96"	RQD 100%	R-2	*193								
30.0	814.3						Bottom of Boring - 30.0'							

STANDARD PENETRATION (N): Natural Moisture Content, % - ● ; PL ⊢⊣ LL ; Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 [11/5/2007 3:33 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-509 | *Location:* Sta. 592+24.5, 194.2 ft. LT of SR 823 CL | *Date Drilled:* 05/04/05 to 05/05/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: None (prior to coring)
38.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	950.2												
0.4	949.8						Topsoil - 5"						
		WOH 1 1	7	1		1.25	Stiff brown SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; damp.						
3.5	946.7												
		3 12 21	16	2			Severely weathered brown SANDSTONE, argillaceous.						
5													
		28 50/2	8	3									
7.5	942.7						Soft to medium hard brown SANDSTONE, fine grained, argillaceous, micaceous, thick bedded, highly fractured, decomposed to highly weathered, contains moderate argillaceous laminations.						
10		Core 90"	Rec 90"	RQD 89%	R-1	*76	@ 9.3',10.6', high angle fractures. @ 7.5'-24.2', rust staining in fractures.						
15							@ 15.0'-24.2', moderately fractured to broken, slightly to highly weathered.						
20		Core 120"	Rec 120"	RQD 80%	R-2	*113	@ 17.4',18.4',21.0', iron nodules. @ 20.3',22.3', high angle fractures.						
23.2	927.0						Medium hard gray SANDSTONE; argillaceous, micaceous, laminated to thickly bedded, moderately fractured, highly to moderately weathered, contains few to moderate argillaceous laminations.						
25							@ 24.2'-30.0', slightly fractured, slightly to moderately weathered.						
30		Core 120"	Rec 120"	RQD 97%	R-3								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:33 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-509 | *Location:* Sta. 592+24.5, 194.2 ft. LT of SR 823 CL | *Date Drilled:* 05/04/05 to 05/05/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: None (prior to coring)
38.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	920.2					*255	Medium hard gray SANDSTONE; argillaceous, micaceous, laminated to thickly bedded, moderately fractured, highly to moderately weathered, contains few to moderate argillaceous laminations.						
							@ 30.4', slightly vuggy.						
35							@ 34.7'-37.2', soft, moderate to abundant argillaceous laminations.						
37.2	913.0						@ 36.1', brown, soft.						
							Medium hard to hard brown SANDSTONE; very fine to fine grained, argillaceous, micaceous, thickly bedded to massive, highly to moderately weathered, slightly fractured to unfractured.						
40		Core 120"	Rec 120"	RQD 95%	R-4	*520							
45							@ 45.9', gray.						
50		Core 120"	Rec 120"	RQD 100%	R-5	*484	@ 49.9'-65.0', pyritic.						
55													
60		Core 120"	Rec 120"	RQD 100%	R-6								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:33 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-509 | *Location:* Sta. 592+24.5, 194.2 ft. LT of SR 823 CL | *Date Drilled:* 05/04/05 to 05/05/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: None (prior to coring)
38.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	890.2					*458	Medium hard to hard gray SANDSTONE; very fine to fine grained, argillaceous, micaceous, thickly bedded to massive, slightly weathered, slightly fractured to unfractured, contains turbidity bedded zone.						
65													
70		Core 120"	Rec 120"	RQD 100%	R-7	*401							
75													
80		Core 120"	Rec 120"	RQD 100%	R-8	*440							
85													
90		Core 120"	Rec 120"	RQD 100%	R-9								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:33 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-509 | *Location:* Sta. 592+24.5, 194.2 ft. LT of SR 823 CL | *Date Drilled:* 05/04/05 to 05/05/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: None (prior to coring)
38.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	860.2					*480	Medium hard to hard gray to dark gray SANDSTONE, fine grained, argillaceous, micaceous, thickly bedded, slightly fractured, slightly weathered; contains turbidity bedded zone. @ 91.9',95.9', rust staining.						
95													
100		Core 120"	Rec 120"	RQD 100%	R10	*375							
105							@ 105.0'-115.0', pyritic.						
110		Core 120"	Rec 120"	RQD 100%	R11	*462							
115		Core 60"	Rec 60"	RQD 100%	R12	*300							
120.0	830.2						Bottom of Boring - 120.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:33 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-510 | *Location:* Sta. 592+32.2, 157.2 ft. RT of SR 823 CL | *Date Drilled:* 05/10/05 to 05/12/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
37.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	914.7												
0.7	914.0	2 1 3	10	1		4.5+	Topsoil - 8" Hard brown SILT (A-4b), some clay, little fine to coarse sand, trace gravel; damp.	3	9	--	10	53	25
3.5	911.2	3 8 9	16	2		4.5+	Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; contains sandstone fragments; damp.						
5.5	909.2	7 19 50/2	13	3		4.5+	Severely weathered brown SANDSTONE; argillaceous.						
7.2	907.5						Medium hard brown SANDSTONE; very fine to fine grained, highly to moderately weathered, micaceous, argillaceous, moderately to slightly fractured.						
10		Core 88"	Rec 88"	RQD 89%	R-1	*354	@ 11.0'-11.3', clay filled fractures. @ 11.3'-14.5', slightly fractured.						
15							@ 14.5'-16.2', iron stained fractures. @ 15.5'-16.9', qu = 9,929 psi, SDI = 97.6%. @ 16.2', gray, pyritic.						
20		Core 120"	Rec 117"	RQD 93%	R-2	*252	@ 18.7', high angle fracture. @ 20.0',20.3',23.2', clay filled fractures.						
25													
30		Core	Rec	RQD	R-3	*400							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:33 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-510 | *Location:* Sta. 592+32.2, 157.2 ft. RT of SR 823 CL | *Date Drilled:* 05/10/05 to 05/12/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
37.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	884.7	120"	118"	98%			Hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, micaceous, argillaceous, massively bedded, slightly fractured to unfractured.						
35							@ 36.8', clay filled fracture.						
40		Core 120"	Rec 120"	RQD 100%	R-4	*468							
45							@ 46.2'-71.6', turbidity interbeds.						
50		Core 120"	Rec 116"	RQD 97%	R-5	*465							
55													
60		Core	Rec	RQD	R-6	*391							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-510 | *Location:* Sta. 592+32.2, 157.2 ft. RT of SR 823 CL | *Date Drilled:* 05/10/05 to 05/12/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
37.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	854.7	120"	117"	97%			Hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, micaceous, argillaceous, massively bedded, slightly fractured to unfractured.						
65							@ 66.7', high angle fracture, moderately fractured.						
70		Core 120"	Rec 120"	RQD 100%	R-7	*355							
75													
80		Core 120"	Rec 117"	RQD 97%	R-8	*352							
85													
90		Core	Rec	RQD	R-9	*308							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:33 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-510 | *Location:* Sta. 592+32.2, 157.2 ft. RT of SR 823 CL | *Date Drilled:* 05/10/05 to 05/12/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
37.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
90	824.7	120"	120"	100%			Hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, micaceous, argillaceous, massively bedded, slightly fractured to unfractured.							Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
95.0	819.7	Core 6"	Rec 6"	RQD 100%	R10	*308	Bottom of Boring - 95.0'							
100														
105														
110														
115														
120														

FILE: 0121-3070-03 [11/5/2007 3:33 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-521 | *Location:* Sta. 603+32.7, 103.4 ft. LT of SR 823 CL | *Date Drilled:* 05/18/05 to 05/19/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: None (prior to coring)
16.2' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	912.5													
0.5	912.0	1 1 2	15	1		2.5	Topsoil - 6" Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand; moist.							
3.5	909.0	8 21 24	15	2			Severely weathered gray and brown SANDSTONE, argillaceous; contains occational rust stains.							
5														
		31 50/2	18	3										50+
7.0	905.5	Core 36"	Rec 36"	RQD 28%	R-1	*298	Medium hard brown SANDSTONE interbedded with SILTSTONE; fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly fractured. @ 8.0', rust stained high angle fracture.							
10														
12.5	900.0	Core 120"	Rec 118"	RQD 75%	R-2	*383	Medium hard gray SANDSTONE ; fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured. @ 15.3'-17.5', highly weathered, rust stained.							
15														
17.5	895.0						Medium hard to hard gray to dark gray SANDSTONE ; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured to unfractured; contains turbidity bedding.							
20														
25		Core 120"	Rec 120"	RQD 100%	R-3	*1493								
30														

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:34 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-521 | *Location:* Sta. 603+32.7, 103.4 ft. LT of SR 823 CL | *Date Drilled:* 05/18/05 to 05/19/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: None (prior to coring)
16.2' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	882.5						Medium hard to hard gray to dark gray SANDSTONE ; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured to unfractured; contains turbidity bedding. @ 32.5',32.7', ferric bands.						
35		Core 120"	Rec 120"	RQD 100%	R-4	*383							
40													
45		Core 120"	Rec 120"	RQD 100%	R-5	*487							
50.0	862.5						Bottom of Boring - 50.0'						
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:34 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-522 | *Location:* Sta. 603+34.2, 57.2 ft. RT of SR 823 CL | *Date Drilled:* 05/18/05

WATER OBSERVATIONS: Water seepage at: 1.0'
Water level at completion: 5.0' (prior to coring)
6.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	897.9													Natural Moisture Content, % - ● PL ⊢——⊣ LL Blows per foot - ○ 10 20 30 40
0.7	897.2	1 3 3	11	1		2.25	Topsoil - 8" Very stiff brown SANDY SILT (A-4a), little clay, trace gravel; damp.							
3.5	894.4	7 17 50/1	12	2			Severely weathered brown SANDSTONE, argillaceous.							50+
5.0	892.9	Core 120"	Rec 114"	RQD 56%	R-1		Medium hard to hard brown SANDSTONE; fine grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded to massive, moderately fractured, iron staining in fractures. @ 6.9',8.4',10.8', high angle fractures.							
13.0	884.9						Medium hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.							
20		Core 120"	Rec 120"	RQD 100%	R-2									
25.0	872.9						Bottom of Boring - 25.0'							
30														

FILE: 0121-3070-03 [11/5/2007 3:34 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-523 | *Location:* Sta. 605+82.4, 180.0 ft. LT of SR 823 CL | *Date Drilled:* 5/13/05 to 5/17/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: 7.0' (prior to coring)
24.3' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	955.4												
0.3	955.1						Topsoil - 3"						
		3 3 8	15	1		2.0	Stiff brown SILT AND CLAY (A-6a), some fine to coarse sand, trace gravel; contains sandstone fragments; damp.						
3.5	951.9												
		8 18 41	17	2			Severely weathered brown and gray SANDSTONE, argillaceous.						
5													
		24 50/5	11	3									
7.0	948.4												
		Core 30"	Rec 26"	RQD 63%	R-1		Medium hard brown SANDSTONE; fine grained, decomposed to highly weathered, argillaceous, micaceous, laminated to thinly bedded, highly fractured, contains few argillaceous laminations. @ 7.4', high angle rust stained fracture. @ 8.4', high angle fracture. @ 11.6', high angle fracture.						
10													
14.8	940.6	Core 120"	Rec 120"	RQD 66%	R-2	*107							
							Medium hard gray SHALE interbedded with SANDSTONE; highly weathered, arenaceous, argillaceous, highly fractured, with rust stained fracture, contains few argillaceous laminae.						
17.3	938.1						Medium hard brown SANDSTONE; fine grained, highly weathered, laminated to thinkly bedded, highly fractured, contains few to moderate argillaceous laminations. @ 17.3'-22.6', argillaceous. @ 17.3'-17.5',18.8'-19.5', 23.6'-24.0, broken zones. @ 17.5',20.1',22.8', high angle fractures.						
20													
		Core 120"	Rec 120"	RQD 59%	R-3	*335	@ 23.1',24.1', high angle fractures.						
25.3	930.1						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, argillaceous, moderately fractured, contains few argillaceous laminations. @ 25.3'-38.1', interbedded siltstone.						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
59
50+

FILE: 0121-3070-03 [11/5/2007 3:34 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-523 | *Location:* Sta. 605+82.4, 180.0 ft. LT of SR 823 CL | *Date Drilled:* 5/13/05 to 5/17/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: 7.0' (prior to coring)
24.3' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	925.4						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, micaceous, highly fractured, contains few argillaceous laminations.						
35		Core 120"	Rec 120"	RQD 98%	R-4	*292	@ 36.2'-38.1' very fine grained, contains moderate argillaceous laminations.						
38.1	917.3						Medium hard to hard gray to light brown SANDSTONE; fine to very fine grained, moderately to slightly weathered, micaceous, argillaceous, slightly fractured to unfractured.						
40							@ 42.8'-43.3', gray seam.						
45		Core 120"	Rec 118"	RQD 98%	R-5	*480	@ 45.9', gray, all low angle fracture.						
50													
55		Core 120"	Rec 120"	RQD 100%	R-6	*505	@ 54.5', slightly to moderately fractured.						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:34 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-523 | *Location:* Sta. 605+82.4, 180.0 ft. LT of SR 823 CL | *Date Drilled:* 5/13/05 to 5/17/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: 7.0' (prior to coring)
24.3' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	895.4						Medium hard to hard gray SANDSTONE; fine to very fine grained, micaceous, argillaceous, slightly weathered, slightly fractured to unfractured.						
65		Core 120"	Rec 120"	RQD 100%	R-7	*477							
70		Core 10"	Rec 10"	RQD 100%	R-8	*527							
70.3	885.1						Bottom of Boring - 70.3'						
75													
80													
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:34 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-525 | *Location:* Sta. 605+94.0, 161.0 ft. RT of SR 823 CL | *Date Drilled:* 05/17/05 to 05/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
32.2' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	967.4												
0.6	966.8						Topsoil - 7"						
		1 2 3	9	1		4.0	Hard brown SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; damp.	4	2	--	7	59	28
		3 5 9	18	2		4.25							
5													
6.0	961.4	5 17		3			Severely weathered brown SANDSTONE, argillaceous.						
7.0	960.4	50/5	15										
		Core 30"	Rec 30"	RQD 77%	R-1	*49	Very soft rusty orange to yellowish light gray SANDSTONE, very fine to fine grained, argillaceous, highly fractured to broken, thin to medium bedded, highly weathered to decomposed, contains few to moderate argillaceous laminations, contains iron stone.						
10		Core 60"	Rec 40"	RQD 13%	R-2		@ 11.5'-28.4', soft to medium hard.						
15		Core 60"	Rec 60"	RQD 77%	R-3	*97	@ 15.6'-15.7',16.6'-16.7',18.8'- 19.4', less argillaceous zones.						
							@ 18.3'-29.2', numerous high angle fractures.						
20							@ 19.9'-20.1',28.1'-28.2', recemented fractures.						
25		Core 120"	Rec 120"	RQD 63%	R-4	*49							
							@ 27.1'-27.6', less argillaceous zone.						
28.4	939.0						Medium hard gray SANDSTONE; very fine to fine grained, argillaceous, moderately to highly fractured.						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:34 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-525 | *Location:* Sta. 605+94.0, 161.0 ft. RT of SR 823 CL | *Date Drilled:* 05/17/05 to 05/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
32.2' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	937.4	Core 120"	Rec 120"	RQD 83%	R-5	*322	Medium hard gray SANDSTONE; very fine to fine grained, argillaceous, laminated to thin bedded, moderately to highly fractured, moderately to highly weathered, contains moderate argillaceous laminations, contains several ferric/ironstone bands. @ 29.8'-30.1', high angle fracture with infilling. @ 30.5', fracture with infilling. @ 37.0'-40.0',42.5'-43.5', massive.						
35													
40							@ 43.2'-43.5', brown and gray broken highly weathered zone, ferric band.						
43.5	923.9	Core 120"	Rec 119"	RQD 83%	R-6	*390	Hard gray SANDSTONE; very fine to fine grained, argillaceous, micaceous, pyritic, moderately to slightly weathered, slightly fractured to unfractured, massive. @ 45.1'-45.3', fractured silt , argillaceous laminations. @ 47.0'-47.5', ferric bands.						
45													
50							@ 52.5', black sand laminations.						
55		Core 120"	Rec 120"	RQD 100%	R-7	*510							
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:34 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-525 | *Location:* Sta. 605+94.0, 161.0 ft. RT of SR 823 CL | *Date Drilled:* 05/17/05 to 05/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
32.2' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	907.4						Hard gray SANDSTONE, very fine to fine grained, micaceous, argillaceous, massively bedded, slightly fractured to unfractured, slightly to moderately weathered.						
65		Core 120"	Rec 120"	RQD 100%	R-8	*408							
70							@ 72.2',83.2',86.2', fractures with shaly surfaces.						
75		Core 120"	Rec 120"	RQD 100%	R-9	*423							
80													
85		Core 120"	Rec 120"	RQD 100%	R10	*379							
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:34 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-525 | *Location:* Sta. 605+94.0, 161.0 ft. RT of SR 823 CL | *Date Drilled:* 05/17/05 to 05/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
32.2' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	877.4	Core 70"	Rec 70"	RQD 100%	R11	*475	Hard gray SANDSTONE, very fine to fine grained, micaceous, argillaceous, massively bedded, slightly fractured to unfractured, slightly to moderately weathered. @ 93.3', fracture with staining.						
95.4	872.0						Bottom of Boring - 95.4'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:34 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-530 | *Location:* Sta. 611+38.6, 59.6 ft. RT of SR 823 CL | *Date Drilled:* 05/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
4.1' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	910.8												
0.5	910.3						Topsoil - 6"						
		1 3 2	15	1		2.75	Very stiff to hard brown SANDY SILT (A-4a), litlle clay, little gravel; damp.						
		3 6 14	17	2		4.5+	@ 3.5'-5.0', contains sandstone fragments.						
5													
6.0	904.8	22 39 50/3	14	3			Severely weathered brown SANDSTONE fragments with SHALE.						
8.0	902.8	Core 24"	Rec 20"	RQD 23%	R-1	*325	Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly fractured. @ 9.2', 10.8', high angle fractures. @ 11.1', 11.3', low angle fractures.						
10													
12.0	898.8	Core 120"	Rec 120"	RQD 81%	R-2	*293	Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, calcareous, thickly bedded, slightly fractured, iron staining in fractures. @ 15.9'-16.4', vertical fracture.						
15													
20.0	890.8	Core 120"	Rec 120"	RQD 100%	R-3	*513	Hard dark gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, thickly bedded, slightly fractured to unfractured. @ 20.6', low angle fracture.						
25													
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:35 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-530 | *Location:* Sta. 611+38.6, 59.6 ft. RT of SR 823 CL | *Date Drilled:* 05/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
4.1' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	880.8												
35		Core 120"	Rec 120"	RQD 99%	R-4	*480	Hard dark gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, thickly bedded, slightly fractured to unfractured. @ 37.6', low angle fracture.						
40.0	870.8						Bottom of Boring - 40.0'						
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:35 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-531 | *Location:* Sta. 613+55.8, 134.4 ft. LT of SR 823 CL | *Date Drilled:* 05/23/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
24.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	946.5												
0.2	946.3						Topsoil - 2"						
		2 2 2	12	1		4.5	Hard brown SILT AND CLAY (A-6a), trace to little gravel, trace to little fine to coarse sand; damp. @ 1.0'-5.0', contains sandstone fragments. @ 3.5'-5.0', contains red shale fragments.						
		4 10 13	18	2		4.5+							
5		12 24 30	16	3		4.5+	@ 6.0'-12.0', trace gravel.	0	3	--	7	60	30
		11 24 50	18	4		4.5+							
10		20 50/5	11	5		4.5+							
12.0	934.5						Medium hard brown SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, medium to thickly bedded, moderately fractured, iron stained fractures, contains few argillaceous laminae. @ 13.0', high angle fracture. @ 13.5'-13.7',14.3'-14.8', ferric bands.						
15		Core 120"	Rec 115"	RQD 45%	R-1								
20							@ 19.5'-22.0', contains few to moderate argillaceous laminations.						
22.0	924.5						Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thickly bedded, slightly fractured. @ 22.0'-22.3', 23.5'-23.9', ferric bands.						
25		Core 120"	Rec 118"	RQD 95%	R-2								
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

○ 54
○ 74
○ 50+

FILE: 0121-3070-03 [11/5/2007 3:35 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-531 | *Location:* Sta. 613+55.8, 134.4 ft. LT of SR 823 CL | *Date Drilled:* 05/23/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
24.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	916.5						Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, thickly bedded, slightly fractured.						
32.6	913.9						Hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, pyritic, massive bedding, slightly fractured to unfractured, contains few argillaceous laminations.						
35		Core 120"	Rec 120"	RQD 98%	R-3								
40													
45		Core 120"	Rec 120"	RQD 100%	R-4								
50													
55		Core 120"	Rec 120"	RQD 100%	R-5								
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:35 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-531 | *Location:* Sta. 613+55.8, 134.4 ft. LT of SR 823 CL | *Date Drilled:* 05/23/05

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (Prior to coring)
24.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	886.5						Hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, pyritic, massive bedding, slightly fractured to unfractured, contains few argillaceous laminations.						
62.0	884.5						Bottom of Boring - 62.0'						
65													
70													
75													
80													
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:35 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-533 | *Location:* Sta. 613+21.1, 150.7 ft. RT of SR 823 CL | *Date Drilled:* 05/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
7.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	967.4												
0.1	967.3						Topsoil - 1"						
		2 2 2	13	1		2.25	Very stiff to hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp to moist.						
		3 5 11	15	2		4.5+							
5													
6.0	961.4	6 8 17	18	3		4.5+	Hard brown SILTY CLAY (A-6b), little fine sand; damp.						
8.5	958.9	33 50/4	10	4			Severely weathered brown SHALE; slightly arenaceous, slight rust staining.						
10							@ 11.0'-12.5', contains sandstone fragments.						
		25 40 50/3	15	5									
12.5	954.9						Medium hard to hard brownish gray SANDSTONE; very fine to fine grained, highly weathered to decomposed, micaceous, argillaceous, laminated to thinly bedded, highly to moderately fractured, contains moderate to abundant argillaceous laminations.						
15		Core 114"	Rec 114"	RQD 75%	R-1	*388							
20							@ 20.6', iron stained fracture.						
							@ 23.5'-23.8', qu = 2,138 psi.						
25							@ 25.7'-27.0', SDI = 61.9%.						
		Core 120"	Rec 120"	RQD 32%	R-2	*45	@ 27.7', 29.2', high angle iron stained fractures.						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+ 50+

FILE: 0121-3070-03 [11/5/2007 3:35 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-533 | *Location:* Sta. 613+21.1, 150.7 ft. RT of SR 823 CL | *Date Drilled:* 05/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
7.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	937.4						
30.0	937.4						Soft to medium hard brownish gray SHALE; highly weathered to decomposed, micaceous, laminated to thinly bedded, highly fractured. @ 30.5'-32.0', qu = 1,874 psi, SDI = 44.9%.
34.3	933.1						Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded, slightly to moderately fractured, contains few argillaceous laminations. @ 37.2'-38.1', SDI = 94.1%. @ 38.6'-39.1', qu = 9,410 psi. @ 41.0'-43.2', contains moderate to abundant argillaceous laminations.
35		Core 120"	Rec 120"	RQD 89%	R-3	*177	
40							
43.2	924.2						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured, contains few argillaceous laminations. @ 43.2'-43.6', ferric band, vuggy.
45		Core 120"	Rec 120"	RQD 96%	R-4	*405	
50							@ 52.0'-62.0', pyritic.
55		Core 120"	Rec 119"	RQD 99%	R-5	*457	@ 57.9'-59.8', qu = 10,714 psi, SDI = 98.4%.
60							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:35 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-533 | *Location:* Sta. 613+21.1, 150.7 ft. RT of SR 823 CL | *Date Drilled:* 05/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
7.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	907.4						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured to unfractured.						
65		Core 120"	Rec 119"	RQD 99%	R-6	*496							
70													
75		Core 120"	Rec 120"	RQD 100%	R-7	*518							
80													
85		Core 120"	Rec 120"	RQD 100%	R-8	*500	@ 84.3', iron staining.						
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:35 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-533 | *Location:* Sta. 613+21.1, 150.7 ft. RT of SR 823 CL | *Date Drilled:* 05/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
7.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	877.4						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured to unfractured.						
95		Core 60"	Rec 60"	RQD 100%	R-9	*422							
97.0	870.4						Bottom of Boring - 97.0'						
100													
105													
110													
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:35 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-542 | Location: Sta. 619+64.3, 186.3 ft. LT of SR 823 CL | Date Drilled: 05/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
4.7' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION
0	837.4						
0.5	836.9						Topsoil - 6"
		1 50/0	0	1			Very stiff brown SANDY SILT (A-4a), little clay, little gravel; contains rust stains; damp.
		10 18 32	18	2		2.75	
5							
		19 29 50/4	15	3		4.0	@ 6.0'-7.5', contains sandstone fragments.
8.0	829.4						Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to medium bedded, slightly to moderately fractured.
10							
10.9	826.5	Core 78"	Rec 78"	RQD 47%	R-1		Soft to medium hard light grayish brown SHALE; very fine grained, decomposed, micaceous, thinly bedded, highly fractured.
13.0	824.4						Medium hard brown SANDSTONE; fine grained, highly weathered to decomposed, argillaceous, micaceous, thinly bedded to thickly bedded, broken, iron stained fractures.
15.0	822.4	Core 66"	Rec 66"	RQD 0%	R-2		Soft to medium hard gray SHALE; highly weathered to decomposed, micaceous, thinly laminated to thinly bedded, highly fractured to broken, iron stained fractures.
20							@ 20.0'-29.5', moderately to highly weathered, arenaceous, moderately to highly fractured.
25		Core 114"	Rec 114"	RQD 56%	R-3		@ 25.7'-27.3', qu = 1,888 psi, SDI = 35.7%.
29.5	807.9						Bottom of Boring - 29.5'

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+
50+

FILE: 0121-3070-03 [11/5/2007 3:36 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-543 | *Location:* Sta. 619+09.5, 2.6 ft. RT of SR 823 CL | *Date Drilled:* 05/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
3.6' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	881.1												
0.6	880.5	3 8 15	15	1			Topsoil - 7" Very stiff brown SANDY SILT (A-4a), little clay, little gravel; damp.						
3.5	877.6	7 28 28	18	2			Severely weathered brown SANDSTONE, argillaceous, slightly rust stained.						
5		50/5	5	3									
7.0	874.1	Core 78"	Rec 78"	RQD 51%	R-1	*266	Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, pyritic, medium bedded to thickly bedded, highly fractured. @ 7.8',10.2',10.9',11.6', 12.9',13.1', rust stained fractures.						
14.0	867.1	Core 84"	Rec 84"	RQD 87%	R-2	*345	Medium hard dark gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded, moderately fractured, iron stained fractures. @ 16.9', high angle fracture.						
20.5	860.6						Bottom of Boring - 20.5'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
56 →
50+

FILE: 0121-3070-03 [11/5/2007 3:36 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

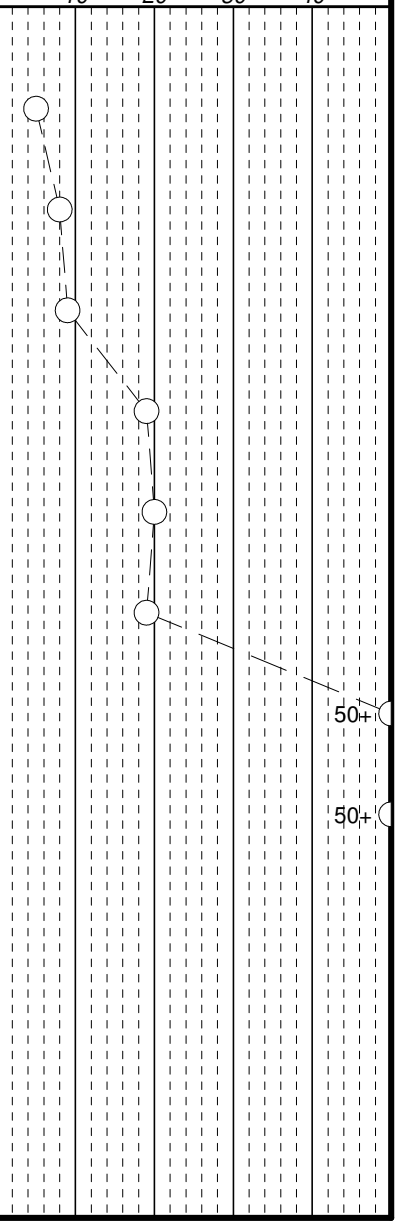
LOG OF: Boring R-548 | *Location:* Sta. 621+88.7, 190.4 ft. LT of SR 823 CL | *Date Drilled:* 05/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
7.6' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION
0	813.4						
0.6	812.8						Topsoil - 7"
		2 3 2	18	1		4.5+	Hard brown SANDY SILT (A-4a), little fine to coarse sand, little gravel; damp.
		2 3 5	14	2		--	
5		2 4 5	15	3		4.5+	
		5 8 11	13	4		4.5+	
10		5 8 12	18	5		--	
		5 7 12	18	6		4.5+	
15							
16.0	797.4	14 40 50/5	17	7			Severely weathered brownish gray SHALE.
		12 16 50/3	15	8			
20.0	793.4						Medium hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded, slightly fractured to broken, iron staining in fractures, contains moderate argillaceous laminations.
25		Core 120"	Rec 117"	RQD 71%	R-1		@ 22.0',22.8',23.0', high angle fractures.
30.0	783.4						Bottom of Boring - 30.0'

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/5/2007 3:36 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-549 | *Location:* Sta. 621+86.8, 21.0 ft. LT of SR 823 CL | *Date Drilled:* 05/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
8.5' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	867.3												
0.3	867.0						Topsoil - 3"						
		4 8 7	16	1		3.75	Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp.						
3.5	863.8	18 50/3	9	2			Severely weathered brown SANDSTONE fragments, argillaceous.						
5.0	862.3						Medium hard to hard brownish gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly to moderately fractured.						
10		Core 120"	Rec 118"	RQD 80%	R-1		@ 6.7', high angle rust stained fracture.						
15							@ 13.6'-20.0', gray, moderately to highly weathered, argillaceous, thinly laminated to thickly bedded, highly to moderately fractured, contains few argillaceous laminations.						
		Core 60"	Rec 60"	RQD 87%	R-2		@ 17.0'-18.0', brown. @ 18.0'-20.0', pyritic.						
20.0	847.3						Bottom of Boring - 20.0'						
25													
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:36 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-550 | *Location:* Sta. 621+95.3, 124.3 ft. RT of SR 823 CL | *Date Drilled:* 05/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
2.7' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	879.5												
0.7	878.8	2 2 8	15	1		2.75	Topsoil - 8" Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand, little gravel; contains sandstone fragments; damp.						
3.5	876.0	20 50/4	9	2			Severely weathered brownish gray SHALE.						
4.5	875.0	Core 114"	Rec 110"	RQD 72%	R-1		Medium hard brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, pyritic, thickly to massively bedded, broken to moderately fractured, iron stained fractures. @ 5.5', 8.3', high angle fractures. @ 9.6'-20.5', gray @ 13.5'-20.5', pyritic.						
15		Core 78"	Rec 75"	RQD 96%	R-2								
20.5	859.0						Bottom of Boring - 20.5'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-554 | *Location:* Sta. 624+86.4, 135.6 ft. LT of SR 823 CL | *Date Drilled:* 05/26/05

WATER OBSERVATIONS: Water seepage at: 16.0
Water level at completion: None (Prior to coring)
10.7' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	830.2						Topsoil - 13"						
1.1	829.1	1 1 1	18	1		2.25	Very stiff to hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; contains roots and grass; moist.						
		2 8 11	18	2		2.25							
5		6 11 18	18	3		3.75							
		9 14 16	18	4		4.0							
10		8 9 10	18	5		2.5							
		4 5 6	18	6		2.75							
15		3 7 6	18	7		1.75	@ 16.0'-17.5', stiff.						
		1 3 4	18	8		2.0							
20													
21.0	809.2	2 4 5	18	9		2.0	Stiff brown SANDY SILT (A-4a), some gravel, trace clay; contains rock fragments; damp.						
		5 7 20	14	10		1.5							
25		3 8 18	18	11		--							
28.5	801.7	32 50/3	8	12			Severely weathered gray SANDSTONE, argillaceous.						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-554 | *Location:* Sta. 624+86.4, 135.6 ft. LT of SR 823 CL | *Date Drilled:* 05/26/05

WATER OBSERVATIONS: Water seepage at: 16.0
Water level at completion: None (Prior to coring)
10.7' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30.0	800.2												
	800.2	Core 120"	Rec 120"	RQD 84%	R-1		Medium hard dark gray SANDSTONE ; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded, slightly to moderately fractured, contains moderate argillaceous laminations, fissile.						
40.0	790.2						Bottom of Boring - 40.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-556 | *Location:* STa. 625+226.2, 95.2 ft. RT of SR 823 CL | *Date Drilled:* 05/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
10.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	889.7													
0.3	889.4						Topsoil - 3"							
		2 3 3	10	1		1.5	Stiff brown SILTY CLAY (A-6b), little fine to coarse sand, little gravel; damp.							
		3 11 20	14	2		4.5+	@ 3.5'-5.0', hard.							
5		35 50/3	9	3		4.5+								50+
8.5	881.2	37 50/2	8	4			Severely weathered brown SANDSTONE and SHALE fragments.							50+
10		50/5	5	5										50+
13.5	876.2	50/4	3	6			Severely weathered gray SHALE fragments.							50+
15.0	874.7	Core 84"	Rec 81"	RQD 68%	R-1		Medium hard grayish brown SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, medium to thickly bedded, slightly to moderately fractured. @ 18.0'-20.0', brown. @ 18.3',19.0', high angle rust stained fractures. @ 20.0'-22.0', gray, moderately to highly fractured, rust stained fractures.							
20														
22.0	867.7						Bottom of Boring - 22.0'							
25														
30														

STANDARD PENETRATION (N): Natural Moisture Content, % - ●; PL ⊢——⊣ LL; Blows per foot - ○; 10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2558 | *Location:* Sta. 629+22.1, 122.6 ft. RT of SR 823 CL | *Date Drilled:* 1/23/06 to 1/24/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
59.1' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	984.3												
0.3	984.0						Topsoil - 4"						
		2 3 35	13	1			Very dense brown SANDY SILT (A-4a), some gravel, little clay; contains sandstone fragments; damp.	27	14	--	14	31	14
3.0	981.3												
		30 26 29	18	2			Severely weathered grayish brown SANDSTONE, argillaceous.						
5													
		33 50/3	4	3									
7.0	977.3						Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, thinly bedded to massive, moderately to highly fractured.						
10		Core 102"	Rec 102"	RQD 93%	R1	*70	@ 10.7'-10.9', vertical fracture. @ 11.7'-15.5', decomposed.						
15													
16.4	967.9						Medium hard grayish brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, laminated to medium bedded, highly fractured.						
20		Core 120"	Rec 120"	RQD 71%	R2	*754	@ 17.3'-17.9', 18.0'-18.9', 20.5'-21.0', iron staining, high angle fractures. @ 21.8'-21.9', 23.1'-23.3', high angle fractures.						
25							@ 27.0'-27.2', broken zone. @ 29.3'-29.6', 29.8'-30.0', high angle fractures.						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
55
50+

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-2558 | Location: Sta. 629+22.1, 122.6 ft. RT of SR 823 CL | Date Drilled: 1/23/06 to 1/24/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
59.1' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	954.3	Core 120"	Rec 120"	RQD 88%	R3	*186	Medium hard grayish brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, laminated to medium bedded, highly fractured. @ 30.0'-31.6', moderately fractured to broken, contains moderate to abundant argillaceous laminations.						
31.6	952.7						Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, laminated to medium bedded, slightly fractured, contains moderate to abundant argillaceous laminations.						
35													
40		Core 120"	Rec 120"	RQD 98%	R4	*1314							
41.2	943.1						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
45													
50		Core 120"	Rec 120"	RQD 100%	R5	*1796	@ 48.8', 51.2', low angle fractures. @ 51.0'-51.3', iron staining. @ 51.9'-54.8', light brown.						
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2558 | *Location:* Sta. 629+22.1, 122.6 ft. RT of SR 823 CL | *Date Drilled:* 1/23/06 to 1/24/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
59.1' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	924.3	Core 120"	Rec 120"	RQD 100%	R6	*1746	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
65													
70		Core 120"	Rec 120"	RQD 100%	R7	*1697							
75													
80		Core 120"	Rec 120"	RQD 100%	R8	*1009	@ 80.2'-80.3', calcareous.						
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2558 | *Location:* Sta. 629+22.1, 122.6 ft. RT of SR 823 CL | *Date Drilled:* 1/23/06 to 1/24/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
59.1' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	894.3	Core 120"	Rec 120"	RQD 100%	R9	*1569	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
95													
100		Core 120"	Rec 120"	RQD 100%	R10	*1447							
105													
110		Core 120"	Rec 120"	RQD 100%	R11	*2036	@ 110.0', slightly pyritic.						
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2558 | *Location:* Sta. 629+22.1, 122.6 ft. RT of SR 823 CL | *Date Drilled:* 1/23/06 to 1/24/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
59.1' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	864.3	Core 120"	Rec 120"	RQD 100%	R12	*1572	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, slightly pyritic, massive , unfractured to slightly fractured.						
125													
130		Core 120"	Rec 120"	RQD 100%	R13	*1932							
135							@ 134.4'-136.3', iron stained.						
140		Core 120"	Rec 120"	RQD 100%	R14	*1587	@ 138.2', 140.7', 142.8', 143.1', low angle fractures.						
145		Core 54"	Rec 54"	RQD 100%	R15	*1311	@ 147.9',148.4', low angle fractures.						
150.0	834.3						Bottom of Boring - 150.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2560 | *Location:* Sta. 629+80.0, 129.4 ft. LT of SR 823 CL | *Date Drilled:* 1/25/06 to 1/26/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
29.9' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	973.9												
0.3	973.6						Topsoil - 3"						
		7 8 24	10	1			Medium dense brown SILT (A-4b), little fine to coarse sand, trace gravel, trace clay; contains sandstone fragments; dry to damp.						
2.5	971.4												
		16 50/4	10	2			Severely weathered grayish brown SANDSTONE, argillaceous.						
5.0	968.9												
		Core 60"	Rec 44"	RQD 12%	R1	*194	Soft to medium hard grayish brown SANDSTONE interbedded with SHALE; very fine to fine grained, highly weathered to decomposed, laminated to thickly bedded, highly fractured to broken, with typical low angle iron stained fractures. @ 5.2'-6.3', lost recovery, possible fracture. @ 5.0'-5.2', 7.1'-8.2', broken zones. @ 6.3'-6.9', ironstone. @ 8.8'-9.8', 11.5'-11.8', 12.5'-12.7', high angle iron stained fractures.						
10													
15		Core 120"	Rec 120"	RQD 74%	R2	*139	@ 14.1'-14.4', 16.9'-17.2', 24.3'-25.2', high angle iron stained fractures.						
20													
25		Core 120"	Rec 120"	RQD 71%	R3	*96	@ 22.8'-24.3', qu = 2,223 psi, SDI = 50.9%. @ 26.2', 27.1'-27.4', high angle iron stained fractures.						
28.7	945.2												
30							Medium hard gray SANDSTONE; very fine to fine grained.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2560 | *Location:* Sta. 629+80.0, 129.4 ft. LT of SR 823 CL | *Date Drilled:* 1/25/06 to 1/26/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
29.9' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	943.9						Medium hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, laminated to thickly bedded, slightly fractured, contains few argillaceous laminations. @ 30.0'-31.4', qu = 7,774 psi, SDI = 59.3%.						
35		Core 120"	Rec 120"	RQD 79%	R4	*899	@ 36.1', low angle clay filled fracture. @ 37.1', low angle fracture. @ 37.9'-38.2', iron concretion. @ 37.9'-45.5', highly weathered, massive. @ 38.3'-40.6', high angle iron stained fracture.						
40							@ 40.5'-51.4', SDI = 99.5%. @ 41.6'-42.2', qu = 9,550 psi.						
45		Core 120"	Rec 120"	RQD 93%	R5	*1317							
45.5	928.4						Hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, massive, unfractured to slightly fractured. @ 45.8'-48.1', iron stained.						
50							@ 51.1'-52.5', qu = 11,414 psi, SDI = 98.1%.						
55		Core 120"	Rec 120"	RQD 100%	R6	*1166							
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2560 | *Location:* Sta. 629+80.0, 129.4 ft. LT of SR 823 CL | *Date Drilled:* 1/25/06 to 1/26/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
29.9' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	913.9						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
65		Core 120"	Rec 120"	RQD 100%	R7	*1532							
70		Core 120"	Rec 120"	RQD 100%	R8	*1505							
75													
80		Core 120"	Rec 120"	RQD 100%	R9	*1813							
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2560 | *Location:* Sta. 629+80.0, 129.4 ft. LT of SR 823 CL | *Date Drilled:* 1/25/06 to 1/26/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
29.9' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	883.9						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
95		Core 120"	Rec 120"	RQD 100%	R10	*1752							
100													
105		Core 120"	Rec 120"	RQD 100%	R11	*1514							
110													
115		Core 120"	Rec 120"	RQD 100%	R12	*824							
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-2560 | Location: Sta. 629+80.0, 129.4 ft. LT of SR 823 CL | Date Drilled: 1/25/06 to 1/26/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
29.9' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
120	853.9						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured. @ 122.6'-124.7', iron stained zone.							
125		Core 120"	Rec 120"	RQD 100%	R13	*1213								
130														
135		Core 120"	Rec 120"	RQD 100%	R14	*1529								
140														
145		Core 120"	Rec 120"	RQD 100%	R15	*1387	@ 147.5', very fine grained, pyritic.							
150.0	823.9						Bottom of Boring - 150.0'							

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2562 | *Location:* Sta. 632+79.7, 121.3 ft. LT of SR 823 CL | *Date Drilled:* 1/26/06

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None; 11.2' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	896.7												
0.4	896.3						Topsoil - 5"/6" soil removed before drilling						
		2 7 12	9	1			Medium dense to very dense brown SANDY SILT (A-4a), some gravel, little clay; contains sandstone fragments; damp.	29	10	--	5	44	12
		30 32 35	18	2									
5.0	891.7						Severely weathered brown SANDSTONE, argillaceous.						
6.5	890.2	50/1	1	3									
		Core 102"	Rec 102"	RQD 76%	R1	*708	Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, massive, highly fractured. @ 7.2'-7.4', 10.5'-11.1', high angle fractures.						
14.0	882.7												
15							Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, massive, slightly fractured. @ 14.8'-15.3', 16.2', 16.9'- 17.3', 19.5'-20.3', iron stained. @ 15.2', 16.2', 17.1', 19.9', 20.1', 21.6', low angle fractures.						
20		Core 120"	Rec 120"	RQD 100%	R2	*540	@ 19.6'-19.7', high angle fracture.						
25													
30		Core 120"	Rec 120"	RQD 97%	R3		@ 28.0'.28.2',28.3', low angle fractures. @ 28.0'-28.2', clay seam.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
67
50+

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2562 | *Location:* Sta. 632+79.7, 121.3 ft. LT of SR 823 CL | *Date Drilled:* 1/26/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None
11.2' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30.0	866.7					*1334	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, unfractured to slightly fractured.						
35													
40		Core 120"	Rec 120"	RQD 100%	R4	*1253							
45							@ 43.7', low angle fracture.						
50		Core 120"	Rec 120"	RQD 100%	R5	*1271	@ 47.2'-49.5', iron stained. @ 47.3', low angle rust stained fracture. @ 49.1', low angle fracture.						
55													
60		Core 120"	Rec 120"	RQD 100%	R6								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2562 | *Location:* Sta. 632+79.7, 121.3 ft. LT of SR 823 CL | *Date Drilled:* 1/26/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None
11.2' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	836.7					*821	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, unfractured to slightly fractured.						
65		Core 60"	Rec 60"	RQD 100%	R7	*1166							
70.0	826.7						Bottom of Boring - 70.0'						
75													
80													
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2564 | *Location:* Sta. 632+76.6, 124.3 ft. RT of SR 823 CL | *Date Drilled:* 1/27/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
14.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	886.1												
0.3	885.8						Topsoil - 3"/6" soil removed before drilling						
		3 4 5	18	1			Loose brown SANDY SILT (A-4a), little gravel, trace clay; contains sandstone fragments; dry to damp.						
3.0	883.1						Severely weathered brown SANDSTONE, argillaceous.						
		18 36 50/5	17	2									
5.0	881.1						Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, massive, highly fractured to broken. @ 5.0'-5.5', 6.1'-6.5', 6.7'- 6.8', 7.8', 8.1', 8.7'-9.2', 12.3'-12.5', 11.2'-11.4', 12.5'-12.8', 13.0'-13.2', high angle fractures.						
		Core 108"	Rec 108"	RQD 41%	R1								
10													
15							@ 14.5'-14.7', 15.2'-15.4', high angle fractures.						
15.7	870.4						Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, pyritic, massive, unfractured to slightly fractured.						
		Core 120"	Rec 120"	RQD 85%	R2	*1378							
20													
25							@ 24.0'-24.9', 33.0'-34.0', iron stained.						
		Core 120"	Rec 120"	RQD 100%	R3	*1421							
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2564 | *Location:* Sta. 632+76.6, 124.3 ft. RT of SR 823 CL | *Date Drilled:* 1/27/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
14.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	856.1						Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, pyritic, massive, unfractured to slightly fractured.						
35							@ 34.7', iron stained fracture.						
40		Core 120"	Rec 120"	RQD 100%	R4	*1447							
45		Core 72"	Rec 72"	RQD 100%	R5	*1743							
50.0	836.1						@ 49.3', low angle fracture. Bottom of Boring - 50.0'						
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:38 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-570 | *Location:* Sta. 639+84.2, 238.3 ft. LT of SR 823 CL | *Date Drilled:* 06/01/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
7.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	796.0													
0.3	795.7						Topsoil - 3"/5" soil removed before drilling							
		3 3 5	10	1		4.0	Hard brown SILT AND CLAY (A-6a), some fine to coarse sand, little gravel; contains rust stains; damp.							
		3 5 5	17	2		4.5+								
5		3 5 6	14	3		4.5+								
8.5	787.5	4 26 48	17	4			Gray SHALE fragments.							74
10		26		5										
11.7	784.3	50/3	9				Medium hard to hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, pyritic, very thickly bedded, moderately fractured.							50+
15		Core 120"	Rec 116"	RQD 93%	R-1									
20														
21.7	774.3						Bottom of Boring - 21.7'							
25														
30														

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-571 | *Location:* Sta. 639+21.1, 80.4 ft. RT of SR 823 CL | *Date Drilled:* 06/01/05 to 06/06/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
4.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	925.7													Natural Moisture Content, % - ● PL ⊢——⊣ LL; Blows per foot - ○ 10 20 30 40
0.2	925.5						Topsoil - 2"							
		2 5 7	12	1		4.5+	Hard brown SILT AND CLAY (A-6a), some fine to coarse sand, trace gravel; damp.							
		9 16 41	18	2		4.5+	@ 3.5'-5.0', contains rust stains.							57
5														
6.0	919.7	26 50/4	9	3			Brown SHALE fragments.							50+
		50/3	2	4										50+
10.0	915.7						Medium hard to hard brown SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, thickly bedded, moderately fractured to broken, iron stained fractures.							
15		Core 120"	Rec 120"	RQD 71%	R-1		@ 11.4'-12.0', infilled fracture.							
							@ 18.0', high angle fracture.							
20.0	905.7						Bottom of Boring - 20.0'							
25														
30														

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-574 | *Location:* Sta. 643+00.3, 72.1 ft. RT of SR 823 CL | *Date Drilled:* 6/7/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
2.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	942.5													
0.3	942.2						Topsoil - 3"							
		5 12 16	15	1			Severely weathered brown SANDSTONE, argillaceous. @ 1.0'-3.9', rust stained.							
		50/5	3	2										50+
5		50/4	4	3										50+
8.5	934.0													
10		Core 30"	Rec 30"	RQD 100%	R-1		Hard brown SANDSTONE, fine grained, slightly weathered, argillaceous, micaceous, massively bedded, slightly to moderately fractured, contains few argillaceous laminations.							
15		Core 120"	Rec 120"	RQD 93%	R-2		@ 15.3'-21.0', gray.							
20														
21.0	921.5						Bottom of Boring - 21.0'							
25														
30														

STANDARD PENETRATION (N): Natural Moisture Content, % - ●; PL ⊢—⊣ LL; Blows per foot - ○; 10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-575 | *Location:* Sta. 642+59.6, 188.3 ft. RT of SR 823 CL | *Date Drilled:* 06/06/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
4.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	971.4												
0.3	971.1						Topsoil - 4"						
		3 3 6	14	1		4.5+	Hard brown SILT AND CLAY (A-6a), some fine to coarse sand, trace gravel; damp.						
		5 16 17	12	2		4.5+							
5		15 26 31	16	3		4.5+	@ 6.0'-11.3', trace fine to coarse sand, contains rust stains.						
		9 21 32	15	4		4.5+		4	4	--	0	67	25
10		21 50/4	10	5		4.5+							
13.5	957.9	18 50/3	8	6			Severely weathered gray SHALE, rust stained.						
15		37 50/4	9	7									
17.5	953.9	Core 120"	Rec 110"	RQD 55%	R-1		Soft to medium hard brown SHALE; very fine grained, highly weathered, micaceous, laminated to thinly bedded, highly fractured, iron stained fractures.						
20													
25.0	946.4						Hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, laminated to medium bedded, slightly to moderately fractured, contains few to moderate argillaceous laminations. @ 25.0'-26.3', decomposed to highly weathered, contains abundant to moderate argillaceous laminations.						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

○ 57 →
○ 53 →
○ 50+
○ 50+
○ 50+

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-575 | *Location:* Sta. 642+59.6, 188.3 ft. RT of SR 823 CL | *Date Drilled:* 06/06/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
4.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	941.4												
32.3	939.1	Core 120"	Rec 118"	RQD 98%	R-2	*369	Hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, laminated to medium bedded, slightly to moderately fractured, contains few to moderate argillaceous laminations. @ 31.5'-32.3', brown.						
35													
35.6	935.8						Very hard pink LIMESTONE; slightly weathered, fossiliferous, argillaceous, micaceous, thickly bedded, slightly fractured.						
		Core 30"	Rec 30"	RQD 100%	R-3	*397	Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, fossiliferous, thickly bedded, unfractured, iron stained.						
40.0	931.4						Bottom of Boring - 40.0'						
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-576 | *Location:* Sta. 646+23.8, 273.5 ft. RT of SR 823 CL | *Date Drilled:* 06/14/05

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
3.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	801.8													Natural Moisture Content, % - ● PL — LL; Blows per foot - ○ 10 20 30 40
0.6	801.2						Topsoil - 7"							
		2 3 3	18	1		3.25	Very stiff to hard brown SILT AND CLAY (A-6a), some fine to coarse sand, trace gravel; damp. @ 1.5'-3.0', contains roots. @ 3.5'-9.2', contains rust stains.							
		7 12 8	18	2		3.75								
5														
		7 9 14	14	3		4.5+								
9.2	792.6	8 50/4	10	4A 4B		4.5+								50+
10.0	791.8						Severely weathered brown SANDSTONE fragments, argillaceous.							
		Core 120"	Rec 120"	RQD 60%	R-1		Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, laminated to medium bedded, highly fractured to broken, moderate argillaceous laminations. @ 10.3'-10.5',11.1'-11.2', 13.6'-13.7',14.3'-15.0', broken. @ 11.4', rust stained low angle fracture. @ 14.9',15.6',15.9', low angle fractures.							
15							@ 17.5'-20.0', gray, moderately weathered, thickly bedded, slightly fractured. @ 17.5'-18.3', broken.							
20.0	781.8						@ 18.6', 18.8', low angle fractures.							
							Bottom of Boring - 20.0'							
25														
30														

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-577 | *Location:* Sta. 646+12.4, 112.2 ft. LT of SR 823 CL | *Date Drilled:* 06/13/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
13.3' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	873.7													
0.3	873.4						Topsoil - 4"							
		4 7 6	18	1		3.0	Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand, little gravel; contains rust stains and rock fragments; damp.							
3.5	870.2	50/5	5	2			Severely weathered brown SANDSTONE fragments, argillaceous.							50+
5														
6.6	867.1	49 50/1	7	3			Hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, massively bedded, slightly to moderately fractured, contains iron stained fractures.							50+
10		Core 101"	Rec 101"	RQD 74%	R-1		@ 6.6'-7.0', 7.4'-8.2', 9.2'- 9.9', 12.2'-12.5', high angle fractures.							
15		Core 60"	Rec 60"	RQD 95%	R-2									
20.0	853.7						Bottom of Boring - 20.0'							
25														
30														

Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

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Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-579 | Location: Sta. 646+03.2, 143.1 ft. RT of SR 823 CL | Date Drilled: 6/7/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
3.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	931.9													
0.3	931.6						Topsoil - 3"							
		2 4 4	14	1		4.5+	Hard brown SILT (A-4b), little fine to coarse sand, little gravel, trace clay; contains rock fragments; damp.							
		9 17 21	16	2		4.5+								
5														
6.0	925.9	19 50/ 5	9	3			Brown SANDSTONE fragments, argillaceous.							50+
		25 50/ 2	6	4										50+
10.0	921.9						Hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, micaceous, thinly bedded to thickly bedded, slightly fractured, contains few to moderate argillaceous laminations. @ 12.4'-12.5', 10.8'-11.1', high angle fractures.							
15		Core 120"	Rec 120"	RQD 95%	R-1	*121								
20.0	911.9						Bottom of Boring - 20.0'							
25														
30														

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-580 | *Location:* Sta. 650+57.9, 42.9 ft. LT of SR 823 CL | *Date Drilled:* 06/09/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
10.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	916.4													Natural Moisture Content, % - ●
0.2	916.2						Topsoil - 2"							PL ⊢——⊣ LL
		2 3 3	11	1			Severely weathered brown SANDSTONE fragments, argillaceous.							Blows per foot - ○
		5 12 6	18	2										10 20 30 40
5		29 50/1	5	3										50+
		50/4	2	4										50+
10.0	906.4						Medium hard to hard brown SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, thinly to thickly bedded, slightly to moderately fractured, iron staining on fractures. @ 11.0', 15.1'-15.5', high angle fractures. @ 11.6'-11.8', broken zone.						
15		Core 120"	Rec 120"	RQD 87%	R-1	*335	@ 12.8'-20.0', gray, thickly bedded to laminated.							
20.0	896.4						Bottom of Boring - 20.0'							
25														
30														

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-582 | *Location:* Sta. 650+28.5, 110.7 ft. RT of SR 823 CL | *Date Drilled:* 06/14/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
3.8' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	885.2												
0.5	884.7						Topsoil - 6"						
		10 4 5	3	1		--	Stiff brown SILT AND CLAY (A-6a), some fine to coarse sand, little gravel; contains rust stains and rock fragments; damp.						
3.5	881.7												
		21 31 35	18	2			Severely weathered brown and gray SANDSTONE, argillaceous.						
5													
		8 50/3	9	3									
7.0	878.2						Medium hard brown SANDSTONE; very fine to fine grained, decomposed to highly weathered, argillaceous, medium bedded, highly fractured to broken, iron staining on fractures, contains few argillaceous laminations.						
10		Core 108"	Rec 108"	RQD 62%	R-1		@ 7.8'-8.1', 11.6'-11.8', 14.1'-14.5', broken zones.						
							@ 13.9'-14.2', high angle fracture.						
14.5	870.7						Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, medium bedded, slightly fractured.						
15		Core 48"	Rec 48"	RQD 96%	R-2		@ 17.3'-18.2', medium hard brown sandstone layer. @ 18.2'-18.5', brown calcareous clay layer.						
20.0	865.2						Bottom of Boring - 20.0'						
25													
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
66
50+

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-583 | *Location:* Sta. 651+47.8, 80.8 ft. LT of SR 823 CL | *Date Drilled:* 06/08/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
3.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	957.8						Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, little gravel; contains rock fragments; damp.							
		4 4 5	13	1		4.5+	No Topsoil/2" soil removed before drilling							
		4 4 4	12	2		4.25								
5		7 12 20	18	3		4.5+								
8.5	949.3	27 50/4	9	4			Severely weathered brown and gray SHALE fragments.							50+
10		10 22 30	14	5										52
13.5	944.3	50/5	3	6			Severely weathered SANDSTONE fragments, argillaceous, rust stained.							50+
15.0	942.8						Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded, moderately to slightly fractured. @ 15.0'-16.8', highly fractured.							
20		Core 120"	Rec 120"	RQD 95%	R-1	*394								
25.0	932.8						Bottom of Boring - 25.0'							
30														

STANDARD PENETRATION (N): Natural Moisture Content, % - ●; PL ⊢—⊣ LL; Blows per foot - ○; 10 20 30 40

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-584 | *Location:* Sta. 651+00.0, 41.8 ft. RT of SR 823 CL | *Date Drilled:* 06/09/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
1.5' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	919.0												
0.3	918.7						Topsoil - 3"						
		3 4 5	16	1		4.5+	Hard brown SILT AND CLAY (A-6a), some fine to coarse sand, trace gravel; contains rust stains.						
3.5	915.5												
		9 15 44	18	2			Severely weathered brown SANDSTONE, argillaceous.						
5													
		28 50/3	9	3									
		50/2	1	4									
10.0	909.0						Hard gray SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, thickly bedded, slightly fractured. @ 10.0',11.2',12.3',13.5', brown sandstone layers. @ 10.6',11.6', low angle filled fractures. @ 11.7', high angle fracture.						
15		Core 120"	Rec 120"	RQD 92%	R-1	*381							
20.0	899.0						Bottom of Boring - 20.0'						
25													
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
59
50+
50+

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-586 | *Location:* Sta. 652+35.9, 3.3 ft. LT of SR 823 CL | *Date Drilled:* 06/08/05 to 06/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
11.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	968.9													Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
0.1	968.8						Topsoil - 1"							
		5 6 6	12	1		4.5+	Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp.							
		8 26 25	16	2		4.5+	@ 3.5'-15.0', contains rock fragments.							
5		6 16 17	12	3		4.5+								51
		7 12 20	15	4		4.5+								
10		11 23 28	17	5		4.5+								51
		18 37 45	18	6		4.5+								
15														82
16.0	952.9	46 50/3	9	7			Severely weathered gray SHALE fragments.							50+
17.5	951.4	Core 66"	Rec 66"	RQD 85%	R-1	*108	Medium hard brownish gray SILTSTONE; very fine grained, decomposed to highly weathered, laminated to medium bedded, highly fractured, contains few argillaceous laminations.							
20														
23.2	945.7	Core 102"	Rec 102"	RQD 72%	R-2	*220	Very hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, calcareous, thickly bedded, moderately fractured, iron stained fractures. @ 23.3'-23.4', ferric band. @ 25.5', high angle fracture.							
25														
30														

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-586 | *Location:* Sta. 652+35.9, 3.3 ft. LT of SR 823 CL | *Date Drilled:* 06/08/05 to 06/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
11.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	938.9						Very hard brown SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, calcareous, thickly bedded, moderately fractured, iron stained fractures.						
35													
36.5	932.4	Core 120"	Rec 120"	RQD 100%	R-3	*265	Hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured, contains few argillaceous laminations.						
40													
45		Core 120"	Rec 120"	RQD 100%	R-4	*473							
50													
51.5	917.4						Bottom of Boring - 51.5'						
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-588 | *Location:* Sta. 653+34.4, 59.2 ft. LT of SR 823 CL | *Date Drilled:* 06/17/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
3.6' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	939.9													Natural Moisture Content, % - ●
0.2	939.7						Topsoil - 2"							PL ⊢——⊣ LL
		4 5 12	9	1		--	Severely weathered brown SANDSTONE, argillaceous.							Blows per foot - ○
		50/5	3	2										10 20 30 40
4.0	935.9													50+
5		Core 72"	Rec 72"	RQD 65%	R-1	*264	Hard brown SANDSTONE ; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, laminated to thickly bedded, slightly to moderately fractured, iron stained fractures. @ 4.0'-10.0', rust stained fractures. @ 5.1', low angle fracture. @ 8.0', high angle fracture.							
10							@ 10.0'-20.0', brown and gray, moderately fractured.							
15		Core 120"	Rec 120"	RQD 94%	R-2	*189								
20.0	919.9						Bottom of Boring - 20.0'							
25														
30														

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-590 | *Location:* Sta. 653+02.4, 208.9 ft. RT of SR 823 CL | *Date Drilled:* 06/08/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
18.3' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	979.7													Natural Moisture Content, % - ● PL ⊢——⊣ LL Blows per foot - ○ 10 20 30 40
0.2	979.5						Topsoil - 2"							
		9 16 42	18	1			Severely weathered brown SANDSTONE, argillaceous.							58
		27 50/2	8	2										50+
5														
6.0	973.7	14 48 50/3	14	3			Severely weathered brown SHALE.							50+
		14 50/4	8	4										50+
10														
11.0	968.7	Core 120"	Rec 120"	RQD 51%	R-1	*117	Soft to medium hard brown SHALE; highly weathered to decomposed, arenaceous, carbonaceous, micaceous, thinly bedded to thinly laminated, highly fractured. @ 11.0'-11.1', 12.6'-12.8', 17.7'-17.9', high angle rust stained fractures.							
15														
							@ 17.7'-18.7', medium hard brown SANDSTONE layer, fine grained.							
20														
25		Core 120"	Rec 120"	RQD 39%	R-2	*106								
27.6	952.1						Medium hard gray SANDSTONE interbedded with SHALE; fine grained, moderately weathered, argillaceous, micaceous, thinly bedded to thinly laminated, moderately fractured.							
30														

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-590 | Location: Sta. 653+02.4, 208.9 ft. RT of SR 823 CL | Date Drilled: 06/08/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
18.3' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	949.7						Medium hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, moderately weathered, arenaceous, micaceous, thinly bedded to thinly laminated, moderately fractured.						
35		Core 120"	Rec 120"	RQD 48%	R-3	*123							
38.2	941.5						Very hard orange LIMESTONE; moderately weathered, arenaceous, fossiliferous, medium bedded, slightly fractured, iron stained.						
40							@ 41.9'-42.4', vertical fracture, calcite spur on surface.						
43.5	936.2						Hard gray SANDSTONE interbedded with SILTSTONE; fine grained, slightly weathered, arenaceous, micaceous, thickly bedded to medium bedded, slightly fractured.						
45		Core 120"	Rec 120"	RQD 82%	R-4	*584	@ 47.1'-48.4', rust staining.						
50							@ 51.0'-57.7', pyritic.						
55		Core 80"			R-5	*390							
57.7	922.0						Bottom of Boring - 57.7'						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-593 | *Location:* Sta. 655+49.8, 197.4 ft. LT of SR 823 CL | *Date Drilled:* 6/20/05 to 6/21/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
5.7' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION
0	812.7						
0.5	812.2						Topsoil - 6"
		19 23 25	18	1		4.5+	Hard brown SANDY SILT (A-4a), some gravel; contains rock fragments and rust stains; damp.
		12 23 21	18	2		4.5+	
5		10 12 8	18	3		4.5+	
		13 24 50/2	14	4A 4B		4.5+	@ 9.5' to 9.7', weathered SANDSTONE, fine grained, argillaceous.
10.0	802.7						Soft brown SANDSTONE interbedded with SHALE; very fine to fine grained, highly weathered to decomposed, micaceous, thinly bedded, highly fractured, iron staining. @ 10.7',11.2',11.7',12.2', 13.0',13.4',14.0',14.3', 14.4', low angle fractures.
15.0	797.7	Core 120"	Rec 120"	RQD 93%	R-1		Medium hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, laminated to thinly bedded, moderately fractured, contains few to moderate argillaceous laminations. @ 14.9',15.1',16.4',18.1', low angle fractures. @ 17.9'-18.0', 19.2'-19.3', broken zones.
20		Core 48"	Rec 48"	RQD 88%	R-2		@ 20.0'-24.0', slightly weathered. @ 20.5'-21.0', broken zone.
24.0	788.7						Bottom of Boring - 24.0'
25							
30							

GRADATION

% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-594 | Location: Sta. 655+11.7, 49.6 ft. LT of SR 823 CL | Date Drilled: 06/16/05 to 06/17/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
13.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	891.0													Natural Moisture Content, % - ● PL ⊢⊣ LL; Blows per foot - ○ 10 20 30 40
0.3	890.7						Topsoil - 3"							
		5 6 10	8	1			Severely weathered brown SANDSTONE, argillaceous.							
		49 50/2	8	2										50+
5														
6.5	884.5	50/5	5	3										50+
		Core 42"	Rec 42"	RQD 45%	R-1		Soft to medium hard brownish gray SANDSTONE; fine grained, highly weathered to decomposed, argillaceous, micaceous, laminated to thinly laminated, highly fractured.							
10							@ 7.4'-7.7', 11.6'-11.7', broken zones with infilling.							
11.7	879.3						Medium hard to hard grayish brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded, moderately fractured, contains iron staining.							
15		Core 120"	Rec 120"	RQD 63%	R-2		@ 12.3'-12.5', 13.9'-14.1', broken zones. @ 12.5'-13.1', 17.2'-17.5', 17.5'-18.1', vertical fractures. @ 14.5'-14.8', argillaceous zone.							
20.0	871.0						Bottom of Boring - 20.0'							
25														
30														

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-596 | *Location:* Sta. 655+12.6, 88.5 ft. RT of SR 823 CL | *Date Drilled:* 06/15/05 to 06/16/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
20.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION
0	909.3						
0.3	909.0						Topsoil - 4"
		1 3 6	3	1			Loose brown GRAVEL WITH SAND (A-1-b), some silt; contains roots and rock fragments; damp.
3.5	905.8	7 8 6	3	2			Medium dense brown SANDY SILT (A-4a), some gravel; damp.
5		8 7 16	14	3			
8.5	900.8	5 2 5	3	4			Loose to medium dense brown SANDY SILT (A-4a), little gravel; damp.
10							
11.0	898.3	15 18 13	6	5			Severely weathered brown SANDSTONE fragments, argillaceous.
		12 50/4	10	6			
15.0	894.3						Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded, moderately fractured to broken; fractures contain soil infilling.
20		Core 120"	Rec 120"	RQD 59%	R-1		
20.5	888.8						Hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, argillaceous, micaceous, massive, moderately to slightly fractured, contains few argillaceous laminations.
25		Core 54"	Rec 54"	RQD 100%	R-2		
29.5	879.8						Bottom of Boring - 29.5'

GRADATION						
% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2574 | *Location:* Sta. 643+06.8, 103.7 ft. LT of SR 823 CL | *Date Drilled:* 1/30/06 to 1/31/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
56.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	939.5													
0.3	939.2						Topsoil - 3"							
		15 25 50/1	13	1			Severely weathered brown SANDSTONE, argillaceous.							50+
		50/1	0	2										50+
5.0	934.5						Hard brown SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, thickly bedded, moderately to highly fractured. @ 5.5'-5.8', 6.6', 7.2', 10.7', 11.5', low angle fractures.							
10		Core 114"	Rec 114"	RQD 96%	R1	*1363	@ 10.7'-12.1', qu = 7,770 psi, SDI = 98.3%.							
12.4	927.1						Hard gray SANDSTONE; fine grained, slightly to moderately weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.							
15														
20		Core 120"	Rec 120"	RQD 100%	R2	*1523	@ 20.1', fractured.							
25							@ 24.1'-24.3', iron staining. @ 25.8', 26.0'-26.2', thin shale beds. @ 26.0'-26.1', iron staining.							
30		Core	Rec	RQD	R3	*1581								

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2574 | *Location:* Sta. 643+06.8, 103.7 ft. LT of SR 823 CL | *Date Drilled:* 1/30/06 to 1/31/06

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
56.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	909.5	120"	120"	100%			Hard gray SANDSTONE; fine grained, slightly to moderately weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
35		Core 120"	Rec 120"	RQD 100%	R4	*1163							
40													
45		Core 120"	Rec 120"	RQD 100%	R5	*1297							
50													
55		Core	Rec	RQD	R6	*1607							
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2574 | *Location:* Sta. 643+06.8, 103.7 ft. LT of SR 823 CL | *Date Drilled:* 1/30/06 to 1/31/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
56.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	879.5	120"	120"	100%			Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
65		Core 120"	Rec 120"	RQD 100%	R7	*1236	@ 64.6'-66.0', qu = 9,892 psi, SDI = 86.7%.						
70							@ 72.1'-72.7', high angle fracture with iron staining.						
75							@ 74.5'-75.4', iron staining.						
80		Core 120"	Rec 120"	RQD 100%	R8	*1813							
85							@ 84.5'-84.8', broken, core loss. @ 84.9'-85.7', iron staining. @ 85.6', 88.2', 88.9', 89.9', low angle fractures.						
90		Core	Rec	RQD	R9	*1276	@ 87.3'-89.9', iron staining.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2574 | *Location:* Sta. 643+06.8, 103.7 ft. LT of SR 823 CL | *Date Drilled:* 1/30/06 to 1/31/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
56.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢⊣ LL / Blows per foot - ○
90	849.5	120"	120"	96%			Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, trace pyritic, thickly bedded to massive, unfractured to slightly fractured.							10 20 30 40
95														
100		Core 120"	Rec 120"	RQD 94%	R10	*1819	@ 100.6'-102.0', qu = 9,899 psi, SDI = 97.9%. @ 102.9'-103.5', iron staining, high angle fracture.							
105														
109.6	829.9	Core 120"	Rec 120"	RQD 96%	R11	*1189	Medium hard gray SANDSTONE; very fine grained, slightly weathered, argillaceous, micaceous, pyritic, laminated to thinly bedded, contains few argillaceous laminations. @ 110.9'-111.2', high angle fracture. @ 110.9', 111.0', 111.2', low angle fractures.							
110														
115		Core 66"	Rec 66"	RQD 100%	R12	*1862								
120.0	819.5						Bottom of Boring - 120.0'							

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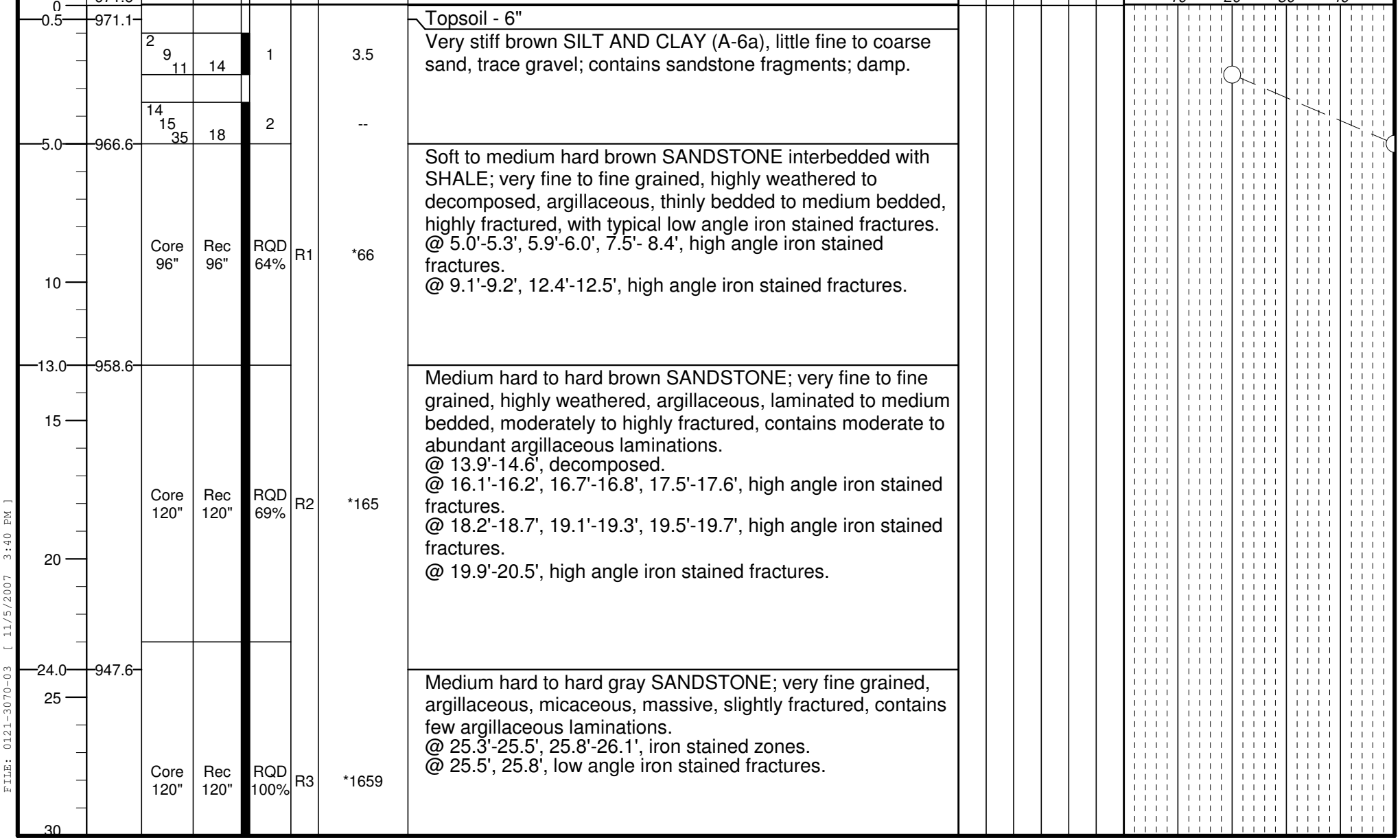
Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-2575 | Location: Sta. 643+21.2, 155.6 ft. RT of SR 823 CL | Date Drilled: 1/31/06 to 2/1/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
33.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	971.6												
0.5	971.1						Topsoil - 6"						
		2 9 11	14	1		3.5	Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; contains sandstone fragments; damp.						
		14 15 35	18	2		--							
5.0	966.6	Core 96"	Rec 96"	RQD 64%	R1	*66	Soft to medium hard brown SANDSTONE interbedded with SHALE; very fine to fine grained, highly weathered to decomposed, argillaceous, thinly bedded to medium bedded, highly fractured, with typical low angle iron stained fractures. @ 5.0'-5.3', 5.9'-6.0', 7.5'- 8.4', high angle iron stained fractures. @ 9.1'-9.2', 12.4'-12.5', high angle iron stained fractures.						
10													
13.0	958.6	Core 120"	Rec 120"	RQD 69%	R2	*165	Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, laminated to medium bedded, moderately to highly fractured, contains moderate to abundant argillaceous laminations. @ 13.9'-14.6', decomposed. @ 16.1'-16.2', 16.7'-16.8', 17.5'-17.6', high angle iron stained fractures. @ 18.2'-18.7', 19.1'-19.3', 19.5'-19.7', high angle iron stained fractures. @ 19.9'-20.5', high angle iron stained fractures.						
15													
20													
24.0	947.6	Core 120"	Rec 120"	RQD 100%	R3	*1659	Medium hard to hard gray SANDSTONE; very fine grained, argillaceous, micaceous, massive, slightly fractured, contains few argillaceous laminations. @ 25.3'-25.5', 25.8'-26.1', iron stained zones. @ 25.5', 25.8', low angle iron stained fractures.						
25													
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2575 | *Location:* Sta. 643+21.2, 155.6 ft. RT of SR 823 CL | *Date Drilled:* 1/31/06 to 2/1/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
33.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	941.6												
31.0	940.6						Medium hard to hard gray SANDSTONE; very fine grained, argillaceous, micaceous, massive, slightly fractured, contains few argillaceous laminations.						
35		Core 120"	Rec 120"	RQD 98%	R4	*1508	Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, massively bedded, slightly fractured. @ 31.0', low angle clay filled fracture. @ 33.0'-33.4', vuggy. @ 38.4', 38.6', low angle iron stained fractures.						
40													
42.7	928.9						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured. @ 42.9'-43.2', iron stained zone. @ 46.7', low angle clay filled fracture.						
45													
50		Core 120"	Rec 120"	RQD 100%	R5	*1436							
55		Core 120"	Rec 120"	RQD 100%	R6	*1410							
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2575 | *Location:* Sta. 643+21.2, 155.6 ft. RT of SR 823 CL | *Date Drilled:* 1/31/06 to 2/1/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
33.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	911.6						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
65		Core 120"	Rec 120"	RQD 100%	R7	*1517							
70													
75		Core 120"	Rec 120"	RQD 100%	R8	*1282							
80							@ 79.1', low angle clay filled fracture.						
85		Core 120"	Rec 120"	RQD 100%	R9	*801							
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2575 | *Location:* Sta. 643+21.2, 155.6 ft. RT of SR 823 CL | *Date Drilled:* 1/31/06 to 2/1/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
33.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	881.6						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
95		Core 120"	Rec 120"	RQD 100%	R10	*1398	@ 98.3'-98.4', ferric band.						
100													
105		Core 120"	Rec 120"	RQD 100%	R11	*2002							
110													
115		Core 120"	Rec 120"	RQD 100%	R12	*1462	@ 117.1'-118.1', 120.3'- 121.3', iron stained zone.						
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2575 | *Location:* Sta. 643+21.2, 155.6 ft. RT of SR 823 CL | *Date Drilled:* 1/31/06 to 2/1/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
33.8' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
120	851.6						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.							Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
125		Core 120"	Rec 120"	RQD 100%	R13	*1291								
130														
135		Core 120"	Rec 120"	RQD 100%	R14	*801								
140														
141.8	829.8						Hard gray SANDSTONE; very fine grained, slightly weathered, argillaceous, pyritic, micaceous, thinly laminated to thinly bedded.							
145		Core 84"	Rec 84"	RQD 90%	R15	*70	@ 146.7', 147.0', 147.1', 147.3', 147.4', low angle clay filled fractures.							
150.0	821.6						Bottom of Boring - 150.0'							

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

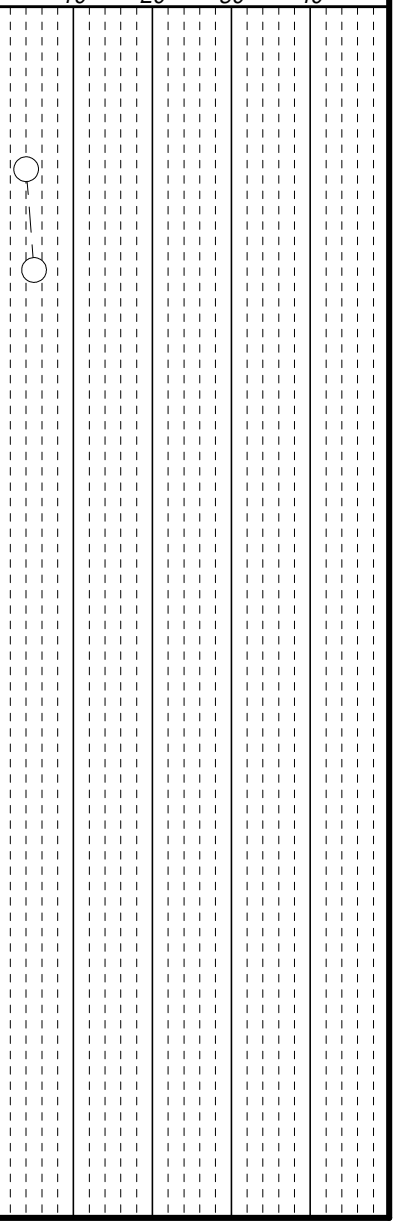
Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2577 | *Location:* Sta. 646+19.0, 109.4 ft. LT of SR 823 CL | *Date Drilled:* 01/31/06 to 02/01/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
76.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	873.8												
0.2	873.6						Topsoil - 2"						
		0 2 2	12	1		--	Soft brown SILT AND CLAY (A-6a), trace to little fine to coarse sand; moist.						
4.5	869.3												
5		5 4 1	6	2		3.5	Very stiff brown SILT (A-4b), little clay, trace fine to coarse sand; dry to damp.						
6.5	867.3						Hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, thickly bedded, moderately fractured.						
		Core 90"	Rec 89"	RQD 94%	R1	*978	@ 7.3', 8.5', low angle fracture.						
10.2	863.6						Hard gray SANDSTONE; very fine to fine grained, slightly to highly weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured, few pyritic inclusions throughout.						
							@ 9.2', 11.0', 11.6', 13.5', low angle fracture.						
15							@ 14.4'-14.7', 15.5'-18.1', 19.1'-22.6', iron stained. @ 14.7', 17.9', 19.8', 20.1', 22.1', low angle fracture.						
		Core 120"	Rec 120"	RQD 95%	R2	*867	@ 16.9'-17.6', 23.1'-24.1', high angle fracture.						
20													
25							@ 33.5'-33.6', high angle fracture.						
		Core 120"	Rec 120"	RQD 99%	R3	*1271							
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2577 | *Location:* Sta. 646+19.0, 109.4 ft. LT of SR 823 CL | *Date Drilled:* 01/31/06 to 02/01/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
76.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	843.8						Hard gray SANDSTONE; very fine to fine grained, slightly to highly weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured, few pyritic inclusions throughout.						
35							@ 34.0'-38.3', moderately weathered.						
38.3	835.5						@ 36.3', low angle fracture. @ 38.8'-40.0', 43.1'-43.2', high angle fractures.						
40		Core 120"	Rec 120"	RQD 94%	R4	*885	Hard gray SANDSTONE; very fine grained, slightly weathered, argillaceous, laminated to thinly bedded, unfractured to slightly fractured. @ 39.1'-40.8', fine grained band.						
45													
50		Core 120"	Rec 117"	RQD 96%	R5	*1642	@ 44.2'-44.3', 46.8'-47.0', broken zones.						
55													
60		Core 120"	Rec 120"	RQD 100%	R6	*313							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2577 | *Location:* Sta. 646+19.0, 109.4 ft. LT of SR 823 CL | *Date Drilled:* 01/31/06 to 02/01/06

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (Prior to coring)
76.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
60	813.8						Hard gray SANDSTONE; very fine grained, slightly weathered, argillaceous, laminated to thinly bedded, unfractured to slightly fractured.							
65		Core 120"	Rec 120"	RQD 100%	R7	*267								
70														
75		Core 85"	Rec 85"	RQD 100%	R8	*467								
80														
81.1	792.7						Bottom of Boring - 81.1'							
85														
90														

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2579 | *Location:* Sta. 646+01.9, 141.8 ft. RT of SR 823 CL | *Date Drilled:* 01/30/06 to 01/31/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
106.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	930.0													
0.3	929.7						Topsoil - 3"							
							Severely weathered brown SANDSTONE, argillaceous.							
		33 50/3		1										50+
3.5	926.5						Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded to massive, highly fractured.							
5														
		Core 84"	Rec 84"	RQD 52%	R1	*896								
8.0	922.0						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured.							
10							@ 8.0'-10.7', iron stained.							
							@ 9.8', 12.9', low angle fractures.							
							@ 12.7'-13.0', 15.8'-16.2', iron stained.							
15		Core 120"	Rec 120"	RQD 100%	R2	*980								
20														
25		Core 120"	Rec 120"	RQD 100%	R3	*978								
30														

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2579 | *Location:* Sta. 646+01.9, 141.8 ft. RT of SR 823 CL | *Date Drilled:* 01/30/06 to 01/31/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
106.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30.0	900.0						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, massive, slightly fractured.						
35		Core 120"	Rec 120"	RQD 100%	R4	*1593							
40													
45		Core 120"	Rec 120"	RQD 100%	R5	*1616							
50													
55		Core 120"	Rec 120"	RQD 100%	R6	*1645							
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-2579 | Location: Sta. 646+01.9, 141.8 ft. RT of SR 823 CL | Date Drilled: 01/30/06 to 01/31/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
106.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	870.0						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, massive, slightly fractured.						
							@ 64.7'-65.4', high angle fracture.						
65		Core 120"	Rec 120"	RQD 98%	R7	*1503	@ 65.0'-65.2', calcareous zone.						
70													
75		Core 120"	Rec 120"	RQD 100%	R8	*1503	@ 75.9'-76.5', 77.5'-78.8', iron staining. @ 76.5', 78.0', 78.6', low angle fractures.						
80													
85		Core 120"	Rec 120"	RQD 100%	R9	*1384							
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2579 | *Location:* Sta. 646+01.9, 141.8 ft. RT of SR 823 CL | *Date Drilled:* 01/30/06 to 01/31/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
106.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90.0	840.0						Medium hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, arenaceous, micaceous, pyritic, massive, slightly fractured.						
							@ 94.0', low angle fracture.						
							@ 93.5'-93.8', 96.6'-96.7', 97.2'-95.7', iron staining.						
95		Core 120"	Rec 120"	RQD 100%	R10	*1112	@ 95.3'-95.7', high angle fracture.						
100							@ 99.5'-110.5', laminated to thinly bedded.						
							@ 102.8'-102.9', broken zone.						
105		Core 120"	Rec 120"	RQD 100%	R11	*563	@ 106.6', low angle fracture.						
110													
110.5	819.5						Bottom of Boring - 110.5'						
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2580 | *Location:* Sta. 650+57.9, 42.9 ft. LT of SR 823 CL | *Date Drilled:* 3/15/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
9.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	916.4													
0.3	916.1						Topsoil - 4"							
		4 6 4	14	1			Medium dense brown SILT (A-4b), little fine to coarse sand; contains sandstone fragments; damp.							
3.5	912.9	7 50/2	8	2			Severely weathered brown SANDSTONE.							50+
4.5	911.9						Very hard brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, massive, moderately fractured. @ 5.0'-5.1', 8.0'-8.1', 9.2'- 9.5', high angle fractures. @ 5.3', 6.4', 6.5', low angle fractures.							
5		Core 108"	Rec 102"	RQD 79%	R1		@ 9.5'-9.7', broken zone.							
10														
10.6	905.8						Very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.							
15		Core 120"	Rec 120"	RQD 100%	R2									
20														
25		Core 120"	Rec 120"	RQD 100%	R3		@ 28.8', low angle fracture.							
30														

Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2580 | *Location:* Sta. 650+57.9, 42.9 ft. LT of SR 823 CL | *Date Drilled:* 3/15/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
9.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	886.4						Very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
							@ 33.5'-33.6', brown highly weathered.						
35							@ 34.4', low angle fracture.						
		Core 120"	Rec 120"	RQD 100%	R4								
40													
45													
		Core 120"	Rec 120"	RQD 100%	R5								
50							@ 49.1'-49.5', calcareous with turbidity.						
55													
		Core 120"	Rec 120"	RQD 100%	R6								
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2580 | *Location:* Sta. 650+57.9, 42.9 ft. LT of SR 823 CL | *Date Drilled:* 3/15/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
9.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	856.4						Very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
		Core 120"	Rec 120"	RQD 100%	R7		@ 63.6'-65.1', pyritic.						
65													
70							@ 71.2'-71.3', pyritic.						
75							@ 76.1'-76.5', 81.0'-81.4', contains argillaceous laminations. @ 76.4', low angle fracture.						
		Core 120"	Rec 120"	RQD 100%	R8	*1288							
80													
83.0	833.4						Hard light and dark gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, calcareous, laminated to medium bedded, slightly fractured, contains abundant argillaceous laminations.						
85							@ 86.7'-87.0', calcareous.						
		Core 120"	Rec 120"	RQD 100%	R9	*1090							
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2580 | *Location:* Sta. 650+57.9, 42.9 ft. LT of SR 823 CL | *Date Drilled:* 3/15/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
9.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	826.4						Hard light and dark gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, calcareous, laminated to medium bedded, slightly fractured, contains abundant argillaceous laminations.						
95		Core 120"	Rec 120"	RQD 100%	R10	*1186	@ 96.0'-97.7', slightly pyritic.						
100							@ 98.7'-99.0', high angle fracture.						
105		Core 89"	Rec 89"	RQD 100%	R-11	*1091							
110													
110.9	805.5						Bottom of Boring - 110.9'						
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2584 | *Location:* Sta. 650+98.8, 38.8 ft. RT of SR 823 CL | *Date Drilled:* 3/15/06 to 3/16/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
70.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	918.4													
0.3	918.1						Topsoil - 3"							
		1 3 2	12	1		2.5	Very stiff brown and gray SANDY SILT (A-4a), trace clay, trace gravel; contains sandstone fragments; damp to moist.							
3.0	915.4													
		7 11 35	17	2		4.0	Hard brown and gray SILT (A-4b), little clay, trace gravel; contains sandstone fragments; damp to moist.	6	19	--	7	52	16	
5														
5.5	912.9													
		50/2	1	3			Severely weathered brown and gray SANDSTONE.							50+
6.5	911.9						Very hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured. @ 7.3', 7.6', 8.2', 8.6', 8.8', 12.3', low angle fractures. @ 8.1'-8.6', qu = 8,035 psi. @ 10.5'-11.5', SDI = 99.5%.							
10		Core 84"	Rec 84"	RQD 87%	R1									
13.5	904.9						Very hard gray SANDSTONE; very fine to fine grained, unweathered to slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.							
15														
		Core 120"	Rec 120"	RQD 100%	R2									
20														
25														
		Core 120"	Rec 120"	RQD 100%	R3		@ 28.0'-28.4', qu = 10,611 psi. @ 28.5'-29.5', SDI = 93.8%.							
30														

STANDARD PENETRATION (N): Natural Moisture Content, % - ● ; PL ⊢——⊣ LL ; Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2584 | *Location:* Sta. 650+98.8, 38.8 ft. RT of SR 823 CL | *Date Drilled:* 3/15/06 to 3/16/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
70.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢ LL / Blows per foot - ○ (10 20 30 40)
30	888.4						Very hard gray SANDSTONE; very fine to fine grained, unweathered to slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.							
35		Core 120"	Rec 120"	RQD 100%	R4									
40														
45		Core 120"	Rec 120"	RQD 100%	R5		@ 48.9'-51.5', pyritic.							
50														
55		Core 120"	Rec 120"	RQD 100%	R6									
60														

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2584 | *Location:* Sta. 650+98.8, 38.8 ft. RT of SR 823 CL | *Date Drilled:* 3/15/06 to 3/16/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
70.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	858.4						Very hard gray SANDSTONE; very fine to fine grained, unweathered to slightly weathered, argillaceous, micaceous, pyritic, massive, unfractured to slightly fractured.						
65		Core 120"	Rec 120"	RQD 100%	R7								
70							@ 71.0'-71.2', iron staining.						
75		Core 120"	Rec 120"	RQD 100%	R8	*1146							
80													
84.6	833.8						Hard light and dark gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, calcareous, very thinly bedded to thinly bedded, slightly to moderately fractured.						
85		Core 120"	Rec 120"	RQD 100%	R9	*946	@ 85.7'-85.8', 86.6'-87.4', 89.0'-89.4', calcareous. @ 85.9', low angle fracture. @ 86.0'-86.9', SDI = 94.1%.						
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2584 | *Location:* Sta. 650+98.8, 38.8 ft. RT of SR 823 CL | *Date Drilled:* 3/15/06 to 3/16/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
70.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	828.4						@ 87.6'-88.1', qu = 7,836 psi. Hard light and dark gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, calcareous, very thinly bedded to thinly bedded, slightly to moderately fractured.						
95		Core 120"	Rec 120"	RQD 100%	R10	*447							
100							@ 98.8', pyritic.						
105		Core 78"	Rec 78"	RQD 100%	R11	*610							
110.0	808.4						Bottom of Boring - 110.0'						
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2588 | *Location:* Sta. 653+27.7, 61.4 ft. LT of SR 823 CL | *Date Drilled:* 3/20/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: 81.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	940.6												
0.2	940.4						Topsoil - 2"						
		5 36 14	13	1			Severely weathered grayish brown SANDSTONE, argillaceous, micaceous.						
		50/3	3	2									
5.0	935.6						Hard to very hard brown and gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, massive, slightly to moderately fractured. @ 5.8'-6.2',7.5'-7.8',10.0' -10.3', broken zones. @ 6.4',6.5',6.8',6.9',8.5', 13.7',low angle fractures.						
10		Core 120"	Rec 120"	RQD 84%	R-1								
15.0	925.6						Hard to very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured. @ 16.8'-16.9', 18.9'-19.1', calcareous.						
20		Core 120"	Rec 120"	RQD 100%	R-2		@ 19.3'-19.8', high angle fracture.						
25							@ 25.0'-25.2', 30.3'-30.5', high angle fractures. @ 25.5'-25.7', 30.2'-30.3', calcareous.						
30		Core 120"	Rec 120"	RQD 100%	R-3								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2588 | *Location:* Sta. 653+27.7, 61.4 ft. LT of SR 823 CL | *Date Drilled:* 3/20/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: 81.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	910.6						Hard to very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
35													
40		Core 120"	Rec 120"	RQD 100%	R-4								
45													
50		Core 120"	Rec 120"	RQD 100%	R-5		@ 50.6'-50.7', argillaceous laminations. @ 52.7'-52.8', broken.						
55							@ 58.8'-58.9', 60.0'-60.5', contains argillaceous laminations. @ 59.5'-59.6', calcareous.						
60		Core 120"	Rec 120"	RQD 100%	R-6								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2588 | *Location:* Sta. 653+27.7, 61.4 ft. LT of SR 823 CL | *Date Drilled:* 3/20/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: 81.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	880.6						Hard to very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured. @ 60.8', pyritic. @ 61.6', low angle fracture.						
65							@ 64.4', low angle fracture. @ 65.7'-65.8', contains argillaceous laminations.						
70		Core 120"	Rec 120"	RQD 100%	R-7		@ 72.3', low angle fracture. @ 72.5'-74.2', slightly calcareous.						
75							@ 74.6'-74.8', high angle fracture. @ 75.7', 80.3'- 81.8', pyritic.						
80		Core 120"	Rec 120"	RQD 100%	R-8	*1242	@ 80.7'-81.8', burrows and turbidity.						
85													
90		Core 120"	Rec 120"	RQD 100%	R-9		@ 88.4',88.9',89.7', pyritic.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2588 | *Location:* Sta. 653+27.7, 61.4 ft. LT of SR 823 CL | *Date Drilled:* 3/20/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: 81.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	850.6					*1038	Hard to very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
95													
100		Core 120"	Rec 120"	RQD 100%	R-10	*1192	@ 99.2'-99.9', burrows.						
105							@ 103.5'-103.6', 104.6'- 104.7', calcareous. @ 105.3',108.8',112.6', low angle fractures.						
107.3	833.3						Hard light and dark gray SANDSTONE interbedded with SHALE; very fine to fine grained, slightly weathered, calcareous, laminated to medium bedded, slightly fractured.						
110		Core 120"	Rec 120"	RQD 100%	R-11	*1036	@ 108.1'-109.5', 111.0'- 111.6', calcareous.						
115							@ 113.4'-113.5', broken.						
120		Core 120"	Rec 120"	RQD 100%	R-12		@ 118.9', pyritic.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2588 | *Location:* Sta. 653+27.7, 61.4 ft. LT of SR 823 CL | *Date Drilled:* 3/20/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: 81.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	820.6					*1021	Hard light and dark gray SANDSTONE interbedded with SHALE; very fine to fine grained, slightly weathered, calcareous, laminated to medium bedded, slightly fractured. @ 122.0', low angle fracture.						
125		Core 120"	Rec 120"	RQD 100%	R-13	*545							
130													
135							@ 135.5', low angle fracture. @ 138.4'-138.6', clay seam.						
140		Core 120"	Rec 120"	RQD 100%	R-14								
145							@ 144.6'-144.7', high angle fracture.						
150.0	790.6	Core 60"	Rec 60"	RQD 100%	R-15	*937	@ 149.7', low angle fracture. Bottom of Boring - 150.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2588 | *Location:* Sta. 653+27.7, 61.4 ft. LT of SR 823 CL | *Date Drilled:* 3/20/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: 81.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
150	790.6												
155													
160													
165													
170													
175													
180													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2590 | *Location:* Sta. 653+02.4, 208.9 ft. RT of SR 823 CL | *Date Drilled:* 3/13/06 to 3/15/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
127.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	979.7													Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
0.1	979.6						Topsoil - less than 1"							
1.5	978.2	8 23 50/5	17	1A 1B		3.0	Very stiff brown SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; contains organic material; moist.							50+
		40 50/5	11	2			Severely weathered brown SANDSTONE, argillaceous.							50+
5.0	974.7	Core 108"	Rec 108"	RQD 44%	R-1		Very hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, carbonaceous, laminated to massive, moderately fractured. @ 5.2'-5.3', high angle fracture. @ 6.2',8.6',9.5',11.8',12.8' 13.2',13.4', low angle fractures. @ 6.2' to 6.6', iron staining. @ 7.4'-7.5', 11.9'-12.1', broken.							
10														
15							@ 14.7',16.0',21.9', low angle fractures. @ 16.6'-16.9', 19.1'-19. 2', 22.2'-22.6', high angle fractures.							
19.0	960.7	Core 120"	Rec 120"	RQD 79%	R-2		Medium hard dark gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, laminated to massive, highly fractured.							
20														
25							@ 23.5'-23.8', clay seam. @ 25.6'-25.7', 26.5'-28.0', high angle fractures.							
29.3	950.4	Core 120"	Rec 120"	RQD 91%	R-3									
30							Very hard gray SANDSTONE; very fine to fine grained.							

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2590 | *Location:* Sta. 653+02.4, 208.9 ft. RT of SR 823 CL | *Date Drilled:* 3/13/06 to 3/15/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
127.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢ LL / Blows per foot - ○
30	949.7						Very hard gray SANDSTONE; very fine to fine grained, unweathered to slightly weathered, argillaceous, micaceous, laminated to massive, slightly fractured.							10 20 30 40
35							@ 36.3', 38.0', low angle fractures.							
37.8	941.9	Core 120"	Rec 120"	RQD 98%	R-4		Very hard brown SANDSTONE; very fine to fine grained, highly weathered, calcareous, massive, unfractured to slightly fractured.							
40							@ 39.0'-40.5', calcareous intrusion.							
45														
48.9	930.8	Core 120"	Rec 120"	RQD 100%	R-5		Very hard gray SANDSTONE; very fine to fine grained, unweathered to slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.							
50														
55														
60		Core 120"	Rec 120"	RQD 100%	R-6									

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2590 | *Location:* Sta. 653+02.4, 208.9 ft. RT of SR 823 CL | *Date Drilled:* 3/13/06 to 3/15/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
127.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	919.7						Very hard gray SANDSTONE; very fine to fine grained, unweathered to slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
65		Core 120"	Rec 120"	RQD 100%	R-7								
70							@ 73.3'-73.5', calcareous.						
75													
80		Core 120"	Rec 120"	RQD 100%	R-8	*1302							
85													
90		Core 120"	Rec 120"	RQD 100%	R-9	*1607							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2590 | *Location:* Sta. 653+02.4, 208.9 ft. RT of SR 823 CL | *Date Drilled:* 3/13/06 to 3/15/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
127.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	889.7						Very hard gray SANDSTONE; very fine to fine grained, unweathered to slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
95		Core 120"	Rec 120"	RQD 100%	R-10	*1520							
100							@ 104.0'-104.2', high angle fracture.						
105							@ 105.7', pyritic.						
110		Core 120"	Rec 120"	RQD 100%	R-11	*1282	@ 108.7'-108.9', slightly weathered.						
115							@ 113.5'-113.6', pyritic.						
120		Core 120"	Rec 120"	RQD 100%	R-12	*1537							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2590 | *Location:* Sta. 653+02.4, 208.9 ft. RT of SR 823 CL | *Date Drilled:* 3/13/06 to 3/15/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
127.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	859.7						Very hard gray SANDSTONE; very fine to fine grained, unweathered to slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured. @ 121.2'-124.0', brown and weathered.						
125		Core 120"	Rec 120"	RQD 100%	R-13	*1105							
130							@ 131.2', low angle fracture.						
135		Core 120"	Rec 120"	RQD 100%	R-14	*928							
140							@ 139.8', low angle fracture. @ 142.2'-142.9', calcareous.						
145													
147.0	832.7						Hard to very hard light and dark gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to medium bedded, slightly to moderately						
150		Core 120"	Rec 120"	RQD 100%	R-15	*627							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2590 | *Location:* Sta. 653+02.4, 208.9 ft. RT of SR 823 CL | *Date Drilled:* 3/13/06 to 3/15/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
127.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
150	829.7						fractured. Hard to very hard light and dark gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to medium bedded, slightly to moderately fractured. @ 149.5'-149.6', 151.1'-151.9', calcareous. @ 151.1'-151.3',151.3'- 151.4',153.8'-154.0', high angle fractures. @ 154.0'-190.7', pyritic. @ 155.4', 158.6', low angle fractures.						
155		Core 120"	Rec 120"	RQD 100%	R-16	*267							
160													
165		Core 120"	Rec 120"	RQD 100%	R-17	*1575							
170													
175		Core 120"	Rec 120"	RQD 100%	R-18	*908	@ 178.4'-178.6', broken.						
180													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2590 | *Location:* Sta. 653+02.4, 208.9 ft. RT of SR 823 CL | *Date Drilled:* 3/13/06 to 3/15/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
127.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
180	799.7						Hard to very hard light and dark gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to medium bedded, slightly to moderately fractured.						
185		Core 81"	Rec 81"	RQD 100%	R-19	*975							
190													
190.7	789.0						Bottom of Boring - 190.7'						
195													
200													
205													
210													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

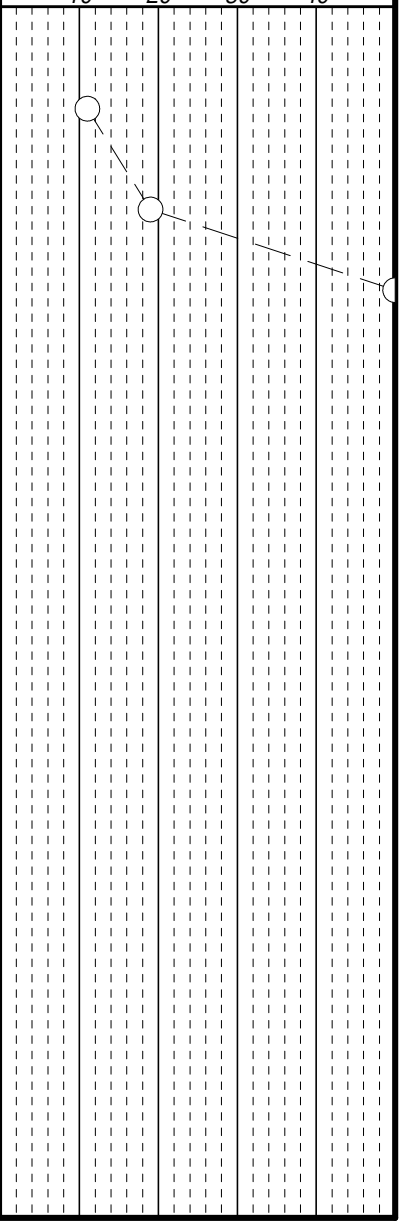
Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2594 | *Location:* Sta. 655+04.8, 58.5 ft. LT of SR 823 CL | *Date Drilled:* 3/22/06 to 3/23/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
^	892.6												
0.2	892.4						Topsoil - 2"						
		5 5 6	16	1			Medium dense brown SILT (A-4b), little clay, little fine to coarse sand; contains sandstone fragments; damp.						
		6 8 11	18	2									
5													
6.0	886.6	5 50/5	9	3			Severely weathered brown SANDSTONE, argillaceous.						
7.0	885.6						Hard brown and gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, laminated to massive, highly fractured, contains moderate to abundant argillaceous laminations.						
10		Core 84"	Rec 83"	RQD 74%	R-1		@ 7.0'-7.3', iron staining. @ 8.0',10.1',10.5',10.9',11.6' 12.7', low angle fractures. @ 8.3'-8.5',8.5'-8.8',11.3' -11.5', high angle fractures.						
13.5	879.1						@ 13.1'-13.2', broken.						
15							Very hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, calcareous, massive, slightly fractured, contains few argillaceous laminations. @ 15.6',16.2',18.6',18.7', low angle fractures. @ 16.5'-16.9', high angle fracture.						
20		Core 120"	Rec 120"	RQD 100%	R-2								
25							@ 23.2'-25.1', highly weathered, calcareous. @ 23.7', low angle fracture.						
30		Core 120"	Rec 120"	RQD 100%	R-3		@ 28.0'-30.8', low angle fractures.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/5/2007 3:40 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2594 | *Location:* Sta. 655+04.8, 58.5 ft. LT of SR 823 CL | *Date Drilled:* 3/22/06 to 3/23/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30	862.6						Very hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, calcareous, massive, slightly fractured, contains few argillaceous laminations. @ 32.2'-36.9', highly weathered. @ 32.6'-33.1', high angle fracture. @ 35.2'-35.3', 36.2'-36.3', high angle fractures.							Natural Moisture Content, % - ● PL ⊢——⊣ LL Blows per foot - ○ 10 20 30 40
35														
36.9	855.7	Core 120"	Rec 120"	RQD 100%	R-4		Very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, pyritic, massive, unfractured to slightly fractured.							
40							@ 43.7', low angle fracture.							
45														
50		Core 120"	Rec 120"	RQD 94%	R-5		@ 50.2', low angle fracture with clay seam. @ 51.8'-53.9', weathered. @ 55.5'-55.6', 58.5'-58.7', calcareous.							
55														
55.5	837.1	Core 120"	Rec 120"	RQD 98%	R-6		Very hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, slightly to moderately weathered, calcareous, laminated to thickly bedded, slightly to moderately fractured. @ 59.4',60.6',62.8',63.2',63.3' 63.7', low angle fractures.							
60														

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2594 | *Location:* Sta. 655+04.8, 58.5 ft. LT of SR 823 CL | *Date Drilled:* 3/22/06 to 3/23/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	832.6						Very hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, slightly to moderately weathered, calcareous, laminated to thickly bedded, slightly to moderately fractured. @ 61.5'-62.4', limestone bed.						
65		Core 120"	Rec 120"	RQD 100%	R-7		@ 64.8',65.9',67.1',68.8',70.6', low angle fractures.						
70													
75													
80		Core 120"	Rec 120"	RQD 100%	R-8	*557							
85							@ 83.8'-84.0', high angle fracture.						
90		Core 120"	Rec 120"	RQD 100%	R-9	*1302	@ 89.6', low angle fracture.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2594 | *Location:* Sta. 655+04.8, 58.5 ft. LT of SR 823 CL | *Date Drilled:* 3/22/06 to 3/23/06

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	802.6						Very hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, slightly to moderately weathered, calcareous, laminated to thickly bedded, slightly to moderately fractured. @ 91.2', low angle fracture.						
95		Core 72"	Rec 72"	RQD 100%	R-10	*1622							
100.0	792.6						Bottom of Boring - 100.0'						
105													
110													
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:40 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-604 | Location: Sta. 662+28.6, 294.1 ft. LT of SR 823 CL | Date Drilled: 06/13/05 to 06/14/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	816.0													Natural Moisture Content, % - ●
0.2	815.8						Topsoil - 2" / 1.5' soil removed before drilling.							PL ⊢—⊣ LL
		2 2 3	12	1		4.5	Hard brown SILT (A-4b), some fine to coarse sand, little clay, trace gravel; contains rust stains and rock fragments; damp.							Blows per foot - ○
		2 3 4	14	2		4.5+		9	15	--	9	51	16	
5		3 1 4	18	3		4.25								
		3 7 9	18	4		4.5								
10														
11.0	805.0	23 50/5	10	5			Severely weathered brownish gray SHALE, contains rust stains.							50+
12.0	804.0						Medium hard grayish brown SANDSTONE; highly weathered, micaceous, argillaceous, pytitic, thinly laminated to thinly bedded, highly fractured to broken, rust stained fractures; contains few to moderate argillaceous laminations. @ 13.6', 15.2', 17.5', 18.3', 20.3', 20.7', 21.5', high angle fractures.							
15		Core 120"	Rec 120"	RQD 22%	R1									
20														
22.0	794.0						Bottom of Boring - 22.0'							
25														
30														

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-605 | *Location:* Sta. 661+84.4, 117.3 ft. LT of SR 823 CL | *Date Drilled:* 06/14/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
3.3' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	779.2												
0.3	778.9						Topsoil - 4" / 3.0' soil removed before drilling.						
		3 3 6	14	1		2.5	Very stiff to hard brown SANDY SILT (A-4a), some clay, little gravel; contains sandstone fragments; damp.	13	10	--	7	49	21
		6 6 9	18	2		2.5							
5		8 9 7	18	3		3.5							
		6 9 12	16	4		4.5							
10													
10.5	768.7	8 19 50/5	18	5			Severely weathered brown SANDSTONE argillaceous.						
13.0	766.2						Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured, contains few argillaceous laminations. @ 13.4', 13.9', 14.4', 14.7', 15.3', 15.8', high angle fractures.						
15													
18.0	761.2	Core 120"	Rec 120"	RQD 49%	R1		Soft to medium hard gray SHALE interbedded with SANDSTONE; highly weathered, micaceous, laminted to thinly bedded, moderately fractured.						
20													
23.0	756.2						Bottom of Boring - 23.0'						
25													
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-606 | *Location:* Sta. 661+49.9, 190.3 ft. RT of SR 823 CL | *Date Drilled:* 06/14/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
8.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	827.3												
0.3	827.0						Topsoil - 3" / 1.0' soil removed before drilling.						
		8 4 5	12	1		3.75	Very stiff to hard brown SANDY SILT (A-4a), some gravel, little clay; contains sandstone fragments; damp.						
		6 6 6	17	2		--							
5		2 3 28	14	3		3.5							
		3 4 7	18	4		3.25		34	13	--	5	34	14
10		8 6 6	14	5		4.5+		23	16	--	6	39	16
13.5	813.8	3 6 7	18	6			Medium dense brown SANDY SILT (A-4a), little clay, trace to little gravel; damp.						
15		8 6 6	12	7			@ 16.0', possible sandstone boulder						
18.5	808.8	3 5 8	18	8		3.5	Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp.						
20													
21.0	806.3	40 50/3	8	9			Severely weathered gray SANDSTONE.						
23.0	804.3	Core 24"	Rec 24"	RQD 60%	R1		Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, laminated to thickly bedded, moderately fractured, contains few to moderate argillaceous laminations.						
25													
30		Core 120"	Rec 93"	RQD 63%	R2								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-606 | *Location:* Sta. 661+49.9, 190.3 ft. RT of SR 823 CL | *Date Drilled:* 06/14/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
8.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	797.3						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, laminated to thickly bedded, moderately fractured, contains few to moderate argillaceous laminations. @ 30.2', 31.7' iron staining on vertical fractures. @ 30.5'-31.9', soft brown shale layer						
35.0	792.3						Bottom of Boring - 35.0'						
40													
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-608 | *Location:* Sta. 665+40.5, 157.0 ft. RT of SR 823 CL | *Date Drilled:* 06/16/05 to 06/17/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
47.9' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.2	996.2						Topsoil - 2" / 1.5' soil removed before drilling.						
	996.0	4 6 6	18	1			Very stiff to hard brown SILT AND CLAY (A-6a), trace fine to coarse sand; contains sandstone fragments; dry. @ 1.0' Possible boulder						
5		6 12 4	18	2		3.75							
		7 7 10	18	3		4.5+							
8.5	987.7	8 18 39	15	4			Severely weathered brownish gray SILTSTONE.						
10													
11.0	985.2	50/4	4	5			Severely weathered brown SANDSTONE.						
12.0	984.2						Medium hard to hard brown SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, medium to thickly bedded to laminated, slightly fractured.						
15		Core 78"	Rec 77"	RQD 94%	R1	*199	@ 16.2', 18.4', high angle fractures.						
20		Core 120"	Rec 120"	RQD 61%	R2	*79	@ 18.9', 24.2', 28.2', iron stained high angle fractures. @ 20.0', contains few to moderate argillaceous laminations. @ 21.7'-22.1', qu = 1,679 psi. @ 22.5'-23.5', SDI = 70.1%.						
25													
30							@ 28.6', 28.8', high angle fractures. @ 29.1', gray						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
57
50+

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-608 | *Location:* Sta. 665+40.5, 157.0 ft. RT of SR 823 CL | *Date Drilled:* 06/16/05 to 06/17/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
47.9' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	966.2	Core 120"	Rec 120"	RQD 85%	R3	*186	Medium hard to hard brown SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, medium to thickly bedded to laminated, slightly to moderately fractured; contains moderate to abundant argillaceous laminations. @ 30.0', 31.3', high angle fractures.						
35													
40		Core 120"	Rec 120"	RQD 94%	R4	*67	@ 38.5', contains gypsum. @ 44.1'-44.5', qu = 8,705 psi.						
45													
46.0	950.2						Very hard orange LIMESTONE; medium to coarse grained, highly weathered, fossiliferous, thickly bedded, slightly fractured, gypsum, iron staining.						
49.4	946.8												
50		Core 120"	Rec 120"	RQD 98%	R5	*446	Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, pyritic, argillaceous, micaceous, thickly to massively bedded, slightly fractured, contains iron staining. @ 49.4'-49.9', qu = 6,005 psi. @ 50.0'-51.0', SDI = 97.3%. @ 53.6', high angle fracture.						
55													
57.9	938.3						Medium hard gray SANDSTONE; fine grained, slightly weathered, pyritic, argillaceous, micaceous, thickly bedded,						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-608 | *Location:* Sta. 665+40.5, 157.0 ft. RT of SR 823 CL | *Date Drilled:* 06/16/05 to 06/17/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
47.9' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
60	936.2						slightly fractured.							Natural Moisture Content, % - ●
		Core 120"	Rec 119"	RQD 99%	R6	*422	Medium hard gray SANDSTONE; very fine to fine grained, slightly weathered, pyritic, argillaceous, micaceous, thickly bedded, slightly fractured to unfractured. @ 62.0'-64.5', qu = 11,452 psi, SDI = 94.4%.							PL ⊢——⊣ LL
65														Blows per foot - ○
70		Core 78"	Rec 78"	RQD 100%	R7	*291								10 20 30 40
75.0	921.2						Bottom of Boring - 75.0'							
80														
85														
90														

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-610 | *Location:* Sta. 666+70.302, 97.8 ft. RT of SR 823 CL | *Date Drilled:* 06/20/05 to 06/21/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
19.2' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.2	1005.2						Topsoil - 2"						
	1005.0	38 50/5	9	1			Severely weathered brown SANDSTONE.						
		50/0	0	2									
5.0	1000.2	Core 108"	Rec 108"	RQD 60%	R1	*237	Hard grayish brown SANDSTONE; fine grained, slightly weathered, micaceous, carbonaceous, medium bedded to thinly laminated, moderately fractured, iron staining on some fractures. @ 5.0' to 5.2', 7.5' to 7.6', 9.8'-10.0', fracture zones. @ 9.1'-10.0', contains moderate to abundant argillaceous laminations.						
10													
							@ 14.7', 15.3', high angle fractures.						
15.1	990.1						Soft gray SHALE interbedded with SANDSTONE; very fine grained, moderately weathered, arenaceous, carbonaceous, micaceous, very thinly bedded to laminated, moderately fractured.						
18.1	987.1	Core 120"	Rec 120"	RQD 87%	R2	*255	@ 16.8'-16.9', high angle fractures.						
20							Hard brown SANDSTONE; fine grained, slightly weathered, argillaceous, micaceous, medium bedded to laminated, slightly fractured. @ 19.0'-19.8', high angle fracture with iron staining.						
24.2	981.0						Medium hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly laminated to thickly bedded , moderately fractured, contains moderate to abundant argillaceous laminations. @ 24.9'-25.1', high angle fracture with iron staining.						
25													
30		Core 120"	Rec 120"	RQD 90%	R3	*232							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+
50+

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-610 | *Location:* Sta. 666+70.302, 97.8 ft. RT of SR 823 CL | *Date Drilled:* 06/20/05 to 06/21/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
19.2' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30	975.2						Medium hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly laminated to thickly bedded , slightly to moderately fractured, contains moderate to abundant argillaceous laminations.							Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
35		Core 120"	Rec 119"	RQD 82%	R4	*241								
40														
45		Core 120"	Rec 120"	RQD 100%	R5	*311								
50														
55.0	950.2						Hard to very hard brown SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, calcareous, thickly bedded, slightly fractured.							
60		Core 120"	Rec 120"	RQD 100%	R6	*620								

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-610 | *Location:* Sta. 666+70.302, 97.8 ft. RT of SR 823 CL | *Date Drilled:* 06/20/05 to 06/21/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
19.2' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	945.2						Hard to very hard brown SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, calcareous, thickly bedded, slightly fractured.						
65		Core 120"	Rec 119"	RQD 99%	R7	*399							
70													
75.2	930.0	Core 14"	Rec 14"	RQD 100%	R8	*458							
							Bottom of Boring - 75.2'						
80													
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-612 | Location: Sta. 669+13.4, 58.0 ft. LT of SR 823 CL | Date Drilled: 06/21/05 to 06/23/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
19.1' (Including drill water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	884.3												
0.3	884.0						Topsoil - 4"						
		8 11 8	12	1			Medium dense brown SILT (A-4b), some fine to coarse sand, little clay, little gravel; dry to damp.	11	13	--	9	50	17
		8 7 12	18	2									
5													
5.5	878.8						Severely weathered brown SANDSTONE.						
		10 15 7	16	3									
		17 26 50/5	15	4									
10.0	874.3						Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, medium bedded to thickly bedded, moderately fractured, contains iron staining.						
		Core 120"	Rec 120"	RQD 77%	R1		@ 10.0'-10.4', 10.8'-10.9', 14.0'-14.1', 17.2'-17.8', high angle fractures.						
15							@ 10.9', 11.3', 13.9', 14.4', low angle fractures.						
							@ 14.5'-15.7', interbedded gray siltstone.						
							@ 16.7'-20.0', carbonaceous.						
20.0	864.3						Bottom of Boring - 20.0'						
25													
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-615 | *Location:* Sta. 669+11.3, 84.3 ft. RT of SR 823 CL | *Date Drilled:* 06/23/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
18.5' (Including drill water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	893.5												
0.2	893.3						Topsoil - 2" / 4.5' soil removed before drilling.						
		6 8 8	8	1		4.5+	Hard brown SILT (A-4b), little clay, little fine to coarse sand, trace to little gravel; contains sandstone fragments; dry to damp.						
		12 18 16	18	2		4.0		10	11	--	8	51	20
5													
5.5	888.0	28 50/5	9	3			Severely weathered brown SANDSTONE.						
8.0	885.5	Core 36"	Rec 33"	RQD 32%	R1		Hard light brown SANDSTONE; fine grained, highly to moderately weathered, medium bedded, highly fractured, contains iron staining in fractures. @ 8.3', 9.7', 10.2', 10.3', low angle fractures. @ 9.2'-9.5', 9.9'-10.3', high angle fractures. @ 11.6', 15.6', 19.2', low angle fractures. @ 12.7'-12.8', 13.1'-13.3', 13.4'-13.6', 15.4'-15.6', 18.9'-19.2', high angle fractures.						
10													
15		Core 120"	Rec 120"	RQD 86%	R2								
20													
21.0	872.5						Bottom of Boring - 21.0'						
25													
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2610 | *Location:* Sta. 666+94.9, 19.3 ft. RT of SR 823 CL | *Date Drilled:* March 2006

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	996.2												
0.3	995.9						Topsoil - 3"						
		NA	NA	1			Severely weathered brown SANDSTONE, argillaceous.						
		NA	NA	2									
5.0	991.2	Core 120"	Rec 118"	RQD 92%	R-1		Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, carbonaceous, micaceous, massively bedded, moderately fractured, contains moderate argillaceous laminations. @ 6.0',7.3',7.6',10.5',14.4', low angle fractures. @ 8.1'-8.2', 12.5'-12.8', high angle fractures. @ 8.1', carbonaceous. @ 8.3'-8.4', 11.7'-12.5', broken.						
10													
15							@ 15.3',15.6',16.6',16.7',16.8' 17.9',18.0', low angle fractures. @ 17.9'-18.0', iron staining.						
19.6	976.6	Core 120"	Rec 119"	RQD 93%	R-2		@ 19.1'-19.3', high angle fracture. Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, laminated to thickly bedded, moderately fractured, contains moderate argillaceous laminations. @ 19.8'-19.9', broken. @ 20.3',20.4',20.8',21.4',23.5' 23.6',24.3', low angle fractures. @ 21.0'-21.2', 22.6'-22.7', high angle fractures.						
20													
25							@ 25.7',28.0',28.4',28.5',28.6' 28.7',29.5',29.6',30.5',30.6' 31.6',33.8',33.9', low angle fractures.						
30		Core 120"	Rec 117"	RQD 95%	R-3								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2610 | *Location:* Sta. 666+94.9, 19.3 ft. RT of SR 823 CL | *Date Drilled:* March 2006

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	966.2						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, laminated to thickly bedded, moderately fractured, contains moderate argillaceous laminations.						
							@ 33.8'-33.9', iron staining.						
35							@ 36.4',38.2',38.5', low angle fractures.						
39.5	956.7	Core 120"	Rec 120"	RQD 98%	R-4		Hard to very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
40													
45													
45.3	950.9						Very hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, calcareous, massive, slightly fractured.						
50		Core 120"	Rec 120"	RQD 93%	R-5		@ 45.6',45.7',46.4',46.7',46.9' 48.5',49.7', low angle fractures.						
55													
59.3	936.9	Core 120"	Rec 120"	RQD 100%	R-6		Very hard gray SANDSTONE; very fine to fine grained,						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2610 | *Location:* Sta. 666+94.9, 19.3 ft. RT of SR 823 CL | *Date Drilled:* March 2006

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	936.2						Very hard gray SANDSTONE; very fine to fine grained, unweathered to slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured, contains few argillaceous laminations and burrows.						
65													
70		Core 120"	Rec 120"	RQD 100%	R-7		@ 70.0'-70.2', high angle fracture.						
75													
80		Core 120"	Rec 120"	RQD 100%	R-8	*1227							
85													
90		Core 120"	Rec 120"	RQD 100%	R-9								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2610 | *Location:* Sta. 666+94.9, 19.3 ft. RT of SR 823 CL | *Date Drilled:* March 2006

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	906.2					*1160	Very hard gray SANDSTONE; very fine to fine grained, unweathered to slightly weathered, argillaceous, micaceous, massively bedded, unfractured to slightly fractured, contains few argillaceous laminations and burrows.						
95													
100		Core 120"	Rec 117"	RQD 97%	R-10	*1639	@ 100.0'-100.3', high angle fracture, broken.						
105													
110		Core 120"	Rec 120"	RQD 100%	R-11	*1262							
115													
120		Core 120"	Rec 120"	RQD 100%	R-12								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2610 | *Location:* Sta. 666+94.9, 19.3 ft. RT of SR 823 CL | *Date Drilled:* March 2006

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	876.2					*1056	Very hard gray SANDSTONE; very fine to fine grained, unweathered to slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured, contains few argillaceous laminations and burrows. @ 120.8', low angle fracture, argillaceous. @ 124.3'-125.0', high angle fracture.						
125													
130		Core 120"	Rec 120"	RQD 100%	R-13	*951							
132.3	863.9						@ 131.9', 132.2', low angle fractures. Hard to very hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
135													
135.8	860.4						Very hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, pyritic, massive, unfractured to slightly fractured.						
140		Core 120"	Rec 120"	RQD 100%	R-14	*1273							
145													
150		Core 120"	Rec 120"	RQD 100%	R-15		@ 149.3', low angle fracture.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2610 | *Location:* Sta. 666+94.9, 19.3 ft. RT of SR 823 CL | *Date Drilled:* March 2006

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
150	846.2					*1372	Very hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, pyritic, massive, unfractured to slightly fractured.						
							@ 154.2'-154.4', high angle fracture.						
155													
156.8	839.4						Hard to very hard light and dark gray SANDSTONE interbedded with SHALE; very fine to fine grained, slightly weathered, calcareous, laminated to medium bedded, moderately fractured.						
160		Core 120"	Rec 120"	RQD 98%	R-16	*1740	@ 158.5',158.6',159.5',161.5', low angle fractures. @ 160.1'-160.9', calcareous. @ 160.4'-160.5', broken.						
165													
170		Core 120"	Rec 120"	RQD 100%	R-17								
175							@ 175.7',176.0',176.6',178.8', low angle fractures.						
180		Core 120"	Rec 120"	RQD 100%	R-18								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2610 | *Location:* Sta. 666+94.9, 19.3 ft. RT of SR 823 CL | *Date Drilled:* March 2006

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
180	816.2						Hard to very hard light and dark gray SANDSTONE interbedded with SHALE; very fine to fine grained, slightly weathered, calcareous, laminated to medium bedded, moderately fractured.							Natural Moisture Content, % - ● PL ⊢——⊣ LL Blows per foot - ○ 10 20 30 40
185		Core 120"	Rec 118"	RQD 98%	R-19		@ 188.9',190.4', low angle fractures. @ 189.9'-190.0', 192.1'- 192.2', broken.							
195														
200		Core 120"	Rec 120"	RQD 100%	R-20		@ 201.4', pyritic.							
205.0	791.2						Very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured. @ 207.7',207.9',212.9', low angle fractures.							
210		Core 120"	Rec 120"	RQD 100%	R-21									

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-2610 | *Location:* Sta. 666+94.9, 19.3 ft. RT of SR 823 CL | *Date Drilled:* March 2006

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: Not reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
210	786.2						Very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured.						
215		Core 66"	Rec 66"	RQD 100%	R-22								
220													
220.5	775.7						Bottom of Boring - 220.5'						
225													
230													
235													
240													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:42 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-620 | *Location:* Sta. 676+81.1, 115.6 ft. LT of SR 823 CL | *Date Drilled:* 06/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
21.1' (Including drill water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	957.6													Natural Moisture Content, % - ●
0.2	957.4						Topsoil - 2"							PL ⊢——⊣ LL
		2 32 25	15	1			Severely weathered brown SANDSTONE.							Blows per foot - ○
		6 16 19	15	2										10 20 30 40
5		50/5	5	3										57
7.0	950.6													50+
		Core 90"	Rec 90"	RQD 83%	R1	*199	Hard brown SANDSTONE; very fine to fine grained, highly weathered, micaceous, thickly bedded, moderately to slightly fractured, contains iron staining. @ 9.5'-9.6', 13.8'-14.5', high angle fractures, carbonaceous. @ 10.3'-10.6', siltstone layer.							
10														
15														
20		Core 120"	Rec 120"	RQD 87%	R2	*305								
21.1	936.5						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured to unfractured, contains turbidity bedding.							
25														
30		Core	Rec	RQD	R3	*319								

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-620 | *Location:* Sta. 676+81.1, 115.6 ft. LT of SR 823 CL | *Date Drilled:* 06/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
21.1' (Including drill water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30.0	927.6	120"	120"	100%			Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured to unfractured, contains turbidity bedding.						
35							@ 34.5'-36.1', iron stained layer.						
40		Core 120"	Rec 119"	RQD 99%	R4	*346	@ 36.4'-36.5', argillaceous bed. @ 36.6'-36.7', ferric beds.						
45		Core 14"	Rec 14"	RQD 100%	R5	*274							
45.7	911.9						Bottom of Boring - 45.7'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-622 | *Location:* Sta. 676+93.1, 171.8 ft. RT of SR 823 CL | *Date Drilled:* 06/27/05 to 06/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
20.8' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	1008.8												
0.2	1008.6						Tospoil - 2" / 3.3' soil removed before drilling.						
		5 4 4	9	1			Severely weathered brown SANDSTONE.						
		4 10 30	12	2									
5		50/4	3	3									
7.0	1001.8						Medium hard brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded to thinly bedded, moderately fractured.						
10		Core 90"	Rec 89"	RQD 76%	R1	*122	@ 10.0'-10.5', abundant argillaceous laminations.						
							@ 11.8'-12.5', 14.1'-14.5', iron stained high angle fractures.						
15							@ 15.1'-18.5', moderate to abundant argillaceous laminations.						
20		Core 120"	Rec 116"	RQD 75%	R2	*31	@ 19.7'-19.5', 26.3'-26.7', iron stained high angle fractures.						
							@ 21.6'-24.5', 32.7'-33.0', broken zone.						
25													
30		Core	Rec	RQD	R3	*210							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-622 | *Location:* Sta. 676+93.1, 171.8 ft. RT of SR 823 CL | *Date Drilled:* 06/27/05 to 06/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
20.8' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30	978.8	120"	120"	68%			Medium hard brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded to thinly bedded, moderately fractured.							
33.8	975.0													
35		Core 120"	Rec 120"	RQD 85%	R4		Medium hard to hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, moderately weathered, argillaceous, arenaceous, micacious, laminated to medium bedded, slightly fractured. @ 37.5'-38.0', high angle fracture.							
40														
45							@ 45.5'-48.0', contains calcareous zone.							
50		Core 120"	Rec 120"	RQD 90%	R5	*394								
55														
55.5	953.3						Hard brownish orange SANDSTONE; fine grained, moderately weathered, calcareous, argillaceous, fossiliferous, medium bedded to thinly bedded, slightly fractured, contains iron staining on fractures.							
60		Core	Rec	RQD	R6	*348								

STANDARD PENETRATION (N): Natural Moisture Content, % - ● ; PL ⊢——⊣ LL ; Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-622 | *Location:* Sta. 676+93.1, 171.8 ft. RT of SR 823 CL | *Date Drilled:* 06/27/05 to 06/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
20.8' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	948.8	120"	120"	90%			Hard brownish orange SANDSTONE; fine grained, moderately weathered, calcareous, argillaceous, fossiliferous, medium bedded to thinly bedded, slightly fractured, contains iron staining on fractures.						
62.0	946.8						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, thickly bedded, slightly fractured.						
65		Core 12"	Rec 12"	RQD 100%	R7	*348							
65.5	943.3						Bottom of Boring - 65.5'						
70													
75													
80													
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-623 | Location: Sta. 679+22.7, 210.5 ft. LT of SR 823 CL | Date Drilled: 6/29/05 to 6/30/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
8.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	832.1													Natural Moisture Content, % - ● PL ⊢——⊣ LL Blows per foot - ○ 10 20 30 40
0.5	831.6						Topsoil - 6" / 6" soil removed before drilling.							
		5 5 5	9	1		3.5	Very stiff brown SILT AND CLAY (A-6a), trace to little fine to coarse sand, trace gravel; contains sandstone fragments; dry.							
		4 9 12	12	2		4.0								
5														
6.0	826.1	12 25 41	17	3			Severely weathered brownish gray SHALE.							66
		36 50/1	11	4										
9.5	822.6													
10		Core 120"	Rec 120"	RQD 77%	R1		Very soft to soft brown SHALE interbedded with CLAYSTONE; very fine grained, decomposed, arenaceous, micaceous, thinly bedded to thinly laminated, highly fractured to broken.							
							@ 13.1'-13.3', 18.0'-18.4', iron stained broken zones.							
15														
							@ 17.7'-17.8', iron stained high angle fracture.							
20							@ 19.6'-23.0', lost recovery.							
23.0	809.1													
25		Core 120"	Rec 86"	RQD 48%	R2		Soft to medium hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, argillaceous, thinly laminated to thinly bedded, moderately fractured, contains abundant argillaceous laminations.							
30														

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-623 | *Location:* Sta. 679+22.7, 210.5 ft. LT of SR 823 CL | *Date Drilled:* 6/29/05 to 6/30/05

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
8.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	802.1	Core 42"	Rec 42"	RQD 79%	R3		Soft to medium hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, argillaceous, thinly laminated to thinly bedded, moderately fractured, contains abundant argillaceous laminations.						
33.0	799.1						Bottom of Boring - 33.0'						
35													
40													
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-624 | *Location:* Sta. 679+48.0, 98.8 ft. LT of SR 823 CL | *Date Drilled:* 07/06/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
2.1' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	861.6												
0.3	861.3						Topsoil - 3"						
		6 7 9	15	1			Medium dense brown SILT (A-4b), some fine to coarse sand, little gravel, trace clay; contains sandstone fragments; dry.	17	17	--	8	50	8
		38 21 24	9	2									
5		19 26 44	14	3									
7.5	854.1						Severely weathered brown SANDSTONE.						
		Core 120"	Rec 72"	RQD 3%	R1		@ 10.0'-14.0', lost recovery.						
15.0	846.6						Medium hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, argillaceous, thinly bedded to medium bedded; contains moderate argillaceous laminations.						
							@ 18.2'-18.6', 27.7', high angle fracture.						
							@ 19.3', 19.5'-19.8', iron stained fracture.						
20		Core 120"	Rec 120"	RQD 58%	R2		@ 20.0'-21.4', qu = 2,142 psi, SDI = 75.4%.						
							@ 20.4'-20.6', 20.9', 21.1', 22.6', 22.8', 23.2', 24.0', low angle fracture.						
							@ 22.0'-22.3', 25.7'-25.8', 26.9'-27.2', broken zone.						
							@ 22.8'-23.2', 25.0'-27.5', interbedded siltstones.						
25							@ 23.2'-25.0', calcareous layer.						
							@ 24.2'-24.6', high angle fracture with calcite deposit on surface.						
							@ 27.5'-28.4', SDI = 64.6%.						
30							@ 28.0', 28.4', 28.6', 29.0', 29.05', 29.2', 29.7', low angle fractures.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
70 →

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-624 | *Location:* Sta. 679+48.0, 98.8 ft. LT of SR 823 CL | *Date Drilled:* 07/06/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
2.1' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	831.6	Core 120"	Rec 120"	RQD 66%	R3		Medium hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, argillaceous, thinly bedded to medium bedded; contains moderate argillaceous laminations. @ 30.4'-31.0', 31.1'-31.5', 31.7', 31.9', 33.1', 33.7', 34.0', 34.7'-34.8', 35.4', low angle fractures. @ 30.5', calcareous layer. @ 32.5'-33.1', qu = 3,731 psi. @ 35.2'-36.3', qu = 2,469 psi, SDI = 79.8%.						
37.5	824.1						Bottom of Boring - 37.5'						
40													
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-626 | *Location:* Sta. 679+14.4, 156.2 ft. RT of SR 823 CL | *Date Drilled:* 06/28/05 to 06/29/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
23.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	978.6													Natural Moisture Content, % - ● PL ⊢——⊣ LL; Blows per foot - ○ 10 20 30 40
0.3	978.3						Topsoil - 3"							
		5 7 6	14	1		4.0	Hard brown SANDY SILT (A-4a), trace clay, trace gravel; contains sandstone fragments; dry to damp.							
		6 10 11	12	2		4.5								
5														
6.0	972.6	6 10 19	18	3			Severely weathered brown SANDSTONE argillaceous.							
		5 11 19	12	4										
10														
11.0	967.6	11 24 43	18	5			Severely weathered brown SILTSTONE arenaceous.							67 →
		19 50/5	8	6										50+
15														
		18 43 50/5	18	7										50+
18.5	960.1	50/3	3	8			Severely weathered gray SANDSTONE.							50+
19.5	959.1						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, fossiliferous, micaceous, thickly bedded, moderately fractured. @ 21.9', 23.2', 23.6', low angle fractures.							
20														
24.0	954.6	Core 120"	Rec 120"	RQD 82%	R1	*289	Hard light brown SANDSTONE; fine grained, highly weathered, fossiliferous, pyritic, micaceous, thickly bedded, moderately fractured, contains calcareous bands. @ 24.0', 24.3', 24.4', 24.7', 24.8', 24.9', 27.2', 27.6', 28.6', low angle fractures. @ 27.2'-28.5', qu = 7,133 psi, SDI = 98.6%.						
25														
30														

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-626 | *Location:* Sta. 679+14.4, 156.2 ft. RT of SR 823 CL | *Date Drilled:* 06/28/05 to 06/29/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
23.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	948.6						Hard light brown SANDSTONE; fine grained, highly weathered, fossiliferous, pyritic, thickly bedded, moderately fractured, micaceous. @ 31.4', 31.7', low angle fractures.						
32.0	946.6												
35		Core 120"	Rec 120"	RQD 94%	R2	*362	Hard light gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, thickly bedded to massive, unfractured to slightly fractured, turbidites, iron staining. @ 33.9', 34.0', 34.4', 36.5', low angle fractures.						
40							@ 41.8', 43.4', low angle fractures.						
45		Core 120"	Rec 119"	RQD 99%	R3	*403							
50							@ 50.4'-51.9', qu = 10,850 psi, SDI = 97.9%.						
55		Core 120"	Rec 117"	RQD 98%	R4	*395							
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-626 | *Location:* Sta. 679+14.4, 156.2 ft. RT of SR 823 CL | *Date Drilled:* 06/28/05 to 06/29/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
23.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	918.6						Hard light gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, thickly bedded to massive, unfractured to slightly fractured, turbidites, iron staining.						
65		Core 120"	Rec 120"	RQD 100%	R5	*5314							
70		Core 120"	Rec 120"	RQD 100%	R6	*408							
75							@ 75.0', low angle fractures.						
80		Core 120"	Rec 120"	RQD 100%	R7	*505							
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-626 | *Location:* Sta. 679+14.4, 156.2 ft. RT of SR 823 CL | *Date Drilled:* 06/28/05 to 06/29/05

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
23.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢ LL / Blows per foot - ○
90	888.6	Core 16"	Rec 16"	RQD 100%	R8	*278	Hard light gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, thickly bedded to massive, unfractured to slightly fractured, turbidites, iron staining.							
90.9	887.7						Bottom of Boring - 90.9'							

10 20 30 40

95 100 105 110 115 120

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-628 | *Location:* Sta. 680+71.2, 152.5 ft. LT of SR 823 CL | *Date Drilled:* 06/30/05 to 07/05/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
6.7' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	819.6												
0.4	819.2						Topsoil - 5"						
		7 7 6	10	1		--	Stiff gray SANDY SILT (A-4a), little clay, little gravel; damp.	11	8	--	17	45	19
3.0	816.6												
		25 28 25	16	2		3.5	Very stiff brown SILT (A-4b), some fine to coarse sand, little clay, trace gravel; contains sandstone fragments; dry to damp.	6	14	--	8	57	15
5													
5.5	814.1												
		20 21 23	14	3		4.5+	Very stiff to hard brown SANDY SILT (A-4a), little clay; contains sandstone fragments; dry.						
		22 21 21	12	4		4.0							
10													
		18 20 26	7	5		3.0							
		16 21 24	8	6		4.5+							
15													
		15 18 14	6	7		4.0	@ 16.0'-17.5', moist.						
		17 19 26	15	8		--	@ 18.5', little gravel.						
20													
21.0	798.6												
		45 50/3	9	9			Severely weathered brown SHALE.						
22.0	797.6						Soft light brown SANDSTONE; very fine grained, highly weathered to decomposed, argillaceous, micaceous, thickly bedded, moderately to highly fractured, iron staining. @ 22.2'-22.5', 23.7'-24.0', broken zones. @ 22.7', 23.0', 23.5', 24.4', low angle fractures.						
25													
26.5	793.1	Core 120"	Rec 120"	RQD 55%	R1		Soft to medium hard gray SANDSTONE; very fine grained, moderately weathered, argillaceous, micaceous, thickly bedded, highly fractured to broken, iron staining. @ 29.2', 29.7', 29.8', low angle fractures.						
30													

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40
53
50+

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-628 | Location: Sta. 680+71.2, 152.5 ft. LT of SR 823 CL | Date Drilled: 06/30/05 to 07/05/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
6.7' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	789.6						Soft to medium hard gray SANDSTONE; very fine grained, moderately weathered, argillaceous, micaceous, thickly bedded, highly fractured to broken, iron staining, contains few argillaceous laminations.						
		Core 54"	Rec 54"	RQD 100%	R2		@ 30.6', 31.5', 33.1', 33.4', 35.4'-36.1', 36.6', low angle fractures.						
35							@ 32.2'-32.9', 34.5'-35.1', broken zone.						
36.5	783.1						Bottom of Boring - 36.5'						
40													
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-629 | *Location:* Sta. 680+71.1, 7.9 ft. LT of SR 823 CL | *Date Drilled:* 07/06/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
2.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	864.0												
0.3	863.7						Topsoil - 3" / 6" soil removed before drilling.						
		18 21 35	14	1		4.5+	Hard brown SILT (A-4b), little fine to coarse sand, little clay, trace gravel; contains sandstone fragments; dry to damp.	6	15	--	5	55	19
		20 31 50/4	14	2		4.5+							
5.0	859.0						Hard grayish brown SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, medium bedded to thickly bedded, moderately fractured to broken. @ 6.1', 9.4', low angle fractures. @ 6.8', 7.3', 7.9', 8.5', 9.5', 13.7' iron stained high angle fractures. @ 6.9', 7.9, 14.1', low angle fractures.						
10		Core 120"	Rec 113"	RQD 55%	R1								
15													
20		Core 120"	Rec 120"	RQD 78%	R2		@ 17.2'-17.6', 22.4', 22.8', 22.9', 23.2'-23.3', 23.9'- 24.3', argillaceous bands.						
25													
30		Core 120"	Rec 120"	RQD 38%	R3		@ 27.3'-27.7', high angle fracture. @ 28.5'-32.2', moderate to abundant argillaceous laminations.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
56
50+

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-629 | *Location:* Sta. 680+71.1, 7.9 ft. LT of SR 823 CL | *Date Drilled:* 07/06/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
2.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	834.0						Hard grayish brown SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, medium bedded to thickly bedded, moderately fractured to broken. @ 32.2'-33.3', broken. @ 32.2', pyritic. @ 32.3'-40', few to moderate argillaceous laminations.						
35		Core 60"	Rec 60"	RQD 88%	R4								
40.0	824.0						Bottom of Boring - 40.0'						
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:29 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-630 | *Location:* Sta. 683+28.9, 73.3 ft. LT of SR 823 CL | *Date Drilled:* 06/24/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	886.3													Natural Moisture Content, % - ● PL ⊢——⊣ LL; Blows per foot - ○ 10 20 30 40
0.2	886.1						Topsoil - 2"							
		3 6 9	14	1			Medium dense brown SANDY SILT (A-4a), trace clay, trace gravel; contains sandstone fragments; dry.							
3.5	882.8													
		4 20 50/1	13	2			Severely weathered brown SANDSTONE argillaceous.							50+
5														
		14 50/3	5	3										50+
7.0	879.3						Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, medium bedded to massive, highly fractured, few argillaceous laminations. @ 7.0' - 7.8', lost recovery. @ 8.5'-8.7', 10.3'-10.5', 11.0'-11.2', 13.2'-13.3', 14.0'-14.1', 14.3'-14.4', 15.4', iron stained high angle fractures. @ 10.7', 11.7', 12.6', 14.4', 15.3', 15.6', low angle fracture.							
10		Core 120"	Rec 105"	RQD 43%	R1									
15														
20		Core 42"	Rec 41"	RQD 74%	R2		@ 19.0'-20.4', gray hard sandstone with interbedded siltstones (turbidites).							
20.5	865.8						Bottom of Boring - 20.5'							
25														
30														

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-632 | *Location:* Sta. 683+15.8, 172.1 ft. RT of SR 823 CL | *Date Drilled:* 06/27/05 to 06/29/05

WATER OBSERVATIONS: Water seepage at: 17.0'-22.0'
Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	964.8						No Topsoil							Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
		8 7 8	14	1		4.5+	Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; dry.							
3.5	961.3	9 50/5	9	2			Severely weathered brown SANDSTONE argillaceous.							50+
5		28 50/3	9	3										50+
		35 50/8	9	4										50+
10														
10.5	954.3	Core 78"	Rec 78"	RQD 95%	R1		Hard brown SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured, contains calcareous zone.							
15							@ 16.35', low angle fracture.							
		Core 60"	Rec 60"	RQD 100%	R2									
20														
22.0	942.8	Core 60"	Rec 60"	RQD 100%	R3		Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, unfractured to slightly fractured.							
25														
		Core	Rec	RQD	R4									
30														

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-632 | *Location:* Sta. 683+15.8, 172.1 ft. RT of SR 823 CL | *Date Drilled:* 06/27/05 to 06/29/05

WATER OBSERVATIONS: Water seepage at: 17.0'-22.0'
Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	934.8	60"	60"	100%			Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, unfractured to slightly fractured.						
		Core 60"	Rec 59"	RQD 95%	R5								
35		Core 60"	Rec 56"	RQD 88%	R6								
40		Core 60"	Rec 60"	RQD 87%	R7								
45		Core 60"	Rec 60"	RQD 46%	R8								
50		Core 60"	Rec 56"	RQD 93%	R9								
55		Core	Rec	RQD	R10								
60													

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-632 | Location: Sta. 683+15.8, 172.1 ft. RT of SR 823 CL | Date Drilled: 06/27/05 to 06/29/05

WATER OBSERVATIONS: Water seepage at: 17.0'-22.0'
Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	904.8	60"	60"	100%			Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, unfractured to slightly fractured.						
65		Core 60"	Rec 59"	RQD 98%	R11								
70		Core 60"	Rec 60"	RQD 100%	R12		@ 68.0', shale seam. @ 70.6', low angle fracture.						
75		Core 60"	Rec 59"	RQD 100%	R13		@ 72.3'-79.2', contains few to moderate argillaceous laminations. @ 73.1', 73.5', low angle fractures.						
80.0	884.8	Core 36"	Rec 36"	RQD 100%	R14		@ 76.9'-77.0', broken zone.						
							Bottom of Boring - 80.0'						
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-633 | *Location:* Sta. 686+12.1, 90.9 ft. LT of SR 823 CL | *Date Drilled:* 6/29/05 to 6/30/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
74.3' (includes drilling water, with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	1015.7												
0.3	1015.4						Topsoil 3"						
		4 4 7	10	1			Severely weathered brown SANDSTONE, argillaceous.						
		5 17 32	18	2									
5		50/5	5	3									
6.5	1009.2	Core 44"	Rec 44"	RQD 80%	R1	*211	Medium hard brown SANDSTONE; fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured, cross bedding.						
10.2	1005.5						Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded, slightly fractured, contains few argillaceous laminations. @ 13.0'-14.5', qu = 3,645 psi, SDI = 84.0%. @ 13.3', 14.4', 19.1', low angle fractures.						
15		Core 120"	Rec 119"	RQD 89%	R2	*117							
20.2	995.5						Soft to medium hard brownish gray SANDSTONE interbedded with SHALE; very fine to fine grained, highly weathered, argillaceous, arenaceous, micaceous, thinly laminated to medium bedded, moderately to highly fractured. @ 21.4'-21.8', qu = 1,013 psi. @ 22.1', high angle fracture.						
23.5	992.2						Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded, highly fractured. @ 24.1'-26.8', 28.6'-29.2', high angle, rust-stained fracture. @ 26.3'-27.5', qu = 3,491 psi, SDI = 91.4%. @ 29.8'-30.0', high angle fracture.						
25		Core 120"	Rec 120"	RQD 71%	R3	*131							
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-633 | *Location:* Sta. 686+12.1, 90.9 ft. LT of SR 823 CL | *Date Drilled:* 6/29/05 to 6/30/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
74.3' (includes drilling water, with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	985.7						Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded, highly fractured. @ 30.2'-30.6', 32.7'-33.0', 33.7'-33.9', 35.9'-36.1', high angle fractures.						
35		Core 120"	Rec 120"	RQD 93%	R4	*88	@ 36.3', low angle fracture.						
36.3	979.4						Medium hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, slightly to moderately fractured, some iron staining; contains moderate to abundant argillaceous laminations.						
40							@ 42.4', high angle fracture with iron staining. @ 43.2'-44.5', qu = 2,069 psi, SDI = 13.2%.						
45		Core 120"	Rec 120"	RQD 79%	R5	*65							
50													
53.1	962.6						Medium hard to hard dark gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured.						
55		Core 120"	Rec 120"	RQD 81%	R6	*288	@ 56.1', 59.5', low angle fractures. @ 56.8'-57.7', SDI = 97.2%. @ 58.4'-58.8', qu = 10,116 psi. @ 58.6'-59.4', contains few argillaceous laminations. @ 59.4', brown, highly weathered.						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-633 | *Location:* Sta. 686+12.1, 90.9 ft. LT of SR 823 CL | *Date Drilled:* 6/29/05 to 6/30/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
74.3' (includes drilling water, with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60.0	955.7						Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, fossiliferous, thickly bedded to massive, unfractured to slightly fractured, iron stained fossils.						
65		Core 120"	Rec 120"	RQD 100%	R7	*419	@ 63.5'-65.0', qu = 8,887 psi, SDI = 98.4%.						
70							@ 70.2', brownsih gray.						
74.0	941.7						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, thickly bedded to massive, unfractured to slightly fractured.						
75		Core 120"	Rec 120"	RQD 100%	R8	*357							
80													
85		Core 120"	Rec 120"	RQD 100%	R9	*414							
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-633 | *Location:* Sta. 686+12.1, 90.9 ft. LT of SR 823 CL | *Date Drilled:* 6/29/05 to 6/30/05

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
74.3' (includes drilling water, with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢⊣ LL / Blows per foot - ○ (10 20 30 40)
90.0	925.7						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, very thickly bedded, unfractured to slightly fractured.							
95		Core 120"	Rec 120"	RQD 100%	R10	*266	@ 95.2'-96.6', qu = 9,874 psi, SDI = 98.0%.							
100														
105		Core 120"	Rec 120"	RQD 100%	R11	*362								
110														
115		Core 120"	Rec 118"	RQD 98%	R12	*447								
120														

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-633 | *Location:* Sta. 686+12.1, 90.9 ft. LT of SR 823 CL | *Date Drilled:* 6/29/05 to 6/30/05

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
74.3' (includes drilling water, with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢—⊣ LL / Blows per foot - ○ (10 20 30 40)
120	895.7						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, very thickly bedded, unfractured to slightly fractured.							
125		Core 120"	Rec 120"	RQD 100%	R13	*459								
130														
135		Core 120"	Rec 118"	RQD 98%	R14	*310								
140							@ 139.9'-140.1', iron stained fracture.							
145		Core 120"	Rec 120"	RQD 100%	R15	*379								
150														

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-633 | *Location:* Sta. 686+12.1, 90.9 ft. LT of SR 823 CL | *Date Drilled:* 6/29/05 to 6/30/05

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
74.3' (includes drilling water, with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢—⊣ LL / Blows per foot - ○ (10 20 30 40)
150.2	865.7 865.5						Bottom of Boring - 150.2'							

155
160
165
170
175
180

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-635 | *Location:* Sta. 686+18.5, 277.2 ft. RT of SR 823 CL | *Date Drilled:* 07/05/05 to 07/07/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
81.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	1054.1												
0.3	1053.8						Topsoil - 3"						
		2 4 4	15	1		4.5+	Hard brown SILT (A-4b), little fine to coarse sand, little gravel, trace clay; damp.						
3.0	1051.1												
		4 6 8	12	2		4.5+	Hard brown and gray SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; damp.						
5													
		4 4 4	18	3		4.0							
		5 7 12	14	4		4.5+							
10													
10.5	1043.6						Severely weathered brown and black SHALE.						
		5 17 32	18	5									
		10 22 28	18	6									
15													
		10 16 32	18	7									
		9 18 27	16	8									
20													
		10 50/5	9	9									
22.0	1032.1						Medium hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded, slightly fractured. @ 22.0'-22.4', iron stained. @ 22.4'-22.9', 23.8'-24.3', sandy shale layers.						
25		Core 96"	Rec 92"	RQD 72%	R1	*113							
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

50+

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-635 | *Location:* Sta. 686+18.5, 277.2 ft. RT of SR 823 CL | *Date Drilled:* 07/05/05 to 07/07/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
81.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	1024.1						Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded, slightly fractured, contains few argillaceous laminations.						
35		Core 120"	Rec 120"	RQD 87%	R2	*35	@ 31.4', low angle fracture. @ 31.4'-31.5', 33.4'-34.0', 42.3'-45.2', 46.3'-47.2', high angle fractures.						
40													
45		Core 120"	Rec 120"	RQD 88%	R3	*283							
50													
55		Core 120"	Rec 120"	RQD 100%	R4	*94	@ 55.0'-56.3', interbedded with shale.						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-635 | *Location:* Sta. 686+18.5, 277.2 ft. RT of SR 823 CL | *Date Drilled:* 07/05/05 to 07/07/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
81.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	994.1						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, medium bedded to thickly bedded, slightly fractured, contains few to moderate argillaceous laminations.						
65		Core 120"	Rec 120"	RQD 97%	R5	*216	@ 61.9', low angle fracture. @ 62.5'-64.0', interbedded with shale.						
70													
75		Core 120"	Rec 120"	RQD 94%	R6	*164	@ 77.7'-78.0', broken zone with low angle fractures.						
80													
85		Core 120"	Rec 119"	RQD 94%	R7	*104	@ 81.3', 82.4', 82.7', 86.1', low angle fractures.						
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-635 | *Location:* Sta. 686+18.5, 277.2 ft. RT of SR 823 CL | *Date Drilled:* 07/05/05 to 07/07/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
81.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION
90.0	964.1-964.1						Medium hard gray SANDSTONE; very fine grained, slightly weathered, argillaceous, pyritic, micaceous, thinly laminated to thickly bedded, slightly fractured, contains moderate to abundant argillaceous laminations.
92.1	962.0						@ 90.7', 91.4', low angle fractures.
95		Core 120"	Rec 119"	RQD 99%	R8	*220	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, pyritic, thickly bedded to massive, micaceous. @ 93.1', 98.4', low angle fractures.
100							@ 99.4', 103.0', brown, highly weathered.
105		Core 120"	Rec 120"	RQD 97%	R9	*329	@ 100.0'-100.8', 101.0', 101.3'-102.1', 103.1'-103.5', calcareous zones. @ 105.0'-105.6', 105.9'-106.0', high angle fractures.
110							
115		Core 120"	Rec 120"	RQD 100%	R10	*212	
120							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-635 | *Location:* Sta. 686+18.5, 277.2 ft. RT of SR 823 CL | *Date Drilled:* 07/05/05 to 07/07/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
81.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	934.1						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, pyritic, thickly bedded to massive, micaceous.						
125		Core 120"	Rec 120"	RQD 100%	R11	*237							
130		Core 120"	Rec 120"	RQD 100%	R12	*314							
135													
140		Core 120"	Rec 117"	RQD 97%	R13	*431							
145													
150													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-635 | Location: Sta. 686+18.5, 277.2 ft. RT of SR 823 CL | Date Drilled: 07/05/05 to 07/07/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
81.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
150	904.1						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, pyritic, thickly bedded to massive, micaceous.						
							@ 151.8', pyritic.						
155		Core 120"	Rec 120"	RQD 100%	R14	*477							
							@ 155.8', 157.4', contains shale seams.						
160							@ 159.7'-159.9', high angle fractures.						
							@ 161.1', low angle fracture, iron staining.						
165		Core 120"	Rec 120"	RQD 100%	R15	*495							
170													
175		Core 120"	Rec 120"	RQD 100%	R16	*474	@ 174.9'-175.0', high angle fracture.						
							@ 179.9'-180.0', calcareous.						
180													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-635 | *Location:* Sta. 686+18.5, 277.2 ft. RT of SR 823 CL | *Date Drilled:* 07/05/05 to 07/07/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
81.6' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
180	874.1	Core 120"	Rec 120"	RQD 100%	R17	*552	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, pyritic, thickly bedded to massive, micaceous. @ 180.9'-184.9', low angle fractures.						
185													
190.0	864.1						Bottom of Boring - 190.0'						
195													
200													
205													
210													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:43 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-645 | *Location:* Sta. 696+15.5, 81.2 ft. LT of SR 823 CL | *Date Drilled:* 07/14/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	832.4												
0.3	832.1						Topsoil - 4" / 1.5' soil removed before drilling.						
		3 6 7	13	1			Medium dense brown SANDY SILT (A-4a), little clay, little gravel; contains sandstone fragments; damp.	17	15	--	6	43	19
		7 10 11	16	2									
5													
5.5	826.9						Severely weathered grayish brown SHALE arenaceous.						
		6 16 30	17	3									
		30 50/3	8	4									
10													
		20 50/3	6	5									
		20 50/4	9	6			@ 13.5' gray						
15.0	817.4						Soft gray SANDSTONE; very fine grained, decomposed, argillaceous, micaceous, very thinly bedded to thinly laminated, broken.						
		Core 60"	Rec 12"	RQD 0%	R1		@ 15.9'-20.0', lost recovery.						
20.0	812.4						Soft to medium hard gray SANDSTONE interbedded with SHALE; very fine grained, highly weathered to decomposed, argillaceous, micaceous, thinly bedded to thinly laminated, highly fractured.						
		Core 60"	Rec 48"	RQD 53%	R2		@ 22.7'-22.8', 23.1'-23.2', high angle iron stained fractures. @ 22.9', 23.5', 23.9', low angle fractures.						
25.0	807.4						Bottom of Boring - 25.0'						
30													

GRADATION

STANDARD PENETRATION (N)

Natural Moisture Content, % - ●

PL ⊢——⊣ LL

Blows per foot - ○

10 20 30 40

50+ 50+ 50+

FILE: 0121-3070-03 [11/5/2007 3:44 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-647 | *Location:* Sta. 696+04.3, 182.5 ft. RT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/13/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	937.1													Natural Moisture Content, % - ● PL ⊢——⊣ LL; Blows per foot - ○ 10 20 30 40
0.7	936.4	3 4 3	15	1			Topsoil - 8" Medium stiff brown SILT AND CLAY (A-6a), little gravel, trace fine to coarse sand; dry.							
3.0	934.1	24 50/3	7	2			Severely weathered brown SANDSTONE.							50+
5		29 50/2	5	3										50+
		22 50/2	4	4										50+
10														
11.0	926.1						Hard brown SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, medium bedded to thinly laminated, moderately fractured. @ 11.3', 11.5', high angle fractures.							
14.6	922.5													
15		Core 120"	Rec 120"	RQD 88%	R1	*187	Hard gray SANDSTONE; fine grained, slightly weathered, argillaceous, pyritic, micaceous, thickly bedded to massive, slightly fractured.							
20							@ 20.0'-20.2', iron staining. @ 20.9'-21.0', high angle fracture with iron staining. @ 21.0', 21.4', high angle fracture.							
25		Core 120"	Rec 120"	RQD 94%	R2	*347								
30														

FILE: 0121-3070-03 [11/5/2007 3:44 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-647 | *Location:* Sta. 696+04.3, 182.5 ft. RT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/13/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢—⊣ LL / Blows per foot - ○
30	907.1						Hard gray SANDSTONE; fine grained, slightly weathered, argillaceous, pyritic, micaceous, thickly bedded to massive, slightly fractured.							10 20 30 40
35		Core 120"	Rec 105"	RQD 83%	R3	*324								
40							@ 41.0', interbedded shale.							
45		Core 120"	Rec 120"	RQD 90%	R4	*295								
50							@ 54.2'-56.0', brown calcareous layer.							
55		Core 120"	Rec 113"	RQD 86%	R5	*426								
60							@ 58.0'-58.2', shale layer. @ 58.5'-60.0', iron staining.							

FILE: 0121-3070-03 [11/5/2007 3:44 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-647 | *Location:* Sta. 696+04.3, 182.5 ft. RT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/13/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢—⊣ LL / Blows per foot - ○
60	877.1						Hard gray SANDSTONE; fine grained, slightly weathered, argillaceous, pyritic, micaceous, thickly bedded to massive, slightly fractured. @ 62.0'-63.5', 66.7'-69.0', brown sandstone layer.							10 20 30 40
65		Core 120"	Rec 116"	RQD 93%	R6	*361	@ 65.3'-65.6', high angle fracture.							
70														
75		Core 120"	Rec 120"	RQD 99%	R7	*373								
80														
85		Core 120"	Rec 120"	RQD 100%	R8	*262								
90														

FILE: 0121-3070-03 [11/5/2007 3:44 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-647 | *Location:* Sta. 696+04.3, 182.5 ft. RT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/13/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	847.1						Hard gray SANDSTONE; fine grained, slightly weathered, argillaceous, pyritic, micaceous, thickly bedded to massive, slightly fractured.						
95.2	841.9	Core 120"	Rec 117"	RQD 90%	R9	*278	Medium hard gray SHALE interbedded with gray SANDSTONE; very fine grained, moderately weathered, argillaceous, micaceous, pyritic, thinly bedded to thinly laminated.						
101.0	836.1	Core 48"	Rec 30"	RQD 31%	R10	*257	Medium hard gray SHALE; moderately weathered, micaceous, thinly bedded to thinly laminated, contains moderate to abundant argillaceous laminations.						
105.0	832.1						Bottom of Boring - 105.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:44 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-654 | *Location:* Sta. 702+46.7, 57.1 ft. LT of SR 823 CL | *Date Drilled:* 06/30/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
34.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	830.4												
0.4	830.0						Topsoil - 5"						
		3 4 5	10	1		3.5	Very stiff brown SILT (A-4b), some clay, little gravel, little fine to coarse sand; contains sandstone fragments; damp.	14	9	--	3	51	23
3.0	827.4												
3.7	826.7						Very stiff gray SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; contains odor; moist.						
		4 2 3	7	2A		3.0							
5				2B		3.0	Very stiff to hard brown SANDY SILT (A-4a), "and" gravel, little clay; contains sandstone fragments; damp.	31	7	--	3	40	19
		4 2 4	10	3		4.0							
		4 5 5	14	4		4.0							
10													
11.0	819.4						Very stiff to hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace to little gravel; damp. @ 12.0'-13.5', contains sandstone fragments.						
		3 4 6	11	5A		4.0							
				5B		4.0							
		6 6 11	15	6		3.5		3	7	--	5	47	38
15													
		6 8 12	16	7		4.5+							
18.5	811.9	50/4	3	8			Severely weathered gray SHALE.						
20.0	810.4						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, highly fractured. @ 20.2'-20.3', broken zone. @ 21.8', 22. 8', 23.0', 23.8', 24.7', 24.8', low angle fractures.						
		Core 60"	Rec 60"	RQD 62%	R1								
25		Core 60"	Rec 59"	RQD 86%	R2								
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-654 | *Location:* Sta. 702+46.7, 57.1 ft. LT of SR 823 CL | *Date Drilled:* 06/30/05

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
34.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	800.4	Core 60"	Rec 58"	RQD 74%	R3		Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded, moderately fractured, iron staining.						
35.0	795.4						Bottom of Boring - 35.0'						
40													
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-656 | *Location:* Sta. 706+29.9, 252.9 ft. LT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/13/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
61.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	963.6												
0.2	963.4						Topsoil - 2"						
		8 12 16	4	1			Medium dense brown SILT (A-4b), little fine to coarse sand; dry.						
3.5	960.1						Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded, highly fractured.						
5		Core 78"	Rec 78"	RQD 73%	R1	*266							
10													
15		Core 120"	Rec 120"	RQD 100%	R2	*226							
17.5	946.1						Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded, unfractured to slightly fractured, contains few argillaceous laminations.						
20													
25		Core 120"	Rec 120"	RQD 97%	R3	*301							
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-656 | *Location:* Sta. 706+29.9, 252.9 ft. LT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/13/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
61.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	933.6						Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded, unfractured to slightly fractured, contains few argillaceous laminations.						
35		Core 120"	Rec 120"	RQD 100%	R4	*358							
40													
45		Core 120"	Rec 120"	RQD 100%	R5	*351							
50													
55		Core 120"	Rec 120"	RQD 98%	R6	*402	@ 54.6', iron staining. @ 57.2'-58.8', zones of weaker cementation.						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-656 | Location: Sta. 706+29.9, 252.9 ft. LT of SR 823 CL | Date Drilled: 07/07/05 to 07/13/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
61.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	903.6						Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded, unfractured to slightly fractured, contains few argillaceous laminations. @ 61.6'-62.3', high angle fracture.						
65		Core 120"	Rec 120"	RQD 78%	R7	*369	@ 65.6'-65.8', broken zone. @ 66.3'-66.9', high angle fracture.						
70							@ 69.4'-69.6', broken zone.						
75		Core 120"	Rec 120"	RQD 94%	R8	*293	@ 76.6'-78.1', brown, highly weathered, contains calcareous bands. @ 78.3'-79.1', high angle fracture.						
80													
85		Core 120"	Rec 120"	RQD 94%	R9	*307	@ 83.1'-84.1', 86.3'-87.2', brown, highly weathered.						
90							@ 88.0'-88.2', high angle fracture.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-656 | *Location:* Sta. 706+29.9, 252.9 ft. LT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/13/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
61.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90.0	873.6						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, pyritic, laminated to thickly bedded, slightly fractured.						
							@ 90.6' to 92.5', brown, highly weathered.						
95		Core 120"	Rec 120"	RQD 100%	R10	*349							
100													
105		Core 120"	Rec 120"	RQD 89%	R11	*378	@ 105.6'-105.7', dark gray, shale bed.						
							@ 106.2'-106.8', brown, highly weathered, high angle fractures.						
110							@ 110.0', few to moderate argillaceous laminations.						
							@ 113.0', moderate to abundant argillaceous laminations.						
115		Core 120"	Rec 120"	RQD 88%	R12	*373							
117.0	846.6						Medium hard gray SANDSTONE interbedded with SHALE; fine grained, moderately weathered, argillaceous, arenaceous, micaceous, laminated bedded, moderately fractured, fissile.						
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-656 | *Location:* Sta. 706+29.9, 252.9 ft. LT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/13/05

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
61.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120.0	843.6						Medium hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, moderately weathered, argillaceous, arenaceous, micaceous, laminated to medium bedded, moderately fractured.						
125		Core 120"	Rec 120"	RQD 80%	R13								
130		Core 120"	Rec 120"	RQD 100%	R14								
140													
145		Core 120"	Rec 120"	RQD 100%	R15	*114							
150													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-656 | *Location:* Sta. 706+29.9, 252.9 ft. LT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/13/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
61.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
150	813.6												
151.0	812.6						Medium hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, moderately weathered, argillaceous, arenaceous, micaceous, laminated to medium bedded, moderately fractured.						
155		Core 120"	Rec 120"	RQD 98%	R16	*477	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, laminated to medium bedded, moderately fractured, contains few to moderate argillaceous laminations.						
160													
165		Core 120"	Rec 120"	RQD 97%	R17	*381							
170		Core 60"	Rec 60"	RQD 100%	R18	*1418							
175.0	788.6						Bottom of Boring - 175.0'						
180													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-658 | *Location:* Sta. 706+50.7, 313.3 ft. RT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/12/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
70.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / PL — LL / Blows per foot
0	1027.6													
0.2	1027.4						Topsoil - 2"							
		38 50/3	8	1			Severely weathered brown SANDSTONE argillaceous.							50+
		23 50/3	9	2										50+
5		50/2	2	3										50+
7.0	1020.6						Medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, laminated to medium bedded, moderately to highly fractured, interbedded iron stained shale, interbedded siltstone, iron staining in fractures.							
10		Core 84"	Rec 84"	RQD 68%	R1	*202								
13.1	1014.5						Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, laminated to thickly bedded, slightly fractured, iron stained interbedded siltstone, interbedded shale.							
15														
		Core 120"	Rec 120"	RQD 95%	R2	*329								
20														
25							@ 25.0'-25.4', qu = 5,299 psi.							
29.1	998.5	Core 120"	Rec 120"	RQD 92%	R3	*275								
30							Soft gray SHALE; highly weathered, arenaceous, laminated.							

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-658 | *Location:* Sta. 706+50.7, 313.3 ft. RT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/12/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
70.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION
30	997.6						Very soft to soft gray SHALE; highly weathered, arenaceous, thinly laminated to laminated.
31.8	995.8						Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded, moderately fractured, interbedded iron stained portions, iron stained fractures, contains few argillaceous laminations.
35							@ 35.6'-36.0', 39.0'-39.6', high angle fractures.
		Core 120"	Rec 120"	RQD 92%	R4	*241	
40							@ 42.5'-44.0', qu = 6,074 psi, SDI = 82.2%.
44.0	983.6						Medium hard to hard gray SANDSTONE interbedded with SHALE (turbidites); very fine to fine grained, moderately weathered, argillaceous, micaceous, laminated to thickly bedded, moderately fractured.
45							
		Core 120"	Rec 120"	RQD 92%	R5	*31	
50							@ 49.8'-50.8', SDI = 66.8%.
							@ 50.9'-51.3', qu = 6,752 psi.
55							
		Core 120"	Rec 120"	RQD 98%	R6	*473	
60							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-658 | *Location:* Sta. 706+50.7, 313.3 ft. RT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/12/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
70.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	967.6												
61.3	966.3						Medium hard to hard gray SANDSTONE interbedded with SHALE (turbidites); very fine to fine grained, moderately weathered, argillaceous, micaceous, laminated to thickly bedded, moderately fractured.						
65		Core 120"	Rec 120"	RQD 93%	R7	*241	Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, medium bedded to massive, slightly fractured to unfractured, iron staining. @ 66.8'-81.5', brown, high to moderately weathered. @ 66.9'-68.4', qu = 7,969 psi, SDI = 99.0%. @ 69.6'-70.0', 70.6'-71. 1', 71.9'-73.0', high angle fractures.						
70													
75													
80		Core 120"	Rec 118"	RQD 98%	R8	*386							
85													
90		Core 120"	Rec 120"	RQD 100%	R9	*406							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-658 | *Location:* Sta. 706+50.7, 313.3 ft. RT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/12/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
70.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	937.6						Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, medium bedded to massive, slightly fractured to unfractured, iron staining.						
							@ 93.2'-93.7', 94.0'-94.2', high angle fractures.						
95		Core 120"	Rec 120"	RQD 100%	R10	*399							
100													
105		Core 120"	Rec 120"	RQD 100%	R11	*377							
110													
115		Core 120"	Rec 120"	RQD 100%	R12	*402							
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-658 | *Location:* Sta. 706+50.7, 313.3 ft. RT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/12/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
70.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	907.6						Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, medium bedded to massive, slightly fractured to unfractured, iron staining.						
125							@ 124.0'-141.7' few argillaceous laminations.						
130		Core 120"	Rec 120"	RQD 100%	R13	*485							
135													
140		Core 120"	Rec 120"	RQD 100%	R14	*210							
145													
150		Core 120"	Rec 120"	RQD 100%	R15	*494	@ 149.5'-149.9', iron staining.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-658 | *Location:* Sta. 706+50.7, 313.3 ft. RT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/12/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
70.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
150	877.6						Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, medium bedded to massive, slightly fractured to unfractured, iron staining.						
							@ 154.0'-164.0', highly fractured due to twisting core barrel.						
155		Core 120"	Rec 120"	RQD 0%	R16								
160							@ 161.7'-162.0', iron staining.						
							@ 164.0'-193.0', few argillaceous laminations.						
165													
		Core 120"	Rec 120"	RQD 100%	R17	*348							
170													
175													
		Core 120"	Rec 120"	RQD 100%	R18	*398							
180													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-658 | *Location:* Sta. 706+50.7, 313.3 ft. RT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/12/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
70.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢⊣ LL / Blows per foot - ○ (10 20 30 40)
180	847.6						Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, medium bedded to massive, slightly fractured to unfractured, iron staining. @ 182.0'-182.1', cross bedding.							
185							@ 184.4'-185.4', SDI = 81.0%. @ 187.5'-187.7', cross-bedding.							
187.7	839.9	Core 120"	Rec 120"	RQD 100%	R19	*171	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, pyritic, medium bedded to thinly laminated, moderately fractured, contains moderate argillaceous laminations, contains ferric bands. @ 192.5'-192.6', iron staining.							
190														
195														
200		Core 120"	Rec 120"	RQD 100%	R20	*234								
204.2	823.4						Medium hard gray SANDSTONE; very fine grained, slightly weathered, micaceous, argillaceous, massive, contains few argillaceous laminations.							
205														
210		Core 120"	Rec 117"	RQD 98%	R21	*399								

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-658 | *Location:* Sta. 706+50.7, 313.3 ft. RT of SR 823 CL | *Date Drilled:* 07/07/05 to 07/12/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
70.5' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
210	817.6						Medium hard gray SANDSTONE; very fine grained, slightly weathered, micaceous, argillaceous, massive, contains few argillaceous laminations.						
215		Core 120"	Rec 119"	RQD 99%	R22	*445							
220													
225		Core 78"	Rec 78"	RQD 100%	R23	*386							
230													
230.5	797.1						Bottom of Boring - 230.5'						
235													
240													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-659 | *Location:* Sta. 709+21.3, 73.5 ft. LT of SR 823 CL | *Date Drilled:* 07/14/05 to 07/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
3.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / PL — LL / Blows per foot
0	936.7													
0.3	936.4						Topsoil - 3"							
		2 4 6	2	1			Stiff brown SILT AND CLAY (A-6a); dry.							
3.5	933.2	43 46 50/2	13	2			Severely weathered brown SANDSTONE argillaceous.							50+
5.0	931.7	Core 60"	Rec 60"	RQD 23%	R1	*336	Soft to medium hard brownish orange SANDSTONE interbedded with SHALE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, thinly laminated to thinly bedded, highly fractured to broken, iron stains. @ 8.9'-9.2', 9.6'-9.7', high angle fractures.							
10														
10.6	926.1	Core 120"	Rec 120"	RQD 74%	R2	*190	Medium hard brown and gray SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, medium bedded to laminated, moderately fractured, iron staining on fracture surface. @ 13.6'-13.7', 19.9'-20.2', high angle fractures.							
15														
20							@ 20.3', gray. @ 21.7'-22.1', high angle fracture.							
25		Core 120"	Rec 120"	RQD 96%	R3	*330								
30														

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-659 | *Location:* Sta. 709+21.3, 73.5 ft. LT of SR 823 CL | *Date Drilled:* 07/14/05 to 07/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
3.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30.0	906.7												
	906.7-						Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded to massive, moderately fractured, iron staining on fracture surface.						
35		Core 120"	Rec 120"	RQD 100%	R4	*394							
40							@ 40.0', pyritic.						
45		Core 120"	Rec 120"	RQD 100%	R5	*301							
50							@ 51.0'-51.7', brown, pyritic.						
55		Core 120"	Rec 120"	RQD 100%	R6	*382							
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-659 | *Location:* Sta. 709+21.3, 73.5 ft. LT of SR 823 CL | *Date Drilled:* 07/14/05 to 07/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
3.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢—⊣ LL / Blows per foot - ○ (10 20 30 40)
60	876.7						Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded to massive, moderately fractured, iron staining on fracture surface.							
65		Core 120"	Rec 120"	RQD 100%	R7	*277	@ 65.3', iron stained fracture. @ 65.3'-67.6', brown.							
70														
75		Core 120"	Rec 120"	RQD 100%	R8	*288	@ 72.5'-73.5', hard, pyritic. @ 72.5'-73.0', iron staining.							
80														
85		Core 120"	Rec 120"	RQD 100%	R9	*401	@ 81.2'-82.5', iron staining. @ 85.7'-85.8', 87.5'-87.6', shale layer. @ 86.1'-86.3', cross bedding.							
90														

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-659 | *Location:* Sta. 709+21.3, 73.5 ft. LT of SR 823 CL | *Date Drilled:* 07/14/05 to 07/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
3.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	846.7												
92.0	844.7						Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded to massive, moderately fractured, iron staining on fracture surface. @ 90.0'-90.9', high angle fracture.						
95		Core 120"	Rec 120"	RQD 89%	R10	*222	Soft gray SHALE interbedded with SANDSTONE and SILTSTONE; very fine grained, slightly weathered, arenaceous, micaceous, very thinly bedded to thinly laminated, moderately fractured.						
100													
105		Core 120"	Rec 120"	RQD 100%	R11	*356							
110													
115		Core 120"	Rec 120"	RQD 100%	R12	*27							
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-659 | Location: Sta. 709+21.3, 73.5 ft. LT of SR 823 CL | Date Drilled: 07/14/05 to 07/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
3.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
120	816.7						Soft gray SHALE interbedded with SANDSTONE and SILTSTONE; very fine grained, slightly weathered, arenaceous, micaceous, very thinly bedded to thinly laminated, moderately fractured.							Natural Moisture Content, % - ● PL ⊢——⊣ LL Blows per foot - ○ 10 20 30 40
125		Core 120"	Rec 120"	RQD 100%	R13	*470								
130														
135.0	801.7	Core 120"	Rec 120"	RQD 100%	R14	*305	Medium hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, laminated to medium bedded, slightly fractured, contains moderate argillaceous laminations, fissile.							
140							@ 142.9'-143.1', high angle fractures.							
145		Core 120"	Rec 120"	RQD 100%	R15	*506								
150							@ 149.2'-150.0', shale layer.							

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-659 | *Location:* Sta. 709+21.3, 73.5 ft. LT of SR 823 CL | *Date Drilled:* 07/14/05 to 07/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
3.9' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
150	786.7	Core 60"	Rec 60"	RQD 100%	R16	*84	Medium hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, laminated to medium bedded, slightly fractured, contains moderate argillaceous laminations, fissile.						
155.0	781.7						Bottom of Boring - 155.0'						
160													
165													
170													
175													
180													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-661 | Location: Sta. 709+29.0, 237.2 ft. RT of SR 823 CL | Date Drilled: 07/12/05 to 07/14/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
73.1' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	938.9													Natural Moisture Content, % - ● PL ⊢——⊣ LL; Blows per foot - ○ 10 20 30 40
0.3	938.6						Topsoil - 3"							
		12 15 22	18	1		--	Hard brown SANDY SILT (A-4a), little gravel, trace clay; contains sandstone fragments; damp.							
3.0	935.9						Severely weathered brown SANDSTONE.							
		22 18 20	15	2										
5														
		13 18 19	15	3										
		26 50/3	8	4										50+
10														
		28 50/2	6	5										50+
12.5	926.4						Medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, very thinly bedded to massive, moderately fractured.							
15		Core 84"	Rec 84"	RQD 69%	R1	*170	@ 16.6'-11.7', iron stained high angle fracture.							
							@ 18.3'-18.4', pyrite layer.							
19.5	919.4						@ 18.3', iron layer.							
20							Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured.							
							@ 19.5'-19.6', iron staining.							
		Core 120"	Rec 118"	RQD 98%	R2	*335								
25														
30														

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-661 | *Location:* Sta. 709+29.0, 237.2 ft. RT of SR 823 CL | *Date Drilled:* 07/12/05 to 07/14/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
73.1' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢⊣ LL / Blows per foot - ○ (10 20 30 40)
30	908.9						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured.							
35		Core 120"	Rec 118"	RQD 98%	R3	*485								
40														
45		Core 120"	Rec 120"	RQD 100%	R4	*439								
50														
55		Core 120"	Rec 120"	RQD 100%	R5	*288	@ 58.1'-58.4', interbedded shale, calcareous sandstone layers.							
60														

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-661 | *Location:* Sta. 709+29.0, 237.2 ft. RT of SR 823 CL | *Date Drilled:* 07/12/05 to 07/14/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
73.1' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢ LL / Blows per foot - ○ (10 20 30 40)
60	878.9						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured. @ 62.5'-62.7', high angle fracture.							
65		Core 120"	Rec 120"	RQD 100%	R6	*281	@ 63.5'-64.4', 66.2'-66.8', iron stained high angle fractures.							
70														
75		Core 120"	Rec 120"	RQD 100%	R7	*393	@ 72.4'-73.0', brown and orange.							
80														
85		Core 120"	Rec 118"	RQD 98%	R8	*287								
90														

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-661 | *Location:* Sta. 709+29.0, 237.2 ft. RT of SR 823 CL | *Date Drilled:* 07/12/05 to 07/14/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
73.1' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL — LL / Blows per foot - ○ (10 20 30 40)
90.0	848.9						Medium hard gray SANDSTONE; very fine grained to fine grained, slightly weathered, pyritic, thinly bedded to thinly laminated, moderately fractured to slightly fractured, contains few to moderate argillacious laminations.							
95		Core 120"	Rec 120"	RQD 82%	R9	*414	@ 96.8'-97.2', calcareous. @ 97.0'-99.5', interbedded shale layers.							
100.0	838.9						@ 99.8'-99.9', calcareous. Medium hard gray SANDSTONE interbedded with SHALE; very fine grained, slightly weathered, thinly laminated to thinly bedded, slightly fractured.							
105		Core 120"	Rec 120"	RQD 87%	R10	*503								
110														
115		Core 120"	Rec 120"	RQD 94%	R11	*248								
120														

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-661 | *Location:* Sta. 709+29.0, 237.2 ft. RT of SR 823 CL | *Date Drilled:* 07/12/05 to 07/14/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
73.1' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
120	818.9													Natural Moisture Content, % - ● PL ⊢——⊣ LL Blows per foot - ○ 10 20 30 40
		Core 120"	Rec 120"	RQD 96%	R12		Medium hard gray SANDSTONE interbedded with SHALE; very fine grained, slightly weathered, thinly laminated to thinly bedded, slightly fractured.							
125														
129.5	809.4													
130							Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, slightly fractured, contains moderate to abundant argillaceous laminations.							
		Core 120"	Rec 120"	RQD 100%	R13	*206								
135														
140							@ 141.0'-141.1', 144.6'-144.7, 147.7'-147.8', interbedded brown siltstone.							
		Core 120"	Rec 120"	RQD 100%	R14	*155								
145														
150														

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-661 | *Location:* Sta. 709+29.0, 237.2 ft. RT of SR 823 CL | *Date Drilled:* 07/12/05 to 07/14/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
73.1' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
150	788.9						Hard gray SANDSTONE; very fine grained, slightly weathered, micaceous, argillaceous, thickly bedded, slightly fractured.							
155		Core 120"	Rec 120"	RQD 100%	R15	*349								
160		Core 77"	Rec 77"	RQD 100%	R16	*387								
165														
165.9	773.0						Bottom of Boring - 165.9'							
170														
175														
180														

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-662 | *Location:* Sta. 713+21.8, 75.0 ft. LT of SR 823 CL | *Date Drilled:* 07/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
3.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
^	820.7												
0.2	820.5						Topsoil - 2"						
		1 2 4	6	1			Medium stiff brown SILT (A-4b), little fine to coarse sand, little clay, trace clay; damp to moist.	3	12	--	7	61	17
3.5	817.2												
		6 8 10	14	2			Very stiff to hard brown SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; damp.	4	12	--	7	42	35
5													
		5 8 11	16	3		4.5+							
		25 50/5	8	4									
10.0	810.7						Soft brown SANDSTONE interbedded with SILTSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded, broken. @ 11.4'-13.5', high angle fracture.						
		Core 102"	Rec 102"	RQD 42%	R1	*124							
15							@ 15.0'-16.7', gray, some iron staining.						
16.7	804.0						Medium hard gray SANDSTONE; fine grained, moderately weathered, argillaceous, micaceous, laminated to thickly bedded, moderately fractured, few bands of iron staining, contains moderate to abundant argillaceous laminations.						
20													
		Core 120"	Rec 119"	RQD 82%	R2	*129							
25							@ 27.5', 28.0', 28.3', low angle iron stained fractures.						
							@ 28.5'-29.1', high angle fracture.						
29.1	791.6						Medium hard gray SHALE interbedded with SANDSTONE.						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-662 | *Location:* Sta. 713+21.8, 75.0 ft. LT of SR 823 CL | *Date Drilled:* 07/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
3.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	790.7	Core 120"	Rec 120"	RQD 100%	R3	*72	Medium hard gray SHALE interbedded with SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, arenaceous, thinly laminated to medium bedded, slightly to moderately fractured, fissile, argillaceous zones.						
35													
40		Core 120"	Rec 120"	RQD 75%	R4	*165	@ 38.9'-41.0', very fine to fine grained sandstone layer. @ 41.5'-41.6', high angle iron stained fracture. @ 45.3' low angle fracture with clay seam.						
45.3	775.4						Soft to medium hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, moderately fractured, contains few to moderate argillaceous laminations.						
50		Core 83"	Rec 83"	RQD 100%	R5	*319							
55.4	765.3						Bottom of Boring - 55.4'						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-664 | *Location:* Sta. 713+39.6, 126.9 ft. RT of SR 823 CL | *Date Drilled:* 07/14/05 to 07/15/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
15.3' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	839.3												
0.3	839.0						Topsoil - 4"						
		16 18 15	15	1		4.0	Very stiff to hard brown SILT AND CLAY (A-6a), some fine to coarse sand, little gravel; contains sandstone fragments; damp.						
		10 13 18	18	2		3.5		17	19	--	8	32	24
5		9 12 18	18	3		2.5							
		10 19 23	18	4		3.0							
10													
10.5	828.8	7 15 20	16	5			Severely weathered grayish brown SHALE arenaceous.						
		10 14 20	18	6									
15		9 15 50/5	14	7									
		21 34 50/5	12	8									
20.0	819.3	Core 114"	Rec 110"	RQD 56%	R1	*77	Soft to medium hard gray SHALE interbedded with SANDSTONE; very fine grained, highly weathered to decomposed, arenaceous, micaceous, very thinly bedded to thinly laminated, highly fractured to broken. @ 20.8'-21.1', 22.0'-22.2', 22.5'-23.4', high angle fractures, iron staining on fracture surfaces. @ 21.0'-21.6', broken.						
25													
26.9	812.4						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, laminated to thickly bedded, moderately fractured, contains few to moderate						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+
50+

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-664 | *Location:* Sta. 713+39.6, 126.9 ft. RT of SR 823 CL | *Date Drilled:* 07/14/05 to 07/15/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
15.3' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢ LL / Blows per foot - ○
30	809.3						argillaceous laminations; fissile after dessication. Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, laminated to thickly bedded, moderately fractured, contains few to moderate argillaceous laminations; fissile after dessication.							10 20 30 40
35		Core 120"	Rec 120"	RQD 93%	R2	*46	@ 27.5'-28.8', sandstone layer.							
40		Core 120"	Rec 120"	RQD 87%	R3	*310	@ 43.5'-43.6', brown sandstone layer, interbedded siltstone (turbidites).							
50		Core 120"	Rec 120"	RQD 86%	R4	*74	@ 59.3'-59.5', high angle fracture, pyrite, interbedded siltstone (turbidites).							
55														
60														

FILE: 0121-3070-03 [11/5/2007 4:24 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-664 | *Location:* Sta. 713+39.6, 126.9 ft. RT of SR 823 CL | *Date Drilled:* 07/14/05 to 07/15/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
15.3' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	779.3	Core 120"	Rec 120"	RQD 100%	R5	*210	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, laminated to thickly bedded, moderately fractured, contains few to moderate argillaceous laminations; fissile after dessication.						
65													
70		Core 66"	Rec 66"	RQD 100%	R6	*650							
75.0	764.3						Bottom of Boring - 75.0'						
80													
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-671 | *Location:* Sta. 727+18.5, 71.0 ft. LT of SR 823 CL | *Date Drilled:* 07/18/05 to 07/19/05

WATER OBSERVATIONS: Water seepage at: Not Reported
Water level at completion: Not Reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	810.3													
0.5	809.8						Topsoil - 6" / 1.0' soil removed before drilling.							
		5 9 9	18	1		4.5+	Hard brown SANDY SILT (A-4a), little clay, trace gravel; contains sandstone fragments; damp.							
3.0	807.3						Severely weathered brown SANDSTONE argillaceous.							
		10 28 39	14	2										67
5		18 50/4	8	3										50+
		40 50/2	7	4										50+
10		25 50/2	6	5										50+
		50 50/2	8	6										50+
15		50/5	4	7										50+
		21 50/2	7	8										50+
20.0	790.3						Soft to medium hard brown SANDSTONE; very fine grained, highly weathered to decomposed, argillaceous, thinly bedded to thinly laminated, highly fractured to broken, moderate argillaceous laminations; iron stained throughout. @ 20.5', 22.7', 23.4', low angle fracture. @ 20.8'-21.0', 21.8', 22.1', iron stained low angle fracture. @ 22.1', 22.4', 35.0', low angle fracture. @ 23.6'-30.0', lost recovery. @ 23.9'-24.1', 24.6'-24.7', 31.3'-31.5', 31.5'-31.8', 33.2'-33.3', 33.5'-33.6', 33.6'-33.7', 34.7'-34.8', iron stained high angle fractured.							
25		Core 120"	Rec 42"	RQD 10%	R1	*119								
30														

Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-671 | *Location:* Sta. 727+18.5, 71.0 ft. LT of SR 823 CL | *Date Drilled:* 07/18/05 to 07/19/05

WATER OBSERVATIONS: Water seepage at: Not Reported
Water level at completion: Not Reported

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30.0	780.3						Medium hard gray SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, thinly bedded to very thinly laminated, highly fractured, abundant argillaceous laminations.						
35		Core 120"	Rec 120"	RQD 62%	R2	*78	@ 33.0'-33.9', iron staining.						
40.0	770.3						Bottom of Boring - 40.0'						
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-672 | *Location:* Sta. 727+35.1, 54.1 ft. RT of SR 823 CL | *Date Drilled:* 07/19/05 to 07/20/05

WATER OBSERVATIONS: Water seepage at: 38.0'
Water level at completion: 36.0' (prior to coring)
36.0' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	826.6												
0.3	826.3						Topsoil - 4" / 1.0' soil removed before drilling.						
		5 9 12	15	1		4.5+	Hard brown SILTY CLAY (A-6b), trace to little fine to coarse sand, trace gravel; damp.						
		4 20 24	16	2		4.5+							
5		8 12 20	14	3		4.5+		1	4	--	5	52	38
		6 14 20	13	4		4.0		3	6	--	6	48	37
10		6 10 16	18	5		4.5+							
13.0	813.6						Severely weathered grayish brown SANDSTONE argillaceous.						
		7 50/3	6	6									
15		29 50/3	7	7									
		50/4	4	8									
20		33 50/4	10	9									
		50/5	5	10									
25		39 50/3	8	11									
		50/4	2	12									
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40
50+ 50+ 50+ 50+ 50+ 50+

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-672 | *Location:* Sta. 727+35.1, 54.1 ft. RT of SR 823 CL | *Date Drilled:* 07/19/05 to 07/20/05

WATER OBSERVATIONS:
Water seepage at: 38.0'
Water level at completion: 36.0' (prior to coring)
36.0' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30.0	796.6						Medium hard gray SANDSTONE interbedded with SHALE; very fine grained, moderately weathered, argillaceous, micaceous, laminated to thinly bedded, moderately to highly fractured, abundant siltstone laminations (some turbidites).						
35		Core 120"	Rec 102"	RQD 76%	R1	*354							
40.0	786.6						Medium hard to hard gray SANDSTONE interbedded with SHALE (turbidites); very fine grained, highly weathered to decomposed, argillaceous, micaceous, laminated to thinly bedded, highly fractured to broken, significant core loss in all runs. @ 40.0'-40.4', 46.0'-46.6', broken zone. @ 41.8'-42.0', high angle fracture.						
45		Core 120"	Rec 55"	RQD 17%	R2	*180							
50		Core 60"	Rec 58"	RQD 97%	R3	*273	@ 50.0', few brown ferric bands.						
55.0	771.6						Bottom of Boring - 55.0'						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-674 | *Location:* Sta. 730+15.5, 118.0 ft. LT of SR 823 CL | *Date Drilled:* 07/27/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	838.5													
0.3	838.2						Topsoil - 3"							
		5 6 8	14	1		4.5+	Hard brown SILTY CLAY (A-6b), trace fine sand; damp.	0	0	--	1	53	46	
		11 35 24	18	2		4.5+								
5		7 15 15	15	3		4.5+								59
		7 13 21	18	4		4.5+								
10		13 33 50/3	15	5		--								50+
		10 32 36	18	6		--								
15		26 36 48	18	7		--								68
		20 50/5	11	8		--	@ 18.5', gray.							84
20		35 50/3	8	9		--								50+
		36 50/3	7	10		--								50+
25.0	813.5						Severely weathered brown SANDSTONE, argillaceous.							50+
30		Core 120"	Rec 45"	RQD 13%	R1									

Natural Moisture Content, % - ● *PL* ⊢——⊣ *LL*

Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-674 | *Location:* Sta. 730+15.5, 118.0 ft. LT of SR 823 CL | *Date Drilled:* 07/27/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	808.5					*87	Severely weathered brown SANDSTONE, argillaceous.						
31.1	807.4						Medium hard to hard gray SANDSTONE interbedded with SHALE; very fine grained, decomposed to highly weathered, micaceous, thinly laminated to medium bedded, highly fractured, fissle.						
35							@ 31.1', lost recovery.						
40		Core 120"	Rec 120"	RQD 98%	R2	*325							
45							@ 43.9'-44.1', 44.8'-45. 2', 45.4'-46.7', 48.3'-48.5' fine grained sandstone beds.						
50		Core 120"	Rec 120"	RQD 92%	R3	*297							
55.0	783.5						Bottom of Boring - 55.0'						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-675 | *Location:* Sta. 730+12.3, 95.5 ft. RT of SR 823 CL | *Date Drilled:* 07/20/05 to 07/25/05

WATER OBSERVATIONS: Water seepage at: 30.0', 39.5'
Water level at completion: 28.7' (prior to coring)
30.0' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	902.5													
0.3	902.2						Topsoil - 3" / 6" soil removed before drilling.							
		5 6 8	15	1		4.5+	Hard brown SILT AND CLAY (A-6a), little fine to coarse sand; damp.	0	10	--	9	62	19	
3.0	899.5													
		22 50/5	9	2		4.5+	Hard brown SANDY SILT (A-4a), little gravel, little clay; contains sandstone fragments; damp.	19	10	--	10	48	13	50+
5		6 19 50/2	14	3		4.5+								50+
8.0	894.5													
		24 50/3	5	4			Severely weathered grayish brown SANDSTONE argillaceous.							50+
10		50/4	3	5										50+
		50/5	2	6										50+
15.0	887.5													
		Core 36"	Rec 32"	RQD 89%	R1	*518	Hard brown and gray SANDSTONE; very fine to fine grained, highly to moderately weathered, argillaceous, micaceous, thickly bedded, moderately to slightly fractured.							
20		Core 120"	Rec 120"	RQD 100%	R2	*204								
25														
30														

STANDARD PENETRATION (N): Natural Moisture Content, % - ● ; PL ⊢—⊣ LL ; Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-675 | *Location:* Sta. 730+12.3, 95.5 ft. RT of SR 823 CL | *Date Drilled:* 07/20/05 to 07/25/05

WATER OBSERVATIONS: Water seepage at: 30.0', 39.5'
Water level at completion: 28.7' (prior to coring)
30.0' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	872.5												
30.0	872.5	Core 120"	Rec 113"	RQD 94%	R3	*201	Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded, slightly fractured. @ 31.4', slightly to moderately fractured, low angle fracture.						
35													
40		Core 120"	Rec 108"	RQD 65%	R4	*320	@ 38.0'-39.1', iron staining.						
45													
48.0	854.5												
50		Core 120"	Rec 69"	RQD 5%	R5		Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded, highly fractured, extensive core loss, contains few to moderate argillaceous laminations.						
55													
60							@ 59.0' - 64.4', low angle fractures.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-675 | *Location:* Sta. 730+12.3, 95.5 ft. RT of SR 823 CL | *Date Drilled:* 07/20/05 to 07/25/05

WATER OBSERVATIONS: Water seepage at: 30.0', 39.5'
Water level at completion: 28.7' (prior to coring)
30.0' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60.0	842.5	Core 120"	Rec 90"	RQD 21%	R6	*360	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly bedded, highly fractured, extensive core loss, contains moderate to abundant argillaceous laminations. @ 60.0'-60.8', high angle fracture. @ 61.0'-63.3', lost recovery.						
68.0	834.5	Core 120"	Rec 118"	RQD 96%	R7		Medium hard to hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to very thinly bedded, highly fractured, moderate to abundant shale laminations. @ 70.8'-70.9', 72.5'-72.6', 73.1'-73.2', 75.9'-76.0', 76.3'-76.4', 77.1'-77.2', hard brown claystone.						
		Core 120"	Rec 120"	RQD 97%	R8	*154	@ 80.6'-80.7', hard brown claystone.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-675 | *Location:* Sta. 730+12.3, 95.5 ft. RT of SR 823 CL | *Date Drilled:* 07/20/05 to 07/25/05

WATER OBSERVATIONS: Water seepage at: 30.0', 39.5'
Water level at completion: 28.7' (prior to coring)
30.0' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90.0	812.5	Core 120"	Rec 112"	RQD 85%	R9	*198	Soft to medium hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, highly weathered, argillaceous, micaceous, medium bedded to thinly bedded, highly fractured. @ 93.1'-93.4', broken zone. @ 95.5'-95.9', 94.2'-94.4', lost recovery. @ 99.1'-99.4', 102.1', 102.3', 107.2', low angle fractures.						
103.0	799.5	Core 120"	Rec 120"	RQD 98%	R10	*425	Medium hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, medium bedded to thinly bedded, highly fractured, moderate to abundant argillaceous laminations.						
110		Core 84"	Rec 84"	RQD 100%	R11	*171							
115.0	787.5						Bottom of Boring - 115.0'						
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-677 | Location: Sta. 734+00.5, 151.0 ft. LT of SR 823 CL | Date Drilled: 07/27/05 to 07/28/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	804.5													
0.5	804.0						Topsoil - 6"							
		4 20 50/4	9	1			Severely weathered brown SANDSTONE argillaceous.							50+
		5 28 50/5	12	2			@ 3.5', gray.							50+
		22 50/3	7	3										50+
8.0	796.5						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, very thickly bedded, slightly fractured, contains few to moderate argillaceous laminations.							
		Core 120"	Rec 115"	RQD 91%	R1	*382								
							@ 16.1'-17.1', shale bed.							
		Core 120"	Rec 114"	RQD 95%	R2	*254	@ 22.2', low angle fracture. @ 22.7', clay seam.							
							@ 29.6'-30.2', abundant argillaceous laminations.							
30														

STANDARD PENETRATION (N): Natural Moisture Content, % - ●; PL ⊢—⊣ LL; Blows per foot - ○; 10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-677 | *Location:* Sta. 734+00.5, 151.0 ft. LT of SR 823 CL | *Date Drilled:* 07/27/05 to 07/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	774.5	Core 84"	Rec 84"	RQD 100%	R3	*493	Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, very thickly bedded, slightly fractured, contains few to moderate argillaceous laminations.						
35.0	769.5						Bottom of Boring - 35.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

40 45 50 55 60

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-679 | *Location:* Sta. 734+06.2, 225.5 ft. RT of SR 823 CL | *Date Drilled:* 07/19/05 to 07/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
55.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / PL — LL / Blows per foot
0	962.1													
0.3	961.8						Topsoil - 3"							
		17 17 50/3	14	1			Very dense brown FINE SAND (A-3); damp.							50+
3.5	958.6	20 50/2	6	2			Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp.							50+
5														
5.3	956.8	Core 116"	Rec 116"	RQD 87%	R1	*429	Hard brown SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous (turbidity), thickly bedded, moderately fractured. @ 5.4', 6.9', 9.9', 10.4', 11.9', 12.0', 12.9', low angle fractures. @ 10.4'-11.6', SDI = 98.1%. @ 11.7'-12.1', qu = 8,786 psi.							
10														
15														
15.6	946.5	Core 120"	Rec 120"	RQD 93%	R2	*387	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous (turbidites), thickly bedded, unfractured to slightly fractured. @ 21.2', low angle fracture. @ 18.0'-19.1', qu = 10,057 psi, SDI = 98.1%.							
20														
25														
30		Core 120"	Rec 120"	RQD 100%	R3									

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-679 | *Location:* Sta. 734+06.2, 225.5 ft. RT of SR 823 CL | *Date Drilled:* 07/19/05 to 07/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
55.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	932.1					*331	Hard gray SANDSTONE; very fine grained to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, unfractured to slightly fractured.						
35		Core 120"	Rec 120"	RQD 100%	R4	*321							
40													
45		Core 120"	Rec 120"	RQD 100%	R5	*268							
50													
55		Core 120"	Rec 120"	RQD 100%	R6								
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-679 | *Location:* Sta. 734+06.2, 225.5 ft. RT of SR 823 CL | *Date Drilled:* 07/19/05 to 07/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
55.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	902.1					*247	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, unfractured to slightly fractured.						
65							@ 67.0'-67.2', 67.5'-67.6', high angle fractures.						
70		Core 120"	Rec 120"	RQD 100%	R7	*388	@ 68.8'-69.6', very fine sandstone, weak zone.						
75							@ 74.9', high angle fracture with iron staining.						
80		Core 120"	Rec 120"	RQD 100%	R8	*349	@ 71.0', 78.0'-79.0', 82.1', pyritic inclusions.						
85							@ 80.4'-82.1', brown, highly weathered.						
90		Core 120"	Rec 120"	RQD 100%	R9								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-679 | Location: Sta. 734+06.2, 225.5 ft. RT of SR 823 CL | Date Drilled: 07/19/05 to 07/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
55.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	872.1					*370	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, unfractured to slightly fractured.						
95							@ 97.5'-98.9', qu = 12,043 psi, SDI = 98.5%.						
100		Core 120"	Rec 120"	RQD 100%	R10	*292	@ 101.5', 102.7', low angle fractures.						
105.0	857.1						Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, laminated to medium bedded, slightly fractured, contains few to moderate argillaceous laminations.						
110		Core 120"	Rec 120"	RQD 100%	R11	*384	@ 105.4'-106.8', qu = 11,379 psi, SDI = 89.6%. @ 110.8'-111.4', 113.0'- 113.8', 114.0'-115.0', calcareous layers. @ 113.2'-113.5', pyritic.						
115.0	847.1						Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, pyritic, thinly bedded, slightly fractured; contains moderate to abundant argillaceous laminations. @ 115.3', 115.4', 117.1', 119.2', 124.6', low angle fractures. @ 117.3'-117.5', calcareous layers.						
120		Core 120"	Rec 120"	RQD 100%	R12								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-679 | *Location:* Sta. 734+06.2, 225.5 ft. RT of SR 823 CL | *Date Drilled:* 07/19/05 to 07/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
55.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	842.1					*280	Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, pyritic, thinly bedded, slightly fractured, contains moderate to abundant argillaceous laminations.						
125													
130		Core 120"	Rec 120"	RQD 100%	R13	*276	@ 129.4', 131.7', low angle fractures. @ 133.1'-134.0', SDI = 86.6%.						
135.0	827.1						Hard gray SHALE moderately interbedded with SANDSTONE layers; very fine to fine grained, slightly weathered, argillaceous, micaceous, thinly laminated to medium bedded, slightly fractured.						
140		Core 120"	Rec 120"	RQD 100%	R14	*394	@ 139.6', 149.4', low angle fracture. @ 141.8'-142.2', qu = 9,517 psi. @ 142.5'-143.6', SDI = 76.8%.						
145													
150		Core 120"	Rec 120"	RQD 100%	R15								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-679 | *Location:* Sta. 734+06.2, 225.5 ft. RT of SR 823 CL | *Date Drilled:* 07/19/05 to 07/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
55.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
150.0	812.1					*337	Hard gray SANDSTONE; very fine grained, slightly weathered, argillaceous, micaceous, medium bedded, unfractured to slightly fractured, contains few to moderate argillaceous laminations. @ 153.7'-155.0', qu = 5,116 psi, SDI = 80.6%.						
155		Core 60"	Rec 60"	RQD 100%	R16	*309							
160.0	802.1						Bottom of Boring - 160.0'						
165													
170													
175													
180													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-680 | *Location:* Sta. 737+95.0, 66.1 ft. LT of SR 823 CL | *Date Drilled:* 07/22/05 to 07/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
20.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	931.4													Natural Moisture Content, % - ● PL ⊢—⊣ LL; Blows per foot - ○ 10 20 30 40
0.7	930.7	18 23 24	5	1			Topsoil - 8" / 6" soil removed before drilling. Severely weathered brown SANDSTONE argillaceous.							
		50/4	2	2										50+
5.0	926.4	Core 120"	Rec 120"	RQD 43%	R1	*138	Hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, medium bedded to thickly bedded, moderately to highly fractured, contains few to moderate argillaceous laminations. @ 6.4', 9.5', 13.5', high angle fracture.							
15														
20		Core 120"	Rec 113"	RQD 41%	R2	*148	@ 22.5', high angle fractures, iron stained.							
25														
27.0	904.4	Core 120"	Rec 120"	RQD 79%	R3		Medium hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded.							
30														

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-680 | *Location:* Sta. 737+95.0, 66.1 ft. LT of SR 823 CL | *Date Drilled:* 07/22/05 to 07/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
20.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	901.4					*248	Medium hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured. @ 32.4', high angle fracture.						
35													
40		Core 120"	Rec 120"	RQD 79%	R4	*251							
45													
50		Core 120"	Rec 120"	RQD 82%	R5	*217	@ 49.3'-48.7', high angle fractures.						
55													
60		Core 120"	Rec 120"	RQD 91%	R6								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-680 | *Location:* Sta. 737+95.0, 66.1 ft. LT of SR 823 CL | *Date Drilled:* 07/22/05 to 07/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
20.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	871.4					*281	Medium hard gray and brown SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately fractured.						
65													
70		Core 120"	Rec 120"	RQD 88%	R7	*258	@ 70.7'-71.6', iron stained high angle fracture.						
75													
80		Core 120"	Rec 120"	RQD 89%	R8	*333	@ 77.5'-78.0', high angle fracture. @ 78.0' contains moderate to abundant argillaceous laminations.						
82.8	848.6						Hard gray SANDSTONE interbedded with SHALE; fine grained, moderately weathered, argillaceous, micaceous, pyritic, laminated to thinly bedded, moderately fractured.						
85													
90		Core 120"	Rec 120"	RQD 87%	R9								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-680 | *Location:* Sta. 737+95.0, 66.1 ft. LT of SR 823 CL | *Date Drilled:* 07/22/05 to 07/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
20.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
90	841.4						Hard gray SANDSTONE interbedded with SHALE; fine grained, moderately weathered, argillaceous, micaceous, pyritic, laminated to thinly bedded, moderately fractured.							Natural Moisture Content, % - ● PL ⊢ LL Blows per foot - ○ 10 20 30 40
95														
100		Core 120"	Rec 120"	RQD 97%	R10	*292								
105		Core 60"	Rec 60"	RQD 95%	R11									
110.0	821.4						Bottom of Boring - 110.0'							
115														
120														

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-682 | *Location:* Sta. 738+24.8, 280.9 ft. RT of SR 823 CL | *Date Drilled:* 07/20/05 to 07/21/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
64.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	1018.2												
0.8	1017.4	13 24 28	4	1			Topsoil - 10" / 6" soil removed before drilling. Very dense brown SANDY SILT (A-4a), little clay; contains rock fragments; dry to damp. @ 1.0'-2.5', organic odor.						
5		50/5	4	2									
5.5	1012.7						Severely weathered brown SANDSTONE, argillaceous.						
8.2	1010.0						Soft to medium hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately to highly fractured, iron stained fractures.						
10		Core 114"	Rec 114"	RQD 72%	R1	*115							
15.0	1003.2						Medium hard brownish gray SANDSTONE interbedded with SILTSTONE; fine grained, highly weathered to decomposed, argillaceous, micaceous, laminated to medium bedded, highly fractured.						
20		Core 120"	Rec 120"	RQD 63%	R2	*154							
21.7	996.5						Soft to medium hard brownish gray SHALE; very fine grained, decomposed, argillaceous, micaceous, thinly bedded, highly fractured, iron stained fractures, contains few sandstone beds. @ 21.7', high angle fracture.						
25													
30		Core 120"	Rec 114"	RQD 88%	R3		@ 29.0', high angle fracture.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
52
50+

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-682 | Location: Sta. 738+24.8, 280.9 ft. RT of SR 823 CL | Date Drilled: 07/20/05 to 07/21/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
64.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	988.2					*86	Soft to medium hard brownish gray SHALE; very fine grained, decomposed, argillaceous, micaceous, thinly bedded, highly fractured, iron stained fractures, contains few sandstone beds. @ 30.8', high angle fracture.						
35.0	983.2						Soft to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, laminated to medium bedded, moderately fractured, contains moderate to abundant argillaceous laminations. @ 36.1', 36.7'; high angle fractures.						
40		Core 120"	Rec 120"	RQD 79%	R4	*405							
42.5	975.7						Very hard brown SANDSTONE; fine grained, calcareous, micaceous, argillaceous, moderately weathered, thickly bedded, slightly fractured.						
45													
50		Core 120"	Rec 120"	RQD 98%	R5	*435							
55.0	963.2						Hard gray and brown SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, laminated to thickly bedded, slightly to moderately fractured, contains few argillaceous laminations.						
60		Core 120"	Rec 120"	RQD 73%	R6		@ 59.5', high angle fracture.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-682 | *Location:* Sta. 738+24.8, 280.9 ft. RT of SR 823 CL | *Date Drilled:* 07/20/05 to 07/21/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
64.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	958.2					*400	Hard gray and brown SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, laminated to thickly bedded, slightly to moderately fractured, contains few argillaceous laminations.						
63.2	955.0						@ 60.2', high angle fracture.						
65							Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
70		Core 120"	Rec 120"	RQD 95%	R7	*365							
75													
80		Core 120"	Rec 120"	RQD 100%	R8	*308							
85													
90		Core 120"	Rec 120"	RQD 100%	R9								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-682 | *Location:* Sta. 738+24.8, 280.9 ft. RT of SR 823 CL | *Date Drilled:* 07/20/05 to 07/21/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
64.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	928.2					*460	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
95													
100		Core 120"	Rec 120"	RQD 100%	R10	*411							
105													
110		Core 120"	Rec 120"	RQD 100%	R11	*331							
115							@ 116.5', pyritic.						
120		Core 120"	Rec 120"	RQD 100%	R12								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-682 | *Location:* Sta. 738+24.8, 280.9 ft. RT of SR 823 CL | *Date Drilled:* 07/20/05 to 07/21/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
64.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	898.2					*411	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, pyritic, micaceous, massive, unfractured to slightly fractured.						
125													
130		Core 120"	Rec 120"	RQD 100%	R13	*375							
135													
140		Core 120"	Rec 120"	RQD 100%	R14	*333							
145													
150		Core 120"	Rec 120"	RQD 100%	R15								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-682 | *Location:* Sta. 738+24.8, 280.9 ft. RT of SR 823 CL | *Date Drilled:* 07/20/05 to 07/21/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
64.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
150	868.2					*414	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, pyritic, micaceous, massive, unfractured to slightly fractured.						
155													
160		Core 120"	Rec 120"	RQD 100%	R16	*369							
165.0	853.2						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, laminated to medium bedded, slightly fractured, contains moderate to abundant argillaceous laminations, fissile after desiccation, contains ferric bands.						
170		Core 120"	Rec 120"	RQD 100%	R17	*615							
175													
180		Core 120"	Rec 120"	RQD 100%	R18								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-682 | *Location:* Sta. 738+24.8, 280.9 ft. RT of SR 823 CL | *Date Drilled:* 07/20/05 to 07/21/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
64.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
180	838.2						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, laminated to medium bedded, slightly fractured, contains moderate to abundant argillaceous laminations, fissile after desiccation, contains ferric bands.						
185													
190		Core 120"	Rec 120"	RQD 100%	R19	*61							
195.0	823.2						Bottom of Boring - 195.0'						
200													
205													
210													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-683 | *Location:* Sta. 742+20.6, 45.9 ft. LT of SR 823 CL | *Date Drilled:* 07/26/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
18.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / PL — LL / Blows per foot
0	906.4													
0.3	906.1						Topsoil - 4"							
		11 15 28	3	1			Severely weathered brown SANDSTONE argillaceous.							
		40 50/4	10	2										50+
5.0	901.4						Soft brown SANDSTONE; fine grained, highly weathered to decomposed, argillaceous, micaceous, thickly bedded, highly fractured to broken, iron staining. @ 7.5'-8.1', lost recovery.							
10		Core 120"	Rec 113"	RQD 43%	R1	*49	@ 10.0'-10.2', high angle fracture. @ 10.4'12.5', gray medium hard.							
12.4	894.0						Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded to massive, moderately to highly fractured. @ 15.0'-15.4', high angle fractures.							
15														
20		Core 120"	Rec 120"	RQD 77%	R2	*193	@ 18.6', iron stained low angle fracture. @ 19.3'-21.0', iron stained high angle fracture.							
25							@ 25.8'-26.0', broken.							
30		Core 120"	Rec 120"	RQD 82%	R3		@ 28.0', iron stained fracture.							

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

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Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-683 | Location: Sta. 742+20.6, 45.9 ft. LT of SR 823 CL | Date Drilled: 07/26/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
18.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	876.4					*167	Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded to massive, moderately to highly fractured. @ 31.9'-32.2', 33.5'-33.6', 30.8'-31.0', high angle fracture. @ 31.9'-32.2', iron stained fracture. @ 34.0'-34.5', broken.						
35		Core 120"	Rec 120"	RQD 89%	R4	*260	@ 38.3', 38.8', iron stained low angle fracture. @ 39.1', gray.						
40													
45													
48.0	858.4						Medium hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, slightly to moderately weathered, micaceous, pyritic, very thinly laminated to thinly bedded, moderately fractured.						
50		Core 120"	Rec 120"	RQD 85%	R5	*282							
55							@ 53.8'-54.0', 58.3'-58.8', high angle fracture.						
60		Core 120"	Rec 120"	RQD 69%	R6								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-683 | *Location:* Sta. 742+20.6, 45.9 ft. LT of SR 823 CL | *Date Drilled:* 07/26/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
18.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	846.4					*75	Medium hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, pyritic, thinly laminated to laminated, moderately fractured.						
65		Core 60"	Rec 60"	RQD 87%	R7	*223	@ 68.5'-68.6', ferric band.						
70.0	836.4						Bottom of Boring - 70.0'						
75													
80													
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-685 | *Location:* Sta. 742+28.5, 191.0 ft. RT of SR 823 CL | *Date Drilled:* 07/26/05 to 07/27/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
86.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	970.5												
0.2	970.3						Topsoil - 2"						
		5 8 11	9	1			Medium dense brown SANDY SILT (A-4a), "and" gravel; damp.	40	6	--	6	48	
3.5	967.0	50/2	2	2			Very dense brown FINE SAND (A-3); damp.						
5.0	965.5						Medium hard to hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, massive, moderately fractured, iron staining on fracture surfaces.						
		Core 108"	Rec 108"	RQD 91%	R1	*405							
15.0	955.5						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
		Core 120"	Rec 119"	RQD 99%	R2	*340							
		Core 120"	Rec 120"	RQD 100%	R3	*381							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
Non-Plastic
50+

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-685 | *Location:* Sta. 742+28.5, 191.0 ft. RT of SR 823 CL | *Date Drilled:* 07/26/05 to 07/27/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
86.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	940.5						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
							@ 33.7'-33.8', high angle fracture.						
35													
							@ 36.6'-36.7', calcareous.						
		Core 120"	Rec 120"	RQD 100%	R4	*392							
40													
45													
		Core 120"	Rec 120"	RQD 100%	R5	*302							
50													
55													
		Core 120"	Rec 120"	RQD 100%	R6	*338	@ 59.0'-59.1', high angle fracture. @ 59.2'-60.8', siltstone layer.						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-685 | *Location:* Sta. 742+28.5, 191.0 ft. RT of SR 823 CL | *Date Drilled:* 07/26/05 to 07/27/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
86.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	910.5						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured to unfractured.						
							@ 63.5'-64.0', siltstone layer.						
65		Core 120"	Rec 120"	RQD 100%	R7	*441							
70							@ 73.1'-73.3', fossiliferous limestone layer.						
							@ 74.0', contains few argillaceous laminations.						
75							@ 74.8', 75.7', shale layers.						
		Core 120"	Rec 120"	RQD 100%	R8	*410							
80							@ 80.1'-80.3', fossiliferous limestone layer.						
85							@ 85.2'-86.3', 89.8'-91.2', brown iron staining.						
		Core 120"	Rec 120"	RQD 100%	R9	*263							
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-685 | *Location:* Sta. 742+28.5, 191.0 ft. RT of SR 823 CL | *Date Drilled:* 07/26/05 to 07/27/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
86.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	880.5						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured to unfractured. @ 90.1'-90.2', 91.2'-91.3', iron stained high angle fractures.						
94.0	876.5						Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, pyritic, medium bedded to thinly bedded, slightly fractured; contains few to moderate argillaceous laminae. @ 97.7'-98.8', iron staining.						
95		Core 120"	Rec 120"	RQD 100%	R10	*383							
100													
105							@ 106.6'-106.7', 117.0'- 117.3', 119.5'-120.0', 120.3' -120.7', calcareous.						
		Core 120"	Rec 120"	RQD 100%	R11	*350							
110							@ 109.8'-109.9', 110.1'- 110.2', limestone layers.						
115													
		Core 120"	Rec 120"	RQD 100%	R12	*172							
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-685 | *Location:* Sta. 742+28.5, 191.0 ft. RT of SR 823 CL | *Date Drilled:* 07/26/05 to 07/27/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
86.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	850.5												
121.0	849.5						Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, pyritic, medium bedded to thinly bedded, slightly fractured; contains few to moderate argillaceous laminae.						
125		Core 120"	Rec 120"	RQD 100%	R13	*415	Medium hard gray SANDSTONE interbedded with SHALE; very fine grained, slightly weathered, argillaceous, micaceous, pyritic, very thinly bedded to thinly bedded, moderately fractured.						
130													
135.0	835.5	Core 12"	Rec 12"	RQD 100%	R14	*90	Bottom of Boring - 135.0'						
140													
145													
150													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-686 | *Location:* Sta. 744+98.3, 86.3 ft. LT of SR 823 CL | *Date Drilled:* 07/26/05 to 07/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
11.6' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	842.6												
0.3	842.3						Topsoil - 4"						
		5 5 5	13	1		3.0	Very stiff brown SILT (A-4b), little to some fine to coarse sand, little clay, trace gravel; damp.						
		4 5 6	14	2		4.0		3	10	--	10	61	16
5													
5.5	837.1						Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; dry to damp.						
		10 13 21	3	3		4.5+							
		9 20 31	10	4		4.5+		3	6	--	6	48	37
10													
10.5	832.1						Severely weathered grayish brown SHALE argillaceous.						
		10 20 25	8	5									
		50/5	5	6									
15.0	827.6						Very soft to soft brownish gray SHALE; very fine grained, decomposed, argillaceous, thinly laminated to laminated, moderately fractured. @ 16.8'-20.2', lost recovery.						
20		Core 120"	Rec 70"	RQD 45%	R1		@ 21.2', low angle fracture.						
25.0	817.6						Medium hard gray SHALE; highly weathered, arenaceous, thinly laminated to laminated, contains few arenaceous laminations.						
30		Core 120"	Rec 120"	RQD 85%	R2								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
51
50+

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-686 | *Location:* Sta. 744+98.3, 86.3 ft. LT of SR 823 CL | *Date Drilled:* 07/26/05 to 07/28/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
11.6' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	812.6						Medium hard gray SHALE; highly weathered, arenaceous, thinly laminated to laminated, contains few arenaceous laminations.						
35		Core 60"	Rec 60"	RQD 100%	R3		@ 35', interbedded with SANDSTONE.						
40.0	802.6						Bottom of Boring - 40.0'						
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-688 | *Location:* Sta. 745+12.0, 92.4 ft. RT of SR 823 CL | *Date Drilled:* 07/28/05 to 07/29/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / PL — LL / Blows per foot
0	908.6													
0.3	908.3						Topsoil - 4" / 2.0' soil removed before drilling.							
		6 18 40	16	1		4.5+	Hard brown SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; contains sandstone fragments; damp.							58
3.0	905.6						Severely weathered brown SANDSTONE argillaceous.							
		50/5	2	2										50+
5														
8.0	900.6						Medium hard gray SANDSTONE; very fine grained, moderately weathered, argillaceous, micaceous, thinly bedded to very thinly bedded, highly fractured, fissile.							
9.3	899.3													
10		Core 120"	Rec 110"	RQD 60%	R1	*225	Hard brownish orange SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, medium bedded to thinly bedded, moderately fractured. @ 9.8', 10.3', 10.8', 11.1'-11.2', 11.8', 12.4', 13.0', 13.1', 14.3', 14.6', 15.9', low angle fracture. @ 10.5'-10.6', 11.6'-11.7', 12.0'-12.2', 12.6'-12.7', 14.9'-15.0', high angle fracture. @ 16.1'-16.6', broken zone. @ 16.6', gray.							
15														
18.0	890.6						Hard gray SANDSTONE; fine grained, slightly to moderately weathered, argillaceous, micaceous, thickly bedded, moderately fractured. @ 19.4'-21.1', iron stained. @ 19.6', 20.8', 21.0', 26.1', 26.2', iron stained low angle fracture.							
20		Core 120"	Rec 108"	RQD 83%	R2	*213								
25							@ 27.0'-28.5', lost recovery.							
							@ 29.0', 29.5', 30.3', 30.8', 31.6', 34.1', low angle fracture.							
30														

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-688 | *Location:* Sta. 745+12.0, 92.4 ft. RT of SR 823 CL | *Date Drilled:* 07/28/05 to 07/29/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	878.6	Core 120"	Rec 102"	RQD 71%	R3	*361	Hard gray SANDSTONE; fine grained, slightly to moderately weathered, argillaceous, micaceous, thickly bedded, moderately fractured.						
33.8	874.8						Hard gray SANDSTONE; very fine grained, moderately weathered, micaceous, argillaceous, thinly laminated to medium bedded, highly fractured, contains few to moderate argillaceous laminations. @ 34.4'-34.9', calcareous. @ 36.3'-36.5', vertical fracture. @ 36.5'-38.0', lost recovery. @ 38.0'-40.0', broken zone.						
35													
		Core 24"	Rec 20"	RQD 0%	R4								
40.0	868.6						Bottom of Boring - 40.0'						
45													
50													
55													
60													

GRADATION

STANDARD PENETRATION (N)

Natural Moisture Content, % - ●

PL ⊢——⊣ LL

Blows per foot - ○

10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:46 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-696 | *Location:* Sta. 753+38.8, 93.8 ft. LT of SR 823 CL | *Date Drilled:* 08/01/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
3.4' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
	884.8												
0.2	884.6						Topsoil - 2"						
		6 7 9	18	1			Medium dense brown SANDY SILT (A-4a), little gravel, trace clay; contains sandstone fragments; dry to damp.						
3.0	881.8						Severely weathered brown SANDSTONE argillaceous.						
		20 50/3	9	2									
5.0	879.8						Hard to very hard light brown to orange SANDSTONE; very fine to fine grained, highly weathered, micaceous, thickly bedded to massive, moderately to highly fractured, iron staining. @ 5.5', 8.1', 8.5', 9.6', 10.2', 10.5'-10.9', low angle fractures. @ 5.7'-6.0', 7.1'-7.2', 8.9' 9.0', 9.4', high angle fractures. @ 6.1'-7.0', lost recovery.						
10		Core 120"	Rec 107"	RQD 68%	R1		@ 10.9', 11.7', 12.3', 12.7', 13.2'-13.9', 15.3'-15.7', 16.0', 16.7'-16.8', low angle fractures.						
15							@ 17.2'-17.5', broken zone.						
18.5	866.3						Hard gray SANDSTONE ; very fine to fine grained, moderately to highly weathered, micaceous, medium bedded to thickly bedded, moderately to highly fractured, turbidity bedding. @ 18.5', 18.9', 19.4'-19.8', 20.2'-20.6', 21.1'-21.7', 22. 7'-23.1', 24.3'-24.6', low angle fractures.						
20		Core 120"	Rec 120"	RQD 64%	R2		@ 23.6'-23.7', 25.2'-25.5', broken zone.						
25							@ 25.0' contains few to moderate argillaceous bands. @ 25.6', 26.8', 27.3', 27.8', 28.3', 29.4', low angle fractures.						
		Core 60"	Rec 60"	RQD 73%	R3		@ 28.7'-29.2', high angle fracture.						
30.0	854.8						Bottom of Boring - 30.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:48 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-696 | *Location:* Sta. 753+38.8, 93.8 ft. LT of SR 823 CL | *Date Drilled:* 08/01/05

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
3.4' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢—⊣ LL / Blows per foot - ○
30	854.8													10 20 30 40
35														
40														
45														
50														
55														
60														

FILE: 0121-3070-03 [11/5/2007 3:48 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-697 | *Location:* Sta. 753+38.0, 20.0 ft. LT of SR 823 CL | *Date Drilled:* 08/01/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
2.4' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	893.4													
0.3	893.1						Topsoil - 4"							
		50/4	3	1			Severely weathered light brown SANDSTONE.							50+
		50/3	2	2										50+
5.0	888.4						Hard light brown SANDSTONE; fine grained, moderately to highly weathered, thinly bedded to medium bedded, highly fractured.							
							@ 7.8'-7.9', 14.2'-14.8', decomposed broken zone.							
10		Core 120"	Rec 120"	RQD 74%	R1									
15							@ 17.2'-17.4', 19.2'-19.3', broken zones.							
							@ 17.4'-19.2', core loss.							
20		Core 120"	Rec 105"	RQD 76%	R2									
							@ 20.9'-21.1', vertical fracture.							
							@ 21.4', gray							
25							@ 24.2'-24.5', 27.5'-28.0', highly weathered broken zone.							
		Core 60"	Rec 60"	RQD 88%	R3									
30.0	863.4						Bottom of Boring - 30.0'							

STANDARD PENETRATION (N): Natural Moisture Content, % - ● ; PL ⊢——⊣ LL ; Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 [11/5/2007 3:48 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-701 | *Location:* Sta. 759+13.0, 122.9 ft. LT of SR 823 CL | *Date Drilled:* 8/01/05 to 8/02/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / PL — LL / Blows per foot
0	968.5													
0.3	968.2						Topsoil - 4" / 2' soil removed before drilling.							
		10 12 8	17	1			Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; damp.							
		4 8 8	12	2				49	13	--	8	24	6	Non-Plastic
5														
5.5	963.0													
		6 9 22	12	3			Medium dense brown SANDY SILT (A-4a), some gravel, trace clay; damp.	32	23	--	8	32	5	Non-Plastic
8.0	960.5													
		50/5	1	4			Severely weathered brown SANDSTONE.							50+
10.0	958.5													
		Core 120"	Rec 107"	RQD 71%	R1	*165	Hard gray SANDSTONE; very fine to fine grained, argillaceous, micaceous, thinly bedded to medium bedded, slightly fractured. @ 10.0'-17.9', highly fractured and discolored (light brown) fractures infilled with clayey silt. @ 10.9'-12.0', lost recovery - air circulation lost in void.							
15														
20														
25		Core 120"	Rec 114"	RQD 93%	R2	*242	@ 27.9'-28.9', qu = 9,776 psi, SDI = 98.0%.							
30														

FILE: 0121-3070-03 [11/5/2007 3:48 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-701 | *Location:* Sta. 759+13.0, 122.9 ft. LT of SR 823 CL | *Date Drilled:* 8/01/05 to 8/02/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL — LL / Blows per foot - ○ (10 20 30 40)
30.0	938.5						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, thinly bedded to medium bedded, slightly to moderately fractured, contains few argillaceous laminations.							
35	938.5	Core 120"	Rec 120"	RQD 100%	R3	*336								
40														
45		Core 120"	Rec 120"	RQD 100%	R4	*376								
50														
55		Core 120"	Rec 120"	RQD 100%	R5	*406								
60														

FILE: 0121-3070-03 [11/5/2007 3:48 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-701 | *Location:* Sta. 759+13.0, 122.9 ft. LT of SR 823 CL | *Date Drilled:* 8/01/05 to 8/02/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	908.5						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, thinly bedded to medium bedded, slightly to moderately fractured, contains few to moderate argillaceous laminations.						
65		Core 120"	Rec 120"	RQD 97%	R6	*419							
70													
75		Core 120"	Rec 120"	RQD 89%	R7	*373	@ 77.4'-78.0', 78.3'-79.4', brown, iron stained.						
80.0	888.5						Bottom of Boring - 80.0'						
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:48 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-703 | *Location:* Sta. 759+08.6, 56.3 ft. RT of SR 823 CL | *Date Drilled:* 8/03/05 to 8/04/05

WATER OBSERVATIONS:
Water seepage at: 23.0'
Water level at completion: 23.0' (prior to coring)
23.0' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	937.8												
0.3	937.5						Topsoil - 3" / 6" soil removed before drilling.						
		6 8 12	18	1		4.0	Very stiff to hard brown SILT (A-4b), some fine to coarse sand, little clay; damp.						
		9 24 18	14	2		4.5+		7	14	--	12	50	17
5		14 50/4	8	3			@ 6.0' to 7.0', Brown and gray.						
8.5	929.3	22 50/4	10	4			Very dense brown SANDY SILT (A-4a), some gravel, little clay; damp.	22	11	--	11	44	12
10													
11.0	926.8	21 50/4	3	5			Severely weathered gray SILTSTONE.						
		50/5	0	6									
15.0	922.8						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, pyritic, thickly bedded, moderately to highly fractured. @ 15.0'-15.3', iron stained.						
20		Core 120"	Rec 112"	RQD 84%	R1	*280	@ 21.4'-22.7', calcareous along vertical fracture.						
25													
30		Core 120"	Rec 116"	RQD 88%	R2								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+
50+
50+

FILE: 0121-3070-03 [11/5/2007 3:48 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-703 | *Location:* Sta. 759+08.6, 56.3 ft. RT of SR 823 CL | *Date Drilled:* 8/03/05 to 8/04/05

WATER OBSERVATIONS:
Water seepage at: 23.0'
Water level at completion: 23.0' (prior to coring)
23.0' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	907.8					*315	Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, pyritic, thickly bedded, moderately to highly fractured. @ 32.1'-32.3', calcareous, iron stained vertical fracture. @ 33.1'-33.3', shale layer.						
35.0	902.8						Bottom of Boring - 35.0'						
40													
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:48 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-704 | *Location:* Sta. 760+36.1, 67.7 ft. RT of SR 823 CL | *Date Drilled:* 8/03/05

WATER OBSERVATIONS: Water seepage at: None; Water level at completion: None

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	888.4													
0.5	887.9						Topsoil - 6" / 6" soil removed before drilling.							
		5 6 7	6	1			Stiff to very stiff brown SANDY SILT (A-4a), "and" gravel; damp.							
		7 12 15	16	2				41	13	--	6	40		
5		8 15 13	17	3										
8.5	879.9	7 35 23	7	4			Dense to very dense brown SANDY SILT (A-4a), some gravel, trace to little clay; damp.	25	11	--	10	44	10	Non-Plastic
10		7 23 25	14	5										58
		50/4	1	6										50+
15.0	873.4	Core 60"	Rec 14"	RQD 0%	R1		Medium hard to hard gray SANDSTONE; fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to medium bedded, highly fractured to broken, 46" of core loss, decomposed rock.							
20		Core 60"	Rec 55"	RQD 83%	R2		@ 21.1', 21.5', 21.9', 23.1', 23.7', 24.0', low angle fractures. @ 21.6'-25.5', brown.							
25.0	863.4						Bottom of Boring - 25.0'							
30														

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-724 | *Location:* Sta. 777+79.1, 0.9 ft. RT of SR 823 CL | *Date Drilled:* 08/01/05 to 08/02/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
30.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.2	1031.0 / 1030.8						Topsoil - 2"						
		2 3 7	12	1			Stiff brown and gray SILT AND CLAY (A-6a), trace fine sand; damp.	0	0	--	2	72	26
3.0	1028.0												
		40 50/3	7	2			Very dense brown and gray SILT (A-4b), some clay, trace fine to coarse sand; damp.	0	2	--	5	72	21
5.0	1026.0						Hard brown and gray SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, laminated to thickly bedded, highly fractured. @ 6.5', 6.8', 7.1', 8.3', 8.4', 8.5', 8.7', high angle fractures.						
10		Core 120"	Rec 120"	RQD 47%	R1	*240	@ 10.0'-11.4', qu = 8,014 psi, SDI = 92.9%. @ 11.3', 12.9', iron stained fractures.						
15.1	1015.9						Medium hard to hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, laminated to thickly bedded, highly fractured, moderately to highly fractured, contains few to moderate argillaceous laminations. @ 16.7'-16.9', iron stained high angle fracture. @ 17.9'-19.3', qu = 1,969 psi, SDI = 8.7%. @ 18.4'-18.5', 21.2'-21.5', clay filled fractures.						
20		Core 120"	Rec 117"	RQD 76%	R2	*75							
25							@ 27.5'-28.9', qu = 2,858 psi, SDI = 11.4%.						
30		Core 120"	Rec 120"	RQD 82%	R3								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-724 | *Location:* Sta. 777+79.1, 0.9 ft. RT of SR 823 CL | *Date Drilled:* 08/01/05 to 08/02/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
30.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30.0	1001.0					*111	Hard gray SANDSTONE interbedded with SHALE; fine grained, moderately weathered, argillaceous, micaceous, laminated to thickly bedded, moderately fractured.						
32.6	998.4						Hard brown SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, thickly bedded, moderately fractured, contains moderate argillaceous laminations. @ 33.3'-34.0', 35.5'-36. 3', 42.5'-43.2', 44.7'-46.2', high angle fractures. @ 37.5'-38.0', qu = 8,519 psi.						
35													
40		Core 120"	Rec 120"	RQD 72%	R4	*231							
45													
49.7	981.3	Core 120"	Rec 120"	RQD 83%	R5	*358	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured, contains few argillaceous laminations.						
55													
60		Core 120"	Rec 119"	RQD 99%	R6								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-724 | *Location:* Sta. 777+79.1, 0.9 ft. RT of SR 823 CL | *Date Drilled:* 08/01/05 to 08/02/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
30.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60.0	971.0					*313	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, unfractured to slightly fractured. @ 60.0'-61.5', qu = 11,315 psi, SDI = 98.8%.						
65													
70		Core 120"	Rec 120"	RQD 100%	R7	*351							
75													
80		Core 120"	Rec 120"	RQD 100%	R8	*429							
85													
90		Core 120"	Rec 120"	RQD 100%	R9								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-724 | *Location:* Sta. 777+79.1, 0.9 ft. RT of SR 823 CL | *Date Drilled:* 08/01/05 to 08/02/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
30.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90.0	941.0					*406	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, unfractured to slightly fractured.						
95													
100		Core 120"	Rec 120"	RQD 100%	R10	*309							
105							@ 105.0', pyritic.						
							@ 107.1', 109.9', 113.0', fossiliferous, calcareous.						
110		Core 120"	Rec 120"	RQD 100%	R11	*491							
115							@ 118.0', fossiliferous.						
120		Core 120"	Rec 120"	RQD 100%	R12								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-724 | *Location:* Sta. 777+79.1, 0.9 ft. RT of SR 823 CL | *Date Drilled:* 08/01/05 to 08/02/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
30.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
120	911.0					*272	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, unfractured to slightly fractured.							
125														
130		Core 120"	Rec 116"	RQD 94%	R13	*308								
135							@ 134.3', iron stained fracture.							
140		Core 120"	Rec 116"	RQD 97%	R14	*240	@ 140.0'-141.4', qu = 12,267 psi, SDI = 98.7%.							
145		Core 60"	Rec 60"	RQD 100%	R15	*516								
150.0	881.0						Bottom of Boring - 150.0'							

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-726 | *Location:* Sta. 779+29.8, 53.7 ft. LT of SR 823 CL | *Date Drilled:* 08/02/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
6.9' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / PL — LL / Blows per foot
0	982.7													
0.2	982.5						Topsoil - 2"							
		5 10 13	9	1			Medium dense to very dense brown SANDY SILT (A-4a), some gravel, little clay; damp.	21	8	--	22	49		Non-Plastic
		28 50/3	2	2				27	6	--	13	38	16	Non-Plastic
5.0	977.7						Hard light brown to orange SANDSTONE; fine grained, moderately to highly weathered, micaceous, thickly bedded to massive, highly fractured to broken, abundant iron staining. @ 5.2'-6.8', lost recovery. @ 5.7'-6.0', 7.1'-7.2', 8.9'- 9.0', 9.4', high angle fractures. @ 6.8'-6.9', 7.5'-7.7', 8.5'- 8.6', 9.5'-9.6', high angle fractures. @ 7.5'-7.7', 12.5'-12.8', broken zones.							50+
10		Core 120"	Rec 100"	RQD 67%	R1	*289	@ 10.9', 11.7', 12.3', 12.7', 13.2', 13.4', 13.6', 13.9', low angle fracture.							
13.1	969.6						@ 13.1'-15.0', gray sandstone.							
15							Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to very thickly bedded, slightly fractured to unfractured.							
20		Core 120"	Rec 120"	RQD 100%	R2	*245								
25							@ 24.7'-25.2', high angle fracture.							
30		Core 120"	Rec 120"	RQD 100%	R3									

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-726 | *Location:* Sta. 779+29.8, 53.7 ft. LT of SR 823 CL | *Date Drilled:* 08/02/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
6.9' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	952.7					*400	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to very thickly bedded, slightly fractured to unfractured.						
35							@ 34.3', low angle fracture. @ 35.0', pyritic. @ 35.2', 42.2', low angle fractures. @ 36.0'-36.3', broken zone. @ 36.9'-37.0', 37.2'-37.3', brown siltstone layers.						
40		Core 120"	Rec 120"	RQD 97%	R4	*378							
45							@ 45.0', pyritic. @ 45.7', 48.7', 50.6', 51.6', low angle fractures (along clay partings).						
50		Core 120"	Rec 120"	RQD 100%	R5	*406							
55							@ 53.8'-54.0', calcareous layer.						
60		Core 120"	Rec 120"	RQD 100%	R6								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-726 | *Location:* Sta. 779+29.8, 53.7 ft. LT of SR 823 CL | *Date Drilled:* 08/02/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
6.9' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	922.7					*298	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to very thickly bedded, slightly fractured to unfractured.						
65							@ 65.0', pyritic, fossiliferous, few argillaceous laminations.						
70		Core 120"	Rec 120"	RQD 100%	R7	*462							
75													
80		Core 120"	Rec 120"	RQD 100%	R8	*417							
85							@ 82.7'-82.8', high angle fracture.						
90		Core 120"	Rec 120"	RQD 100%	R9								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-726 | *Location:* Sta. 779+29.8, 53.7 ft. LT of SR 823 CL | *Date Drilled:* 08/02/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
6.9' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	892.7					*392	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to very thickly bedded, slightly fractured to unfractured.						
95.0	887.7						Bottom of Boring - 95.0'						
100													
105													
110													
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-728 | *Location:* Sta. 779+282.7, 228.5 ft. RT of SR 823 CL | *Date Drilled:* 08/02/05 to 08/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
18.6' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	1048.1													Natural Moisture Content, % - ● PL ⊢——⊣ LL; Blows per foot - ○ 10 20 30 40
0.3	1047.8						Topsoil - 3"							
		2 3 10	15	1			Medium dense to very dense brown SANDY SILT (A-4a), some clay; damp.	0	1	--	37	42	20	● ○
		50/3	2	2				0	1	--	53	24	22	● Non-Plastic 50+
5.0	1043.1						Hard white SANDSTONE; fine to medium grained, highly weathered, thickly bedded, broken to highly fractured, iron staining. @ 5.3'-15.1', numerous low angle fractures. @ 6.8'-7.0',11.0'-11.1', 11.7'-12.0', high angle fractures.							
10		Core 120"	Rec 120"	RQD 42%	R1	*163								
15														
15.4	1032.7						Medium hard gray SANDSTONE; very fine to fine grained, highly weathered, carbonaceous, medium bedded, highly fractured. @ 15.5'-16.3', decomposed shale. @ 15.5'-22.7, numerous low angle fractures. @ 18.8'-19.9',20.0'-20.2', 20.7'-20.9',21.0'-21.1', 21.2'-21.7', 22.0'-22.5', 22.7'-23.0',24.0'-24.3', 24.3'-24.6',24.8'-25.0', rust stained high angle fractures.							
19.4	1028.7													
20		Core 120"	Rec 120"	RQD 49%	R2	*92								
							Medium hard brown SANDSTONE; fine grained, highly weathered, carbonaceous, micaceous, medium bedded to thinly bedded, broken, iron staining.							
25							@ 25.0'-26.3', broken layer with high angle fractures.							
							@ 26.6',28.2',28.8',29.3', low angle fractures. @ 26.7'-27.0', 27.0'-27.2', 27.6'-27.8', 28.0'-28.2', 28.3'-29.3', 29.4'-30.0', high angle fractures.							
30		Core 120"	Rec 117"	RQD 27%	R3									

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-728 | Location: Sta. 779+282.7, 228.5 ft. RT of SR 823 CL | Date Drilled: 08/02/05 to 08/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
18.6' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	1018.1					*121	Medium hard brown SANDSTONE; fine grained, highly weathered, carbonaceous, micaceous, medium bedded to thinly bedded, broken, iron staining. @ 30.3',32.3',33.4',33.7', 33.8',34.2', low angle fractures. @ 30.0'-30.8', 34.2'-35.0', high angle fractures. @ 31.0'-31.7',32.5'-33.4', broken layers with high angle fractures. @ 33.7'-33.8', shale layer. @ 35.0'-37.5', sandstone interbedded with shale. @ 35.0'-36.5', broken zone. @ 36.5'-36.8', 37.0'-37.4', high angle fractures.						
35													
37.5	1010.6						Medium hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, moderately weathered to decomposed, argillaceous, carbonaceous, thinly bedded, moderately fractured to broken, fissile zones. @ 37.5'-45.0', iron staining. @ 40.4', 44.5', low angle fractures.						
40		Core 120"	Rec 118"	RQD 80%	R4	*178							
45							@ 45.0'-48.2', shale interbedded with sandstone zone, sandstone afterward, iron staining. @ 45.0'-47.9', pyritic layer.						
47.8	1000.3						Very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, thickly bedded, slightly fractured.						
50.2	997.9	Core 120"	Rec 118"	RQD 97%	R5	*272	Hard brown SANDSTONE; very fine to fine grained, slightly weathered, calcareous, carbonaceous, laminated to medium bedded, slightly fractured. @ 51.1'-51.2', 52.0', 54.3'- 54.4', 54.6'-55.0', calcareous layers.						
55							@ 55.6', 58.6', 59.0', low angle fractures.						
60		Core 120"	Rec 120"	RQD 100%	R6								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-728 | Location: Sta. 779+282.7, 228.5 ft. RT of SR 823 CL | Date Drilled: 08/02/05 to 08/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
18.6' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	988.1					*149	Hard brown SANDSTONE; very fine to fine grained, slightly weathered, calcareous, carbonaceous, laminated to medium bedded, slightly fractured. @ 61.8'-62.0', fossiliferous zone. @ 62.0'-65.0', pyritic zone.						
65							@ 65.3', 70.1', 70.7', low angle fractures.						
65.7	982.4						Very hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, pyritic, laminated to medium bedded, slightly fractured to unfractured. @ 66.3', 68.4', 69.55', 70.7', interbedded shale.						
70		Core 120"	Rec 120"	RQD 100%	R7	*437	@ 65.7'-68.2', pyritic.						
75							@ 77.6'-77.9', trace fossil.						
80		Core 120"	Rec 120"	RQD 100%	R8	*312	@ 83.1', low angle fractures.						
85													
90		Core 120"	Rec 120"	RQD 100%	R9								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-728 | Location: Sta. 779+282.7, 228.5 ft. RT of SR 823 CL | Date Drilled: 08/02/05 to 08/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
18.6' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
90.0	958.1					*368	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, thickly bedded to massive, slightly fractured to unfractured.							
95							@ 97.7', pyritic.							
100		Core 120"	Rec 120"	RQD 100%	R10	*330								
105														
110		Core 120"	Rec 120"	RQD 100%	R11	*332	@ 113.15', 110.3', 105.2', thin shale layer.							
115														
120		Core 120"	Rec 120"	RQD 100%	R12		@ 119.4'-120.1, iron staining.							

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-728 | *Location:* Sta. 779+282.7, 228.5 ft. RT of SR 823 CL | *Date Drilled:* 08/02/05 to 08/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
18.6' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢ LL / Blows per foot - ○
120	928.1					*374	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, thickly bedded to massive, slightly fractured to unfractured.							10 20 30 40
							@ 122.8'-145.6, pyritic.							
125														
130		Core 120"	Rec 120"	RQD 100%	R13	*14								
135							@ 136.0', shale layer.							
140		Core 120"	Rec 120"	RQD 100%	R14	*14								
							@ 142.0', calcareous layer.							
145														
150		Core 120"	Rec 116"	RQD 97%	R15									

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-728 | *Location:* Sta. 779+282.7, 228.5 ft. RT of SR 823 CL | *Date Drilled:* 08/02/05 to 08/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
18.6' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
150	898.1					*478	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, thickly bedded to massive, slightly fractured to unfractured. @ 151.35'-152.1', brown layer.						
155		Core 60"	Rec 60"	RQD 100%	R16	*332							
160.0	888.1						Bottom of Boring - 160.0'						
165													
170													
175													
180													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-729 | *Location:* Sta. 782+97.1, 28.9 ft. LT of SR 823 CL | *Date Drilled:* 08/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
8.6' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % / PL — LL / Blows per foot
0	971.6													
0.3	971.3						Topsoil - 3"							
		12 43 36	12	1			Very dense brown SANDY SILT (A-4a), "and" gravel, trace to little clay; damp.	46	11	--	7	36		Non-Plastic; 19
3.0	968.6													
		50/3	2	2			Very dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; damp.	59	3	--	6	24	8	Non-Plastic; 50+
5.0	966.6						Medium hard to hard brown and gray SANDSTONE; very fine to fine grained, moderately to highly weathered, arenaceous, micaceous, medium bedded to thickly bedded, slightly fractured. @ 5.1'-5.2', 7.7'-7.8', 10.4'-10.5', high angle iron stained fractures, iron stained throughout. @ 5.2'-6.7', lost recovery, washed out clay in large fracture. @ 11.0'-11.6', 13.4'-14.0', iron staining. @ 12.3', 13.5', iron stained low angle fractures.							
10		Core 120"	Rec 102"	RQD 81%	R1	*267								
15.0	956.6						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, arenaceous, micaceous, thickly to massively bedded, moderately fractured, contains few argillaceous laminations.							
20		Core 120"	Rec 120"	RQD 96%	R2		@ 22.5', 23.1', 22.7', 24.1', 24.2', 24.7', low angle fractures.							
25							@ 27.1', 32.7', low angle fractures.							
30		Core 120"	Rec 120"	RQD 100%	R3		@ 29.0', high angle fracture.							

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-729 | *Location:* Sta. 782+97.1, 28.9 ft. LT of SR 823 CL | *Date Drilled:* 08/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
8.6' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	941.6					*284	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, arenaceous, micaceous, thickly to massively bedded, moderately fractured, contains few argillaceous laminations.						
35							@ 34.5'-34.7', iron stained layer.						
40		Core 120"	Rec 120"	RQD 100%	R4	*514	@ 40.3'-40.7', high angle fracture.						
							@ 42.5'-43.0', high angle fracture healed with calcite in fracture.						
45							@ 43.8', low angle fracture.						
50		Core 120"	Rec 120"	RQD 100%	R5	*416	@ 46.1', 48.7', 50.5'-50.7', low angle fractures, pyritic.						
55.0	916.6						Bottom of Boring - 55.0'						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-731 | Location: Sta. 783+15.2, 213.8 ft. RT of SR 823 CL | Date Drilled: 08/02/05 to 08/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
7.35' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	1037.1												
0.3	1036.8						Topsoil - 4"						
		12 13 15	2	1			Very dense brown SILT (A-4b), little to some fine to coarse sand, trace to little clay; contains sandstone fragments; damp.	0	3	--	45	52	
		40 50/3	4	2				0	1	--	9	90	
5.0	1032.1	Core 120"	Rec 116"	RQD 63%	R1	*89	Soft to medium hard light brown SANDSTONE; fine grained, highly weathered to decomposed, argillaceous, micaceous, thinly bedded to medium bedded, highly fractured. @ 5.1'-5.2', high angle fracture. @ 6.2'-6.5', lost recovery. @ 6.5'-7.0', 10.8'-11.1', broken zone, iron stained. @ 7.6', 8.0', 9.4', 10.2', 11.2', 11.6', 12.0', 12.9', 13.3', 13.5', 13.9', 14.1', low angle fractures, iron stained. @ 8.4'-10.0', qu = 3,562 psi, SDI = 90.9%.						
15							@ 15.0'-15.2', 15.2'-15.3', 15.4'-15.6', 23.7'-23.9', 24.3'-24.4', high angle fractures. @ 15.9', 18.5', 18.7', 18.9', 19.0', 22.7', 24.6', 24.8', low angle fractures. @ 16.2'-16.3', 19.7'-20.0', 20.4'-20.8', 23.0'-23.1', broken zone. @ 16.4'-17.7', 20.0'-20.4', lost recovery.						
20.4	1016.7	Core 120"	Rec 95"	RQD 39%	R2	*258	Soft to medium hard gray SHALE interbedded with SANDSTONE; very fine grained, highly weathered to decomposed, argillaceous, arenaceous, thickly bedded, moderately fractured to broken. @ 20.5'-22.4', qu = 1,083 psi, SDI = 18.9%.						
25							@ 25.4'-29.6', lost recovery.						
29.6	1007.5	Core 120"	Rec 69"	RQD 48%	R3		@ 29.6'-30.0', 34.7'-35.0', broken zones.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
Non-Plastic
50+

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-731 | *Location:* Sta. 783+15.2, 213.8 ft. RT of SR 823 CL | *Date Drilled:* 08/02/05 to 08/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
7.35' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	1007.1						Soft gray SANDSTONE interbedded with SHALE; very fine grained, highly weathered, argillaceous, micaceous, medium bedded to thickly bedded, highly to moderately fractured. @ 30.0'-31.9', qu = 516 psi, SDI = 3.7%. @ 30.6'-30.9', high angle iron stained fracture.						
35.0	1002.1												
36.6	1000.5						Hard gray SANDSTONE; very fine grained, slightly weathered, argillaceous, micaceous, medium bedded, slightly fractured. @ 36.5', 36.7', 36.8', 36.9', 37.1', 38.5', 39.0', 39.5', 39.6', 39.7', 41.8', 42.1', 42.8', 43.8', low angle fractures, iron stained.						
40		Core 120"	Rec 120"	RQD 88%	R4	*348	Hard brown SANDSTONE; fine grained, highly weathered, argillaceous, calcareous, micaceous, very thickly bedded, slightly fractured. @ 37.5'-37.7', broken. @ 39.4'-41.4', qu = 9,710 psi, SDI = 98.4%. @ 42.1'-42.2', calcareous, iron stained.						
45							@ 45.4', 48.7', 49.0', 49.3', low angle fracture, iron stained.						
50		Core 120"	Rec 120"	RQD 93%	R5	*376							
53.0	984.1						@ 52.6'-52.7', high angle fracture.						
55							Medium hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, very thickly bedded, slightly fractured, contains few argillaceous laminations. @ 54.0', 54.7', 54.8', low angle fractures, on shale partings. @ 55.9', 56.5', 57.1', low angle fractures.						
60		Core 120"	Rec 120"	RQD 100%	R6								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-731 | *Location:* Sta. 783+15.2, 213.8 ft. RT of SR 823 CL | *Date Drilled:* 08/02/05 to 08/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
7.35' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60.0	977.1					*356	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
65							@ 65.0', abundant trace fossils (burrows).						
							@ 67.5'-69.1', qu = 11,422 psi, SDI = 97.9%.						
70		Core 120"	Rec 120"	RQD 100%	R7	*338							
75													
80		Core 120"	Rec 120"	RQD 100%	R8	*429							
85							@ 86.4', 98.9', low angle fracture.						
90		Core 120"	Rec 120"	RQD 100%	R9								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-731 | *Location:* Sta. 783+15.2, 213.8 ft. RT of SR 823 CL | *Date Drilled:* 08/02/05 to 08/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
7.35' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	947.1					*396	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.						
95							@ 95.0'-99.8', pyritic.						
100		Core 120"	Rec 120"	RQD 100%	R10	*79							
105							@ 102.5'-135.7', pyritic.						
110		Core 120"	Rec 120"	RQD 100%	R11	*444	@ 108.2'-110.0', qu = 9,183 psi, SDI = 97.2%.						
115													
120		Core 120"	Rec 120"	RQD 100%	R12								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-731 | *Location:* Sta. 783+15.2, 213.8 ft. RT of SR 823 CL | *Date Drilled:* 08/02/05 to 08/03/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
7.35' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
120	917.1					*348	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.							
125							@ 125.2', 129.5', 132.3', low angle fractures.							
130		Core 120"	Rec 120"	RQD 100%	R13	*236	@ 130.8'-132.3', qu = 11,486 psi, SDI = 98.2%.							
135							@ 135.5', 137.6', 140.4', low angle fractures.							
140		Core 120"	Rec 120"	RQD 100%	R14	*413								
145		Core 60"	Rec 60"	RQD 100%	R15	*435								
150.0	887.1						Bottom of Boring - 150.0'							

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-732 | *Location:* Sta. 787+24.8, 30.2 ft. LT of SR 823 CL | *Date Drilled:* 08/04/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
43.8' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	1000.1												
0.2	999.9						Topsoil - 2"						
		50/0	0	1			Severely weathered brown SANDSTONE, argillaceous.						
4.5	995.6						Hard brown SANDSTONE; fine grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded, moderately fractured. @ 5.5'-5.6', high angle fracture. @ 6.4'-6.6', low angle fracture.						
5													
		Core 114"	Rec 112"	RQD 87%	R1	*291							
10							@ 9.7'-12.8'; turbidite flow.						
							@ 12.8', 13.4', low angle fractures. @ 13.0'-14.0', laminated to very thin bedding.						
15							@ 15.2', 16.5', 19.8', low angle fractures.						
							@ 17.0'-18.5', turbidite flow. @ 17.9'-18.0', 19.3'-19.8', 20.0'-20.1', gray.						
		Core 120"	Rec 120"	RQD 95%	R2	*429							
20													
22.5	977.6						Very hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, unfractured to slightly fractured.						
25							@ 26.5'-26.8', iron stained.						
		Core 120"	Rec 120"	RQD 100%	R3	*370							
30							@ 29.0', low angle fracture.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40 50+

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-732 | *Location:* Sta. 787+24.8, 30.2 ft. LT of SR 823 CL | *Date Drilled:* 08/04/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
43.8' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30.0	970.1						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, thickly bedded to massive, unfractured to slightly fractured.						
35		Core 120"	Rec 120"	RQD 100%	R4	*476	@ 35.5', low angle fracture.						
40													
45							@ 49.9', low angle fracture.						
50		Core 120"	Rec 120"	RQD 100%	R5	*344							
55							@ 55.0', 57.8', 61.1', 62.2', low angle fractures.						
60		Core 120"	Rec 120"	RQD 100%	R6	*437	@ 59.0'-60.5', pyritic.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-732 | *Location:* Sta. 787+24.8, 30.2 ft. LT of SR 823 CL | *Date Drilled:* 08/04/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
43.8' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	940.1						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, thickly bedded to massive, unfractured to slightly fractured.						
65		Core 72"	Rec 71"	RQD 99%	R7	*494							
70.0	930.1						Bottom of Boring - 70.0'						
75													
80													
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-734 | *Location:* Sta. 787+02.5, 195.2 ft. RT of SR 823 CL | *Date Drilled:* 08/04/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
4.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	1023.0												
0.2	1022.8						Topsoil - 2" / 9" soil removed before drilling.						
		7 8 8	9	1			Medium dense brown SANDY SILT (A-4a), little to some gravel, trace to little clay; damp.	23	14	--	9	54	
		5 7 14	11	2				11	14	--	11	64	
5													
6.0	1017.0	14 15 18	11	3		--	Hard brown and gray SILT AND CLAY (A-6a), trace to little fine to coarse sand, trace gravel; damp. (Weathered Shale).						
		9 14 21	12	4		4.5+							
10													
		14 50/4	10	5		4.5+							
13.5	1009.5						Soft to hard grayish brown SHALE; very fine to fine grained, highly weathered to decomposed, micaceous, medium bedded to laminated, highly fractured to broken, moderate argillaceous laminations.						
15		Core 78"	Rec 78"	RQD 62%	R1		@ 13.5'-13.6', 13.9'-14.1', broken zone.						
							@ 13.8', 14.4', 14.7', 16.1', 16.6', 17.0', 18.6', 19.0', 19.5', low angle fractures, iron stained.						
							@ 15.0'-15.1', 15.6'-15.8', 16.3'-16.4', 17.2'-17.3, 18.5'-18.7',						
20.0	1003.0						19.3'-19.4', high angle fractures, iron stained.						
		Core 60"	Rec 55"	RQD 68%	R2	*152	Medium hard to hard brown SANDSTONE; fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to very thickly bedded, moderately to highly fractured, few argillaceous laminations.						
							@ 20.1', 22.9', 23.9', 24.1', 24.4', 24.5', low angle fracture.						
25							@ 20.3'-20.4', 21.7'-22.2', broken zone.						
							@ 20.3'-20.7', core loss, suspected void.						
							@ 28.2', 28.5', 28.6', 28.7', 29.5', 29.6', low angle.						
							@ 28.4'-28.6, 32.2'-32.5', calcareous layer, fossiliferous.						
		Core 120"	Rec 120"	RQD 94%	R3								
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ——— LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-734 | *Location:* Sta. 787+02.5, 195.2 ft. RT of SR 823 CL | *Date Drilled:* 08/04/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
4.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	993.0					*415	Medium hard to hard brown SANDSTONE; fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to very thickly bedded, moderately to highly fractured, few argillaceous laminations. @ 30.5'-31.6', iron stained. @ 32.0'-35.0', interbedded siltstones, turbidites.						
35													
36.8	986.2						Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to very thickly bedded, moderately fractured, few argillaceous laminations. @ 37.6'-37.8', high angle fracture. @ 39.1', 40.6', 40.8', 41.4', 41.7', low angle fractures, generally along siltstone layers. @ 47.1'-47.3', iron staining.						
40		Core 120"	Rec 120"	RQD 91%	R4	*452							
45													
50		Core 120"	Rec 120"	RQD 100%	R5	*403							
55													
60		Core 120"	Rec 120"	RQD 100%	R6								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-734 | *Location:* Sta. 787+02.5, 195.2 ft. RT of SR 823 CL | *Date Drilled:* 08/04/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
4.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	963.0					*456	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to very thickly bedded, moderately fractured, few argillaceous laminations.						
65							@ 65.0'-65.6', lost recovery, possible void.						
70		Core 120"	Rec 113"	RQD 94%	R7	*459	@ 75.1', shale laminations. @ 73.1'-73.2', ferric band.						
75													
80		Core 120"	Rec 120"	RQD 100%	R8	*336	@ 83.5, pyritic.						
85							@ 85.0'-85.3', vertical fracture. @ 85.0', all fractures mechanical.						
90		Core 120"	Rec 120"	RQD 100%	R9								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-734 | *Location:* Sta. 787+02.5, 195.2 ft. RT of SR 823 CL | *Date Drilled:* 08/04/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
4.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	933.0					*419	Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to very thickly bedded, moderately fractured, few argillaceous laminations.						
95		Core 60"	Rec 60"	RQD 100%	R10	*500	@ 97.9'-98.1', fossiliferous layer.						
100.0	923.0						Bottom of Boring - 100.0'						
105													
110													
115													
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:49 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-743 | *Location:* Sta. 799+00.0, 29.3 ft. RT of SR 823 CL | *Date Drilled:* 08/08/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
17.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	904.5												
0.3	904.2						Topsoil - 4" / 6.0' soil removed before drilling.						
		50/5	4	1			Very dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; damp.	47	12	--	7	27	7
2.5	902.0						Severely weathered brown SANDSTONE argillaceous.						
		50/0	0	2									
4.7	899.8						Medium hard gray SANDSTONE; fine grained, moderately weathered, micaceous, argillaceous, medium bedded, moderately fractured.						
							@ 4.9'-5.1', 7.0'-7.1', iron stained.						
7.8	896.7						@ 5.4', 6.9', 7.8', iron stained low angle fractures.						
		Core 112"	Rec 112"	RQD 80%	R1		Medium hard brown SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, thickly bedded, slightly to moderately fractured.						
10							@ 8.7'-9.0', 10.3'-10.4', iron stained high angle fracture.						
							@ 9.9'-10.1', 7.8'-8.7', broken zones.						
							@ 10.9', iron stained low angle fracture.						
14.0	890.5						Medium hard brown SANDSTONE; fine grained, highly weathered, argillaceous, micaceous, thickly bedded, slightly to moderately fractured.						
15		Core 72"	Rec 64"	RQD 82%	R2		@ 14.0'-14.8', 19.3'-20.0', hard gray sandstone, fine grained interbedded with siltstone (turbidites).						
							@ 15.5'-15.7', 17.2'-17.4', high angle fractures.						
							@ 15.9', 19.3', iron stained low angle fractures.						
20.0	884.5						@ 19.6'-20.0', pitted, highly weathered.						
							Bottom of Boring - 20.0'						
25													
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+ Non-Plastic
50+

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-744 | *Location:* Sta. 804+05.8, 224.9 ft. LT of SR 823 CL | *Date Drilled:* 08/08/05 to 08/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
None (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	1042.6												
0.3	1042.3						Topsoil - 3"						
		10 23 21	12	1			Very dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; damp.	17	12	--	37	34	
3.0	1039.6						Hard brown CLAY (A-7-6), some silt, little fine to coarse sand, trace gravel; damp.	1	6	--	11	24	58
		16 22 24	10	2									
5													
		10 14 17	15	3									
8.0	1034.6						Severely weathered brown and gray SHALE arenaceous.						
		9 38 50/4	10	4									
10													
		16 50/4	8	5									
		50/3	3	6									
15.0	1027.6						Soft to medium hard brown and gray SHALE and SANDSTONE; fine grained, highly weathered to decomposed, argillaceous, micaceous, laminated to medium bedded, highly fractured to broken.						
		Core 72"	Rec 69"	RQD 13%	R1A	*92							
20													
		Core 42"	Rec 42"	RQD 100%	R1B	*92							
24.0	1018.6						Medium hard to hard brownish gray SANDSTONE; fine grained, moderately to highly weathered, argillaceous, micaceous, laminated to thickly bedded, slightly to highly fractured. @ 25.0'-26.9', qu = 2,886 psi, SDI = 70.0%. @ 27.8'-29.3', breccia.						
25													
		Core	Rec	RQD	R2	*63							
30													

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Non-Plastic
50+
50+
50+

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-744 | *Location:* Sta. 804+05.8, 224.9 ft. LT of SR 823 CL | *Date Drilled:* 08/08/05 to 08/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
None (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION
30	1012.6	120"	120"	69%			Medium hard to hard brownish gray SANDSTONE; fine grained, moderately to highly weathered, argillaceous, micaceous, laminated to thickly bedded, slightly to highly fractured.
32.0	1010.6						@ 31.3'-32.0'; iron stained.
35							Hard light brown SANDSTONE; fine grained, highly weathered, micaceous, very thickly bedded, unfractured to slightly fractured, iron stained.
40		Core 120"	Rec 120"	RQD 100%	R3	*364	@ 40.4'-42.0', qu = 8,220 psi, SDI = 98.2%.
44.5	998.1						
45							Hard light brown SANDSTONE; fine to medium grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded, slightly fractured.
							@ 48.0'-49.5', qu = 8,067 psi, SDI = 98.1%.
50		Core 120"	Rec 120"	RQD 100%	R4	*242	@ 50.2'-51.4', low angle fractures.
51.7	990.9						
							Hard gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, argillaceous, very thickly bedded, unfractured to slightly fractured.
55							
		Core	Rec	RQD	R5	*333	
60							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-744 | *Location:* Sta. 804+05.8, 224.9 ft. LT of SR 823 CL | *Date Drilled:* 08/08/05 to 08/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
None (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	982.6	120"	120"	100%			Hard gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, argillaceous, very thickly bedded, unfractured to slightly fractured. @ 61.0'-61.4', iron stained. @ 62.3', low angle fracture.						
65							@ 67.0'-67.7', qu = 9,926 psi.						
70		Core 120"	Rec 120"	RQD 100%	R6	*326	@ 68.6'-69.7', SDI = 97.8%.						
75													
80		Core 120"	Rec 120"	RQD 100%	R7	*262							
85													
90		Core	Rec	RQD	R8	*348							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-744 | *Location:* Sta. 804+05.8, 224.9 ft. LT of SR 823 CL | *Date Drilled:* 08/08/05 to 08/10/05

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
None (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	952.6	120"	120"	100%			Hard gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, argillaceous, very thickly bedded, unfractured to slightly fractured. @ 90.8', 91.5', low angle fractures. @ 91.7'-92.3', ferric band with pyrite.						
95													
100		Core 120"	Rec 120"	RQD 100%	R9	*281							
105							@ 106.7'-107.2', high angle fracture, calcareous, iron stained.						
110		Core 120"	Rec 120"	RQD 100%	R10	*372	@ 108.4'-109.0', 110.0'-110.5', shale layer. @ 112.0'-113.6', qu = 7,725 psi, SDI = 83.7%.						
115							@ 113.3'-122.5', pyrite.						
120		Core	Rec	RQD	R11	*372							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-744 | *Location:* Sta. 804+05.8, 224.9 ft. LT of SR 823 CL | *Date Drilled:* 08/08/05 to 08/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
None (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	922.6	120"	120"	100%			Hard gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, argillaceous, very thickly bedded, unfractured to slightly fractured.						
125							@ 126.7'-132.0', iron stained.						
130		Core 120"	Rec 120"	RQD 100%	R12	*385	@ 127.4'-129.0', qu = 15,368 psi, SDI = 97.5%. @ 128.5', 140.7', low angle fracture.						
135							@ 137.5'-138.4', iron stained.						
140		Core 120"	Rec 120"	RQD 100%	R13	*356							
145							@ 144.9'-150.3', iron stained.						
150		Core	Rec	RQD	R14	*387	@ 147.6'-149.3', iron stained high angle fracture.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-744 | *Location:* Sta. 804+05.8, 224.9 ft. LT of SR 823 CL | *Date Drilled:* 08/08/05 to 08/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
None (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
150	892.6	120"	120"	89%			Hard gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, argillaceous, very thickly bedded, unfractured to slightly fractured. @ 150.8'-154.0', iron stained. @ 154.2'-154.4', calcareous. @ 154.9', 155.9', 156.0', 158. 6', 159.0', 161.2', 163.2', 163.6', 164.4', low angle fractures.						
155													
160		Core 120"	Rec 118"	RQD 98%	R15	*490	@ 159.0'-161.1', qu = 4,080 psi, SDI = 96.1%. @ 162.0'-172.5', contains few to moderate argillaceous laminations.						
165													
170		Core 120"	Rec 120"	RQD 100%	R16	*403	@ 168.6', 171.4', 172.5', 174. 0', low angle fractures.						
172.5	870.1						Soft gray SHALE interbedded with SANDSTONE; very fine grained, slightly to moderately weathered, arenaceous, argillaceous, micaceous, laminated to thickly bedded, slightly fractured. @ 175.1'-175.5', qu = 2,933 psi.						
175													
180		Core	Rec	RQD	R17	*220							

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-744 | *Location:* Sta. 804+05.8, 224.9 ft. LT of SR 823 CL | *Date Drilled:* 08/08/05 to 08/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
None (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
180	862.6	120"	120"	100%			Soft gray SHALE interbedded with SANDSTONE; very fine grained, slightly to moderately weathered, arenaceous, argillaceous, micaceous, laminated to thickly bedded, slightly fractured.						
185							@ 184.5', iron stained.						
190		Core 120"	Rec 117"	RQD 98%	R18	*271	@ 187.8'-189.5', qu = 8,181 psi, SDI = 78.9%.						
195		Core 66"	Rec 66"	RQD 100%	R19	*299							
200.0	842.6						Bottom of Boring - 200.0'						
205													
210													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-747 | *Location:* Sta. 803+74.1, 158.7 ft. RT of SR 823 CL | *Date Drilled:* 08/08/05 to 08/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
37.6' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	1028.5													
0.4	1028.1	50/5	1	1			Topsoil - 5" Severely weathered brown SANDSTONE.							50+
		50/1	1	2										50+
5.0	1023.5	Core 120"	Rec 75"	RQD 41%	R1	*33	Soft to medium hard brown and gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to medium bedded, broken to highly fractured, iron staining. @ 5.4', 5.7', 5.9', 6.1', 6.5', 6.5', 6.6', 7.1', 14.0', low angle fractures. @ 8.4'-12.1', lost recovery due to poor rock quality and fractures. @ 12.1'-12.5', high angle fractures.							
15							@ 14.6'-15.0', broken zone. @ 15.4', 16.6', 16.7', 21.9', 22.0', 22.2', 22.3', 22.8', 24.4', 24.5', low angle fractures. @ 16.5'-16.7', 17.6'-17.7', 18.2'-18.5', 19.8'-20.0', 20.0'-20.5', 20.8'-21.1', 23.0'-23.1', high angle fractures.							
20		Core 120"	Rec 120"	RQD 77%	R2	*62								
23.0	1005.5						Soft to medium hard gray SHALE; highly weathered to decomposed, arenaceous, carbonaceous, laminated to thickly bedded, highly fractured to broken, iron staining. @ 25.0'-25.5', 34.6'-35.0', broken zones. @ 25.5'-28.1', lost recovery. @ 28.1'-28.4', high angle fractures. @ 28.7', 29.8', 30.1', 30.4', 32.5', 33.0', 33.5', 33.8', low angle fractures.							
25														
30		Core 120"	Rec 89"	RQD 55%	R3									

Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-747 | *Location:* Sta. 803+74.1, 158.7 ft. RT of SR 823 CL | *Date Drilled:* 08/08/05 to 08/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
37.6' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	998.5					*569	Soft to medium hard gray SHALE; highly weathered to decomposed, arenaceous, carbonaceous, laminated to thickly bedded, highly fractured to broken, iron staining.						
35							@ 35.1', 35.4', 37.3', 39.1', 39.3', low angle fractures.						
40.0	988.5	Core 120"	Rec 111"	RQD 76%	R4	*355	@ 39.3'-40.0', lost recovery. Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately to highly fractured, contains few argillaceous laminations.						
45							@ 45.0'-45.5', lost recovery. @ 46.8', 48.2', 51.1', 51.3', 51.16', 51.8', 52.7', 54.2', 54.6', 54.7', low angle fractures.						
50		Core 120"	Rec 114"	RQD 82%	R5	*315							
55							@ 55.4', 56.1', 57.3', 57.5', 57.8', 58.1', 58.6', 59.8', 60.2', 60.4', 61.7', 62.1', 62.2', 62.6', 63.5', 63.8', 64.8', low angle fractures.						
60		Core 120"	Rec 120"	RQD 78%	R6								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-747 | *Location:* Sta. 803+74.1, 158.7 ft. RT of SR 823 CL | *Date Drilled:* 08/08/05 to 08/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
37.6' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	968.5					*292	Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly bedded to thickly bedded, moderately to highly fractured, contains few argillaceous laminations.						
63.0	965.5						@ 62.5'-65.0', gray sandstone.						
65							Medium hard to hard gray SANDSTONE; very fine grained, highly to moderately weathered, argillaceous, micaceous, thinly laminated to thinly bedded, moderately fractured, contains few to moderate argillaceous laminations. @ 65.2', 65.4', 66.1', 67.8', 68.8', 69.0', 69.3', 70.8', 71.3', 71.6', 71.7', 71.9', 72.0', 72.3', 72.8', 73.9', low angle fractures.						
70		Core 120"	Rec 120"	RQD 74%	R7	*245	@ 70.4'-70.5', broken zone.						
73.5	955.0						Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded to massive, moderately fractured, contains few argillaceous laminations.						
75													
80		Core 120"	Rec 120"	RQD 92%	R8	*270							
85							@ 85.9', 94.3', 94.5', low angle fractures.						
90		Core 120"	Rec 120"	RQD 98%	R9								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-747 | *Location:* Sta. 803+74.1, 158.7 ft. RT of SR 823 CL | *Date Drilled:* 08/08/05 to 08/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
37.6' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	938.5					*223	Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded to massive, moderately fractured, contains few argillaceous laminations.						
95							@ 95.7', 96.2', 96.3', 96.7', 96.9', 103.7', low angle fractures.						
100		Core 120"	Rec 113"	RQD 91%	R10	*387							
105							@ 104.4'-105.0', lost recovery. @ 105.6', 106.2', 107.1', 109.2', 109.3', 110.6', 111. 2', 112.8', 113.0', low angle fractures.						
110		Core 120"	Rec 120"	RQD 96%	R11	*373	@ 110.0', pyritic						
115							@ 115.4', 116.0', 113.5', 121.1', 121.3', 123.6', 124.7', low angle fractures.						
120		Core 120"	Rec 120"	RQD 94%	R12								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-747 | *Location:* Sta. 803+74.1, 158.7 ft. RT of SR 823 CL | *Date Drilled:* 08/08/05 to 08/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
37.6' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	908.5					*205	Medium hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, thickly bedded to massive, moderately fractured, contains few argillaceous laminations.						
125							@ 126.2', 129.5', 130.3', 131.6', 133.2', 133.5', low angle fractures.						
130		Core 120"	Rec 120"	RQD 97%	R13	*306							
135.0	893.5						Hard to very hard grayish brown SANDSTONE; fine grained, highly weathered to decomposed, argillaceous, micaceous, laminated to thinly bedded, moderately fractured to broken, turbidic.						
140		Core 120"	Rec 120"	RQD 91%	R14	*290	@ 136.9'-141.4', 142.3'-142.9', highly weathered, iron stained. @ 137.3', 137.6', 139.1', 140.4', 142.4', 142.7', low angle fractures. @ 138.1'-138.4', 138.6'- 138.8', 139.0'-139.2', decomposed, broken zones. @ 138.1'-138.4', broken zone.						
145													
150		Core 120"	Rec 120"	RQD 97%	R15		@ 148.6', 149.1', 149.2', 149.4', 151.7', low angle fractures.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-747 | *Location:* Sta. 803+74.1, 158.7 ft. RT of SR 823 CL | *Date Drilled:* 08/08/05 to 08/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
37.6' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
150	878.5					*101	Hard to very hard grayish brown SANDSTONE; fine grained, highly weathered to decomposed, argillaceous, micaceous, laminated to thinly bedded, moderately fractured to broken, turbidic.						
155													
160		Core 120"	Rec 120"	RQD 98%	R16	*210	@ 158.85', 160.5', 161.0', 164.3', low angle fractures.						
165.0	863.5						Very hard gray SANDSTONE interbedded with few SHALE layers; fine grained, slightly weathered, argillaceous, micaceous, laminated to thinly bedded, slightly fractured, turbidic.						
170		Core 120"	Rec 120"	RQD 95%	R17	*407	@ 169.4', 171.1', 171.5', 172.9', 173.4', 173.6', low angle fractures.						
173.6	854.9						Very hard gray SANDSTONE; fine grained, slightly weathered, argillaceous, micaceous, pyritic, laminated to thinly bedded, highly fractured, contains moderatre to abundant argillaceous laminations.						
175							@ 173.7', 176.4', 177.0', 177.3', 177.9', 178.1', 179.3', 179.6', 180.9', 182.3', 183.1', 184.1', low angle fractures.						
180		Core 120"	Rec 120"	RQD 90%	R18		@ 174.7'-175.0', broken zone, turbidic. @ 175.7'-175.9', 178.5'- 179.0', high angle fractures.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-747 | Location: Sta. 803+74.1, 158.7 ft. RT of SR 823 CL | Date Drilled: 08/08/05 to 08/10/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
37.6' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
180	848.5					*398							
181.2	847.3						Very hard gray SANDSTONE; fine grained, slightly weathered, argillaceous, micaceous, pyritic, laminated to thinly bedded, highly fractured, contains moderatre to abundant argillaceous laminations.						
185							Hard gray SHALE; very fine grained, moderately weathered, argillaceous, micaceous, thinly laminated to thinly bedded, moderately fractured, fissle. @ 182.3', 183.2', 184.1', 186.3', 187.0', 187.1', 187.2', 187.5', 189.2', 189.7', 191.2', 193.6', low angle fractures.						
190		Core 120"	Rec 120"	RQD 98%	R19	*393							
195		Core 60"	Rec 60"	RQD 100%	R20	*438							
200.0	828.5						Bottom of Boring - 200.0'						
205													
210													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-751 | *Location:* Sta. 810+06.9, 67.9 ft. LT of SR 823 CL | *Date Drilled:* 08/10/05

WATER OBSERVATIONS: Water seepage at: 21.0' - 22.5'
Water level at completion: None (prior to coring)
5.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	860.9													Natural Moisture Content, % - ● PL — LL; Blows per foot - ○ (10 20 30 40)
0.3	860.6						Topsoil - 3"							
		8 13 12	9	1		--	Very stiff to hard brown SILT AND CLAY (A-6a), trace to little gravel, trace to little fine to coarse sand; damp.	12	4	--	5	79		
		14 19 28	18	2		4.5+		3	6	--	7	60	24	
5														
5.5	855.4													
		28 50/6	11	3		1.75	Stiff brown SILT (A-4b), some fine to coarse sand, little gravel, little clay; damp.	12	12	--	10	50	16	50+
8.0	852.9													
		19 37 30	18	4		4.25	Very stiff to hard brown SILT AND CLAY (A-6a), little to some fine to coarse sand, trace gravel; damp.							
10														67
		13 18 25	18	5		2.75		5	10	--	18	46	21	
		17 17 13	16	6		3.0								
15														
		17 25 32	18	7		4.0								57
		13 23 28	18	8		4.25								
20														51
		7 6 8	18	9		0.5		4	10	--	8	57	21	
		8 10 16	17	10		3.5		4	11	--	5	47	33	
25														
26.0	834.9													
		8 18 40	18	11		--	Dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; contains sandstone fragments; dry.							58
28.0	832.9													
		23 50/3	9	12			Severely weathered gray SHALE, arenaceous.							
30														50+

GRADATION

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-751 | Location: Sta. 810+06.9, 67.9 ft. LT of SR 823 CL | Date Drilled: 08/10/05

WATER OBSERVATIONS: Water seepage at: 21.0' - 22.5'
Water level at completion: None (prior to coring)
5.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30	830.9													
		50/2	2	13			Severely weathered gray SHALE, arenaceous.							50+
34.5	826.4													
35		Core 51"	Rec 51"	RQD 100%	R1		Medium hard gray SANDSTONE interbedded with SHALE; very fine to fine grained, highly weathered, argillaceous, micaceous, thinly laminated to thinly bedded, slightly fractured.							
		Core 9"	Rec 9"	RQD 100%	R2									
39.5	821.4						Bottom of Boring - 39.5'							
40														
45														
50														
55														
60														

STANDARD PENETRATION (N): Natural Moisture Content, % - ● PL ⊢——⊣ LL; Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-752 | *Location:* Sta. 809+91.2, 16.0 ft. RT of SR 823 CL | *Date Drilled:* 08/11/05 to 08/15/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
13.8' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	855.2													
0.3	854.9						Topsoil - 4"							
		9 13 21	18	1			Dense to very dense brown SANDY SILT (A-4a), little clay, little gravel; contains sandstone fragments; damp.	17	15	--	8	41	19	
		13 25 26	18	2										51
5		25 27 32	18	3										59
8.0	847.2													
		10 15 18	14	4		4.5+	Hard brown and gray SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; contains shale fragments; damp.	10	11	--	5	42	32	
10		15 25 32	18	5		--								57
13.0	842.2						Severely weathered gray SHALE.							
		35 38 43	15	6										81
15		38 50/5	9	7										50+
		46 50/4	10	8										50+
20		18 50/4	3	9										50+
24.0	831.2	50/3	3	10										50+
25		Core 60"	Rec 60"	RQD 68%	R1		Medium hard gray SHALE; highly weathered, laminated, moderately fractured to broken. @ 24.0'-24.8', broken. @ 24.9', 25.2'-25.6', 26.3', 26.9', 27.3', 28.0', low angle fractures.							
29.0	826.2						Bottom of Boring - 29.0'							
30														

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-754 | *Location:* Sta. 810+31.1, 111.7 ft. RT of SR 823 CL | *Date Drilled:* 08/10/05 to 08/11/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
7.6' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	838.8												
0.2	838.6						Topsoil - 2"						
		21 21 22	12	1			Dense to very dense brown SANDY SILT (A-4a), some clay, trace gravel; contains sandstone fragments; damp.						
		20 22 30	11	2									
5													
		20 33 35	18	3				9	13	--	8	47	23
8.0	830.8												
		12 13 25	14	4		4.5+	Hard brown SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; damp.	4	10	--	6	46	34
10													
		33 39 42	18	5		4.5+							
		8 16 17	9	6		4.5+							
15													
15.5	823.3												
		15 32 40	18	7		4.5+	Hard brownish gray SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; contains shale fragments; damp.	5	12	--	6	44	33
		48 50/1	7	8		4.5+							
20.0	818.8						Medium hard to hard gray SHALE; very fine grained, highly weathered, micaceous, arenaceous, laminated to very thinly bedded, moderately fractured.						
		Core 120"	Rec 120"	RQD 95%	R1								
25													
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

52
68
81
72
50+

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-754 | *Location:* Sta. 810+31.1, 111.7 ft. RT of SR 823 CL | *Date Drilled:* 08/10/05 to 08/11/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
7.6' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	808.8												
		Core 120"	Rec 120"	RQD 98%	R2		Medium hard to hard gray SHALE; very fine grained, highly weathered, micaceous, arenaceous, laminated to very thinly bedded, moderately fractured.						
35													
40.0	798.8						Bottom of Boring - 40.0'						
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:51 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-765 | *Location:* Sta. 826+09.7, 20.2 ft. RT of SR 823 CL | *Date Drilled:* 08/16/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
12.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	802.9													
0.3	802.6						Topsoil - 3"							
		12 12 22	10	1			Dense brown SILT (A-4b), little clay, trace fine to coarse sand, trace gravel; dry.							
3.0	799.9													
		13 26 40	18	2		4.5+	Very stiff to hard brown SANDY SILT (A-4a), trace gravel, trace clay; damp.							66
5		13 29 46	18	3		--								75
		16 22 21	16	4		4.5+								
10		16 23 39	18	5		3.5								62
		13 22 25	16	6		3.0								
15														
15.5	787.4						Very stiff to hard brown and gray SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; damp.							
		14 10 10	18	7		3.75								
		7 14 18	18	8		3.0								
20		7 12 13	18	9		2.25								
		9 17 20	17	10		4.5+								
25		13 27 36	18	11		3.0								
28.0	774.9													63
		18 29 46	16	12			Severely weathered brown and gray SHALE.							
30														75

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-765 | *Location:* Sta. 826+09.7, 20.2 ft. RT of SR 823 CL | *Date Drilled:* 08/16/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
12.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30	772.9						Severely weathered gray SHALE.							
		50/2	2	13										50+
34.0	768.9						Hard gray SANDSTONE; very fine grained, slightly to moderately weathered, argillaceous, micaceous, thinly bedded, slightly fractured, contains moderate argillaceous laminations. @ 36.4', low angle fractures.							
35		Core 60"	Rec 60"	RQD 97%	R1									
39.0	763.9						Bottom of Boring - 39.0'							
40														
45														
50														
55														
60														

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40 75

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-766 | *Location:* Sta. 827+69.7, 7.1 ft. RT of SR 823 CL | *Date Drilled:* 08/16/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
5.1' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	853.1												
0.3	852.8						Topsoil - 3"						
		10 7 7	9	1			Medium dense brown SILT (A-4b), little to some clay, trace fine to coarse sand, trace gravel; damp.						
		10 7 6	14	2									
5													
5.5	847.6						Very stiff brown SANDY SILT (A-4a), little clay, trace gravel; damp to moist.						
		3 4 3	7	3		3.0							
8.0	845.1						Very stiff to hard brown SILTY CLAY (A-6b), trace gravel, trace fine to coarse sand; damp.						
		4 7 5	18	4		3.25							
10													
		10 20 31	17	5		4.5+							
		17 22 36	18	6		2.5							
15													
		9 26 42	18	7		4.5+							
18.0	835.1						Severely weathered gray SHALE argillaceous.						
		36 50/5	10	8									
20													
		50/5	5	9									
22.0	831.1						Medium hard gray SHALE; very fine grained, highly weathered, thickly bedded, moderately fractured. @ 22.1', 22.4', 25.4', 25.7', 26.4'-26.5', low angle fractures.						
		Core 60"	Rec 60"	RQD 80%	R1								
25													
27.0	826.1						Bottom of Boring - 27.0'						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
51
58
68
50+
50+

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-767 | *Location:* Sta. 831+30.0, 46.3 ft. LT of SR 823 CL | *Date Drilled:* 08/17/05 to 08/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
104.9' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	1007.3													
0.3	1007.0						Topsoil - 3"							
		7 14 22	9	1			Dense to very dense brown SILT (A-4b), some fine to coarse sand, little clay; contains sandstone fragments; dry to damp.	0	1	--	15	72	12	Non-Plastic
		22 50/4	8	2				0	8	--	17	59	16	
4.5	1002.8						Severely weathered brown SANDSTONE.							50+
5														
6.5	1000.8	50/4	4	3			Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded to massive, moderately to highly fractured, few argillaceous laminations.							50+
10		Core 102"	Rec 102"	RQD 58%	R1	*14	@ 6.7'-6.8', carbonaceous layer. @ 6.7', 7.7'-7.8', 9.4', 9.9', 10.1', 10.3', 11.2', 12.2', low angle fractures.							
15							@ 14.0', slightly fractured.							
20		Core 120"	Rec 120"	RQD 100%	R2	*250								
25														
27.8	979.5						Hard gray SANDSTONE; fine grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured.							
30		Core 120"	Rec 120"	RQD 100%	R3									

STANDARD PENETRATION (N): Natural Moisture Content, % - ● PL ⊢⊣ LL; Blows per foot - ○ (10 20 30 40)

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-767 | *Location:* Sta. 831+30.0, 46.3 ft. LT of SR 823 CL | *Date Drilled:* 08/17/05 to 08/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
104.9' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢ LL / Blows per foot - ○
30	977.3					*260	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive to thinly bedded, unfractured to slightly fractured.							10 20 30 40
							@ 34.0'-35.0', iron stained.							
35							@ 36.5'-36.6', iron stained.							
40		Core 120"	Rec 120"	RQD 100%	R4	*332								
45							@ 46.0', 54.2', calcareous nodules. @ 46.2', 56.7, 58.2', low angle fracture.							
50		Core 120"	Rec 120"	RQD 100%	R5	*211								
55							@ 57.3', 64.8', low angle fracture.							
60		Core 120"	Rec 120"	RQD 100%	R6		@ 59.6'-60.0', calcareous layer.							

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-767 | *Location:* Sta. 831+30.0, 46.3 ft. LT of SR 823 CL | *Date Drilled:* 08/17/05 to 08/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
104.9' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Natural Moisture Content, % - ● PL ⊢—⊣ LL Blows per foot - ○ 10 20 30 40
60	947.3					*531	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive to thinly bedded, unfractured.							
65							@ 67.3'-68.2', iron stained fracture.							
70		Core 120"	Rec 120"	RQD 85%	R7	*399								
75							@ 75.0, pyritic.							
80		Core 120"	Rec 120"	RQD 100%	R8	*229	@ 80.6'-80.8', shale layer.							
85.0	922.3						@ 83.0'-84.9', hard, brown, sandstone, fine grained.							
90		Core 120"	Rec 120"	RQD 100%	R9		Hard orange SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded to massive, moderately fractured. @ 86.9', 87.3', 88.4', 92.8', low angle fractures (partially healed).							

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-767 | *Location:* Sta. 831+30.0, 46.3 ft. LT of SR 823 CL | *Date Drilled:* 08/17/05 to 08/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
104.9' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢ LL / Blows per foot - ○ (10 20 30 40)
90.0	917.3					*312	Hard orange SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, thickly bedded to massive, moderately fractured, contains moderate to abundant argillaceous laminations.							
95.0	912.3						@ 94.4'-94.5', iron stained high angle fracture. Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured.							
100		Core 120"	Rec 120"	RQD 100%	R10	*31								
105														
110		Core 120"	Rec 118"	RQD 98%	R11	*262/165	@ 109.7'-113.1', brown, highly weathered. @ 110.8'-111.9', iron concretions. @ 113.1', low angle fracture.							
115							@ 115.5', 116.5', 118.5', high angle fractures.							
120		Core 120"	Rec 120"	RQD 100%	R12		@ 119.9', 122.6', low angle fractures.							

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-767 | *Location:* Sta. 831+30.0, 46.3 ft. LT of SR 823 CL | *Date Drilled:* 08/17/05 to 08/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
104.9' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	887.3					*286	Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, unfractured.						
125.0	882.3						Hard gray SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, pyritic, thinly bedded to medium bedded, unfractured to slightly fractured.						
130		Core 120"	Rec 120"	RQD 100%	R13	*361							
135.0	872.3						Medium hard gray SANDSTONE interbedded with SHALE; very fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thinly laminated, slightly fractured, contains abundant argillaceous laminations. @ 138.6', 142.6', low angle fracture.						
140		Core 120"	Rec 120"	RQD 100%	R14	*222							
145.0	862.3						Medium hard gray SANDSTONE interbedded with SHALE; very fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thinly laminated, slightly fractured, small brown siltstone lenses throughout, fissile.						
150		Core 120"	Rec 120"	RQD 100%	R15								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-767 | *Location:* Sta. 831+30.0, 46.3 ft. LT of SR 823 CL | *Date Drilled:* 08/17/05 to 08/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
104.9' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
150	857.3					*135	Medium hard gray SANDSTONE interbedded with SHALE; very fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thinly laminated, slightly fractured, small brown siltstone lenses throughout, fissile.							Natural Moisture Content, % - ● PL ⊢——⊣ LL Blows per foot - ○ 10 20 30 40
155														
160		Core 120"	Rec 119.5"	RQD 99%	R16									
165														
170		Core 120"	Rec 120"	RQD 100%	R17	*306								
175							@ 176.1'-176.2', high angle fracture.							
180		Core 120"	Rec 118"	RQD 98%	R18									

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Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-767 | Location: Sta. 831+30.0, 46.3 ft. LT of SR 823 CL | Date Drilled: 08/17/05 to 08/18/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
104.9' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
180	827.3					*122	Medium hard gray SANDSTONE interbedded with SHALE; very fine grained, slightly weathered, argillaceous, micaceous, thinly bedded to thinly laminated, slightly fractured, small brown siltstone lenses throughout, fissile.							Natural Moisture Content, % - ● PL ⊢ LL Blows per foot - ○ 10 20 30 40
185		Core 120"	Rec 120"	RQD 100%	R19									
190							@ 191.0'-191.1', 194.4'- 194.5', light brown siltstone layer.							
195		Core 60"	Rec 60"	RQD 100%	R20									
200.0	807.3						Bottom of Boring - 200.0'							
205														
210														

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-769 | *Location:* Sta. 831+13.4, 273.2 ft. RT of SR 823 CL | *Date Drilled:* 08/17/05 to 08/22/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
139.8' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	1024.8												
0.4	1024.4						Topsoil - 5"						
		3 2 35	8	1			Dense brown SANDY SILT (A-4a), trace clay; dry.						
3.0	1021.8												
		50/1	1	2			Severely weathered brown SANDSTONE.						
5.0	1019.8												
		Core 60"	Rec 48"	RQD 22%	R1	*329	Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, massive, moderately to highly fractured. @ 5.0'-5.2', 8.5'-10.0', iron stained high angle fracture. @ 5.8'-6.3', low angle fractures. @ 7.0'-10.7', large high angle fracutre with clay and gravel infilling @ 10.0'-10.7', broken zone. @ 10.6'-12.0', qu = 8,960 psi, SDI = 98.2%. @ 12.0', 12.6', 14.2', 14.7', 14.8', 15.5', 17.1', 17.7', 18.3', low angle fracture.						
10													
		Core 120"	Rec 120"	RQD 93%	R2	*338							
15													
20													
		Core 120"	Rec 120"	RQD 83%	R3	*238	@ 21.7', 21.9', 22.3', 22.5', 23.8'-24.1', 24.5'-24.9', 26.3', 27.6'-28.0', 28.6', 29.2', low angle fracture. @ 22.5'-22.9', iron stained high angle fracture. @ 24.3'-24.6', 26.1'-26.4', argillaceous and turbidic band.						
25													
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

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Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-769 | *Location:* Sta. 831+13.4, 273.2 ft. RT of SR 823 CL | *Date Drilled:* 08/17/05 to 08/22/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
139.8' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	994.8						Hard brown SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, massive, moderately to highly fractured. @ 31.4', 32.1', 33.5', 34.4', 35.5', 36.3', 37.9', low angle fractures.						
35		Core 120"	Rec 120"	RQD 100%	R4	*231	@ 35.9'-37.5', qu = 4,932 psi, SDI = 97.4%.						
40.0	984.8						Hard brown SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, massive, unfractured to slightly fractured. @ 40.8'-41.5', 44.3'-44.7', iron stained. @ 41.3', 43.3', 44.7', 48.1', iron stained low angle fracture.						
45		Core 120"	Rec 120"	RQD 100%	R5	*250							
50							@ 50.5', 54.2', low angle fracture.						
55		Core 120"	Rec 120"	RQD 100%	R6	*306	@ 52.7'-54.2', qu = 8,852 psi, SDI = 95.6%.						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-769 | Location: Sta. 831+13.4, 273.2 ft. RT of SR 823 CL | Date Drilled: 08/17/05 to 08/22/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
139.8' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢⊣ LL / Blows per foot - ○ (10 20 30 40)
60	964.8						Hard brown SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, massive, unfractured to slightly fractured.							
							@ 62.7', iron staining.							
65		Core 120"	Rec 120"	RQD 100%	R7	*248	@ 63.8', 63.9', 66.5', low angle fracture.							
70														
75		Core 120"	Rec 120"	RQD 100%	R8	*251	@ 73.5'-73.7', 76.8'-77.0'; ferric bands. @ 73.7', 75.8', low angle fracture. @ 75.3'-77.0', qu = 9,386 psi, SDI = 86.2%. @ 77.3', calcareous lens.							
80														
85		Core 120"	Rec 120"	RQD 100%	R9	*282	@ 81.9', low angle fracture. @ 82.1'-82.2', 83.2'-83.3', 85.9'-86.1', fossiliferous and calcareous lens.							
90														

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-769 | *Location:* Sta. 831+13.4, 273.2 ft. RT of SR 823 CL | *Date Drilled:* 08/17/05 to 08/22/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
139.8' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
90	934.8						Hard brown SANDSTONE; very fine to fine grained, moderately weathered, argillaceous, micaceous, massive, unfractured to slightly fractured. @ 90.5', low angle fracture.						
95		Core 120"	Rec 120"	RQD 100%	R10	*296	@ 96.0'-96.1', high angle fracture.						
99.2	925.6												
100							Medium hard to hard brown SANDSTONE; fine grained, moderately to highly weathered, argillaceous, micaceous, thickly bedded to very thickly bedded, highly fractured to broken. @ 101.4'-103.2', qu = 9,288 psi, SDI = 97.9%. @ 103.1'-104.1', 104.5'- 108.6', iron stained high angle fractures.						
105		Core 120"	Rec 120"	RQD 47%	R11	*302							
110													
112.0	912.8						Medium hard to hard gray SANDSTONE; fine to very fine grained, moderately weathered, argillaceous, micaceous, thickly to massively bedded, slightly fractured.						
115		Core 120"	Rec 120"	RQD 95%	R12	*290	@ 114.7'-116.2', qu = 9,515 psi, SDI = 97.2%.						
120													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-769 | *Location:* Sta. 831+13.4, 273.2 ft. RT of SR 823 CL | *Date Drilled:* 08/17/05 to 08/22/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
139.8' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
120	904.8						Medium hard to hard gray SANDSTONE; fine to very fine grained, moderately weathered, argillaceous, micaceous, thickly to massively bedded, slightly fractured. @ 120.6'-122.9', 124.4'- 124.9', brown.						
125		Core 120"	Rec 120"	RQD 90%	R13	*289	@ 125.0'-125.4', iron stained. @ 126.1'-126.6', pitted zone @ 126.1', 126.2', 126.3', 126.7', low angle fracture.						
126.6	898.2						Medium hard brown SANDSTONE; very fine to fine grained, highly weathered to decomposed, argillaceous, micaceous, medium bedded, moderately fractured. @ 127.5'-128.1', qu = 10,868 psi. @ 128.5'-129.0', pitted zone @ 128.7', 128.8', 129.1', 129.7', 129.9', low angle fracture. @ 129.1'-129.5', calcareous layer.						
130.3	894.5						Hard gray SANDSTONE; fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to very thickly bedded, slightly fractured.						
135		Core 120"	Rec 120"	RQD 100%	R14	*294	@ 135.0'-136.6', qu = 9,740 psi, SDI = 96.8%.						
140.0	884.8						@ 139.5'-140.0'; iron stained high angle fracture.						
145		Core 120"	Rec 120"	RQD 53%	R15	*342	Medium hard to hard grayish brown SANDSTONE interbedded with SHALE; very fine to fine grained, slightly to moderately weathered, micaceous, thinly laminated to thinly bedded, unfractured to slightly fractured, few argillaceous laminae, fissle. @ 140.8'-141.2', 141.7', 142.3', low angle fractures. @ 142.5'-143.8', 144.3'- 146.3', high angle fractures. @ 143.8'-144.3', broken. @ 147.0'-149.2', qu = 7,214 psi, SDI = 73.0%.						
150													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-769 | *Location:* Sta. 831+13.4, 273.2 ft. RT of SR 823 CL | *Date Drilled:* 08/17/05 to 08/22/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
139.8' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
150	874.8						Medium hard to hard grayish brown SANDSTONE interbedded with SHALE; very fine to fine grained, slightly to moderately weathered, micaceous, thinly laminated to thinly bedded, unfractured to slightly fractured, abundant argillaceous laminae, fissle.							Natural Moisture Content, % - ● PL ⊢——⊣ LL Blows per foot - ○ 10 20 30 40
155		Core 120"	Rec 120"	RQD 99%	R16	*109	@ 154.2', 154.3', 154.9', 159.1', low angle fractures.							
160														
165		Core 120"	Rec 120"	RQD 99%	R17	*440	@ 168.0'-170.0', qu = 5,774 psi, SDI = 73.5%.							
170														
175		Core 120"	Rec 120"	RQD 100%	R18	*357								
180														

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-769 | Location: Sta. 831+13.4, 273.2 ft. RT of SR 823 CL | Date Drilled: 08/17/05 to 08/22/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
139.8' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
180	844.8						Medium hard to hard grayish brown SANDSTONE interbedded with SHALE; very fine to fine grained, slightly to moderately weathered, micaceous, thinly laminated to thinly bedded, unfractured to slightly fractured, abundant argillaceous laminae, fissle.						
185		Core 120"	Rec 120"	RQD 96%	R19	*228	@ 180.1', 182.1', 187.6', 188.6', 189.7', 194.3', low angle fractures.						
190													
195		Core 120"	Rec 120"	RQD 100%	R20								
200													
205		Core 120"	Rec 120"	RQD 95%	R21		@ 205.0'-206.5', SDI = 79.6%.						
210							@ 203.8', 204.5', 207.9' 208.5', 209.3', low angle fractures.						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

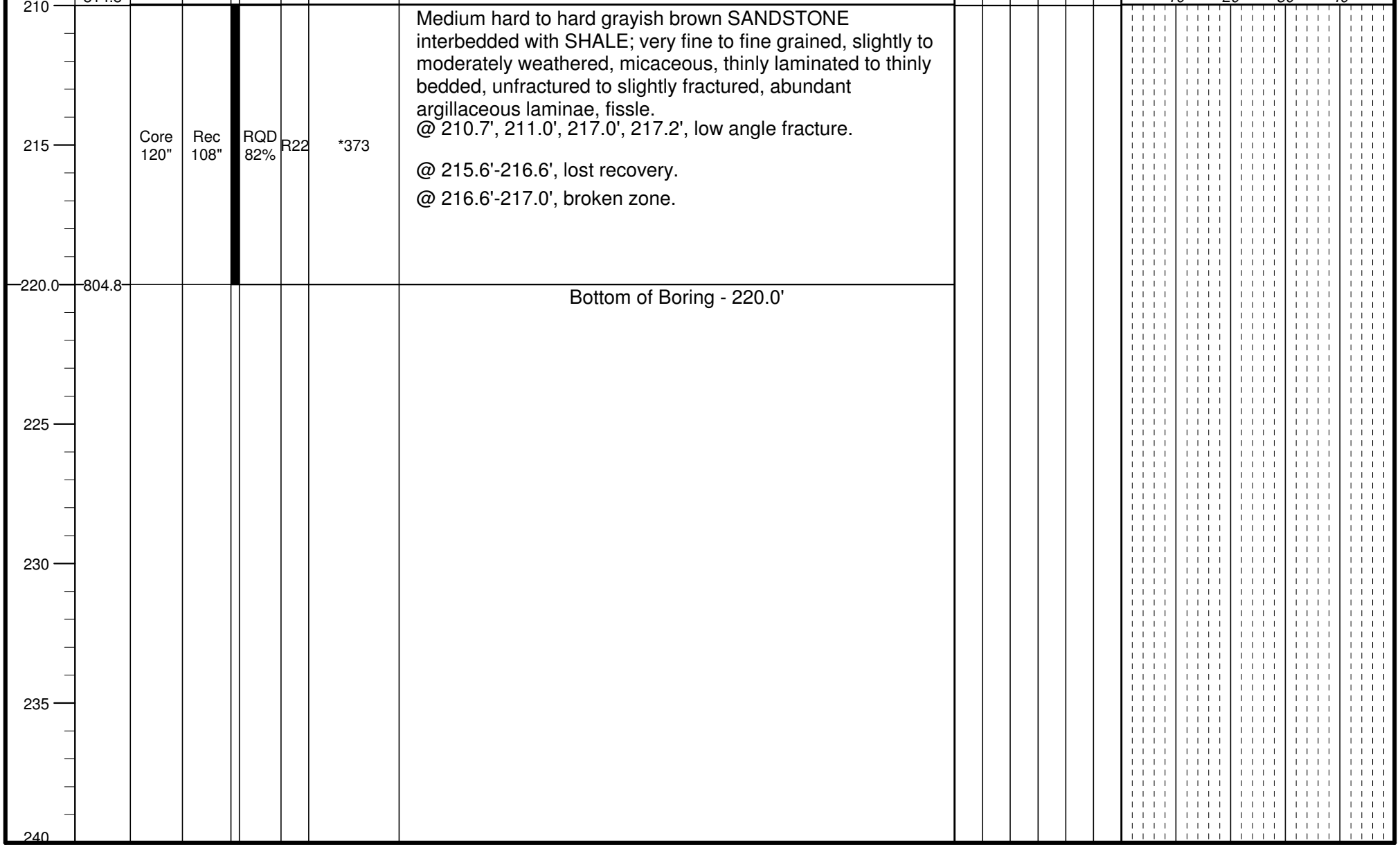
Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-769 | *Location:* Sta. 831+13.4, 273.2 ft. RT of SR 823 CL | *Date Drilled:* 08/17/05 to 08/22/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
139.8' (with augers removed)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
210	814.8												
215		Core 120"	Rec 108"	RQD 82%	R22	*373	Medium hard to hard grayish brown SANDSTONE interbedded with SHALE; very fine to fine grained, slightly to moderately weathered, micaceous, thinly laminated to thinly bedded, unfractured to slightly fractured, abundant argillaceous laminae, fissle. @ 210.7', 211.0', 217.0', 217.2', low angle fracture. @ 215.6'-216.6', lost recovery. @ 216.6'-217.0', broken zone.						
220.0	804.8						Bottom of Boring - 220.0'						
225													
230													
235													
240													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-770 | *Location:* Sta. 835+09.6, 112.6 ft. LT of SR 823 CL | *Date Drilled:* 08/21/05 to 08/23/05

WATER OBSERVATIONS: Water seepage at: 21.0'-21.5'
Water level at completion: 15.8' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) / Natural Moisture Content, % - ● / PL ⊢ LL / Blows per foot - ○ (10 20 30 40)
0	859.4													
0.3	859.1						Topsoil - 3"							
		9 9 10	12	1			Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace to little clay; contains sandstone fragments; damp.	52	11	--	4	33		Non-Plastic
3.5	855.9													
		9 9 9	14	2		--	Very stiff to hard brown and gray SILT AND CLAY (A-6a), little fine to coarse sand, little gravel; damp.							
5														
		7 8 8	18	3		--		11	14	--	6	37	32	
		6 8 9	16	4		4.5+								
10							@ 10.5', contains shale fragments.							
		12 18 46	16	5		--		2	7	--	4	49	38	64 →
		27 50/3	9	6		--								50+
15.0	844.4													
		29 50/3	8	7		--	Hard brownish gray SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; contains shale fragments; damp.							50+
		25 38 34	15	8		--		1	9	--	5	45	40	
20														72 →
20.5	838.9													
		50/6	6	9			Severely weathered gray SHALE argillaceous.							50+
23.0	836.4													
		Core 84"	Rec 84"	RQD 100%	R1	*115	Soft gray SHALE; very fine grained, moderately weathered, micaceous, thickly bedded, slightly fractured, contains few arenaceous laminations, fissile.							
25														
							@ 24.1', 28.9', low angle fracture.							
30														

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-770 | Location: Sta. 835+09.6, 112.6 ft. LT of SR 823 CL | Date Drilled: 08/21/05 to 08/23/05

WATER OBSERVATIONS: Water seepage at: 21.0'-21.5'
Water level at completion: 15.8' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30	829.4						Soft gray SHALE; very fine grained, moderately weathered, micaceous, thickly bedded, slightly fractured, contains few arenaceous laminations, fissile.							Natural Moisture Content, % - ● PL ⊢——⊣ LL Blows per foot - ○ 10 20 30 40
35		Core 120"	Rec 120"	RQD 100%	R2									
40.0	819.4						Medium hard gray SANDSTONE; very fine grained, moderately weathered, argillaceous, micaceous, thinly laminated to laminated, slightly fractured, contains moderate to abundant argillaceous laminations, fissile. @ 40.7', 44.8', 48.3', low angle fractures.							
45		Core 120"	Rec 117"	RQD 98%	R3									
50							@ 50.0', contains few to moderate argillaceous laminations.							
55		Core 120"	Rec 120"	RQD 100%	R4									
60														

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-770 | *Location:* Sta. 835+09.6, 112.6 ft. LT of SR 823 CL | *Date Drilled:* 08/21/05 to 08/23/05

WATER OBSERVATIONS: Water seepage at: 21.0'-21.5'
Water level at completion: 15.8' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	799.4												
		Core 120"	Rec 120"	RQD 100%	R5	*275	Medium hard gray SANDSTONE; very fine grained, moderately weathered, argillaceous, micaceous, thinly laminated to laminated, slightly fractured, contains few to moderate argillaceous laminations, fissile.						
65													
70.0	789.4						Bottom of Boring - 70.0'						
75													
80													
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-772 | *Location:* Sta. 835+19.3, 64.4 ft. RT of SR 823 CL | *Date Drilled:* 08/22/05 to 08/23/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
21.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	847.5												
0.4	847.1						Topsoil - 5"						
		10 11 10	2	1		--	Very stiff to hard brown SILT (A-4b), trace to little clay, trace fine sand, trace gravel; contains sandstone fragments; damp. @ 1.0'-2.5', red sandstone boulder.						
		7 10 11	18	2		4.0							
5		21 10 13	18	3		4.5+							
		7 10 9	18	4		2.75							
10		10 11 11	14	5		3.0							
13.0	834.5						Very stiff to hard brown SILTY CLAY (A-6b), trace fine sand; contains shale fragments; damp to moist.						
		4 6 9	18	6		3.5							
15		10 14 15	8	7		4.0							
		9 11 13	18	8		4.5+							
20		8 12 15	6	9		4.5+	@ 21.0', little fine to coarse sand.						
23.0	824.5						Hard brown CLAY (A-7-6), trace fine to coarse sand; contains shale fragments; damp to moist.						
24.0	823.5	8 50/4	8	10A 10B		4.5+							
25.0	822.5						Severely weathered gray SHALE.						
							Soft to medium hard gray SHALE; very fine grained, moderately to highly weathered, argillaceous, micaceous, thinly laminated to thinly bedded, moderately fractured. @ 25.5', 28.2', 31.1', 31.3', 34.5', 34.9', low angle fractures.						
30		Core 120"	Rec 120"	RQD 93%	R1								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-772 | Location: Sta. 835+19.3, 64.4 ft. RT of SR 823 CL | Date Drilled: 08/22/05 to 08/23/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
21.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	817.5						Soft to medium hard gray SHALE; very fine grained, moderately to highly weathered, argillaceous, micaceous, thinly laminated to thinly bedded, moderately fractured.						
							@ 33.5'-33.6', high angle fracture.						
35							@ 35.1', 35.5', 36.6', 36.9', 38.0', 39.1', 40.5', 44.2', 44.5', low angle fractures.						
40		Core 120"	Rec 120"	RQD 80%	R2		@ 39.5'-39.8', 40.0'-40.2', 40.8'-41.0', broken zone.						
45							@ 45.0'-45.7', 46.6'-48.1', 51.6'-51.7', sandstone beds.						
							@ 46.0', 46.6', 48.1'-48.2', 48.4'-48.9', 49.5', 50.2', 51.1', 51.5'-51.6', 51.9', 52.3', 53.5'-53.6', low angle fractures.						
50		Core 120"	Rec 120"	RQD 74%	R3								
55													
56.1	791.4	Core 60"	Rec 60"	RQD 100%	R4	*437	Medium hard gray SHALE interbedded with SANDSTONE; very fine grained, moderately weathered, micaceous, argillaceous, thinly laminated to thinly bedded, slightly fractured, iron staining.						
60.0	787.5												

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-772 | *Location:* Sta. 835+19.3, 64.4 ft. RT of SR 823 CL | *Date Drilled:* 08/22/05 to 08/23/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (prior to coring)
21.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	787.5						@ 56.1', 58.6', low angle fractures. Bottom of Boring - 60.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

65 70 75 80 85 90

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-773 | *Location:* Sta. 837+19.8, 111.1 ft. LT of SR 823 CL | *Date Drilled:* 08/23/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
20.6' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	809.7													
0.3	809.4						Topsoil - 4"							
		10 24 18	2	1			Dense brown SANDY SILT (A-4a), "and" gravel, trace clay; damp.	42	12	--	8	38		Natural Moisture Content, % - ● PL ⊢⊣ LL; Blows per foot - ○ 10 20 30 40; Non-Plastic
3.0	806.7						Medium dense to dense brown and gray SILT (A-4b), some clay, trace gravel; damp.							
		15 20 30	4	2										
5														
		14 14 14	6	3				6	11	--	7	51	25	Non-Plastic
		7 7 10	15	4										
10														
10.5	799.2													
		9 8 9	18	5		3.25	Very stiff brown and gray SANDY SILT (A-4a), little gravel, little clay; contains shale fragments; damp to moist.	11	18	--	9	46	16	
		6 8 9	2	6		--								
15														
		6 10 15	18	7		3.25								
		7 8 10	4	8		3.75								
20														
		7 8 7	18	9		3.75								
23.0	786.7													
		50/2	2	10			Severely weathered gray SHALE.							50+
25.0	784.7													
		Core 120"	Rec 113"	RQD 80%	R1		Medium hard gray SHALE interbedded with SANDSTONE; very fine to fine grained, highly weathered to decomposed, micaceous, thinly laminated to medium bedded, moderately fractured. @ 27.0'-27.6', void.							
30														

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-773 | *Location:* Sta. 837+19.8, 111.1 ft. LT of SR 823 CL | *Date Drilled:* 08/23/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
20.6' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	779.7					*130	Medium hard gray SHALE interbedded with SANDSTONE; very fine to fine grained, highly weathered to decomposed, micaceous, thinly laminated to medium bedded, moderately fractured.						
35.0	774.7						Bottom of Boring - 35.0'						
40													
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-774 | *Location:* Sta. 837+16.8, 16.9 ft. RT of SR 823 CL | *Date Drilled:* 08/23/05

WATER OBSERVATIONS: Water seepage at: 8.5'-10.0', 18.5'-20.0', 26.5'-27.5'
Water level at completion: None (prior to coring)
5.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	792.8												
0.3	792.5						Topsoil - 4"						
		10 14 20	16	1		4.0	Very stiff to hard brown SILT (A-4b), little to some clay, little to some fine to coarse sand, trace gravel; damp.	1	7	--	5	60	27
		20 50/6	12	2		3.0							
5													
		17 24 22	18	3		4.5+		0	16	--	9	57	18
8.0	784.8												
		17 32 39	18	4		2.0	Very stiff brown SANDY SILT (A-4a), little clay, little gravel; damp.						
10													
		17 22 9	18	5		3.5		16	15	--	10	45	14
		8 10 11	18	6		3.0							
15													
		21 12 15	16	7		3.0							
		9 9 10	15	8		2.0							
20													
21.0	771.8												
		4 4 6	18	9		--	Stiff to very stiff brown and gray SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; damp.						
		3 4 12	18	10		3.0							
25													
25.5	767.3						Very stiff gray SILTY CLAY (A-6b), trace fine to coarse sand; moist.						
		9 13 15	18	11		3.0							
28.0	764.8						Severely weathered gray SHALE.						
		38 50/4	9	12									
30													

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+
71
50+

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-774 | *Location:* Sta. 837+16.8, 16.9 ft. RT of SR 823 CL | *Date Drilled:* 08/23/05

WATER OBSERVATIONS: Water seepage at: 8.5'-10.0', 18.5'-20.0', 26.5'-27.5'
Water level at completion: None (prior to coring)
5.2' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30.0	762.8	Core 60"	Rec 60"	RQD 75%	R1		Medium hard gray SHALE interbedded with SANDSTONE; very fine grained, highly weathered to decomposed, micaceous, very thinly bedded to laminated, highly fractured to broken. @ 30.0'-31.2', iron stained. @ 30.0'-30.2', 30.5'-30.7', broken zones. @ 30.9'-31.0', high angle fracture. @ 33.0', low angle fracture.						
35.0	757.8						Bottom of Boring - 35.0'						

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

40 45 50 55 60

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-775 | *Location:* Sta. 838+17.4, 74.4 ft. RT of SR 823 CL | *Date Drilled:* 08/23/05

WATER OBSERVATIONS: Water seepage at: 7'-7.5', 8.5'
Water level at completion: None (prior to coring)
7.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	766.4													
0.3	766.1						Topsoil - 3"							
		14 13 16	16	1			Medium dense to dense brown SANDY SILT (A-4a), trace clay, trace gravel; dry to damp.							
		14 20 21	18	2										
5														
5.5	760.9						Very stiff to hard brown SILT AND CLAY (A-6a), trace to little fine to coarse sand, trace gravel; damp.							
		14 22 29	18	3		3.0								51
		10 16 21	17	4		3.5								
10														
		8 19 24	18	5		--								
		18 25 32	16	6		--								
15														
15.5	750.9						Medium dense to dense brown SANDY SILT (A-4a), trace gravel, trace clay; damp.							
		18 16 12	18	7										
		15 21 20	15	8										57
20														
20.5	745.9						Very stiff to hard brown SILT AND CLAY (A-6a), trace to little fine to coarse sand, trace gravel; contains siltstone fragments; damp.							
		6 10 11	14	9		4.5+								
		11 11 13	18	10		3.5								
25														
		3 6 11	14	11		4.5+								
		6 12 20	18	12		2.75								
30														

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-775 | *Location:* Sta. 838+17.4, 74.4 ft. RT of SR 823 CL | *Date Drilled:* 08/23/05

WATER OBSERVATIONS: Water seepage at: 7'-7.5', 8.5'
Water level at completion: None (prior to coring)
7.5' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30.0	736.4						Severely weathered gray SHALE argillaceous.							Natural Moisture Content, % - ● PL — LL; Blows per foot - ○ (10 20 30 40)
		10 27 37	18	13										
35														64 →
		50/5	4	14										50+
40.0	726.4	Core 60"	Rec 60"	RQD 100%	R1		Medium hard gray SILTSHALE; very fine grained, highly weathered, thinly laminated to laminated, slightly fractured.							
45.0	721.4						Bottom of Boring - 45.0'							
50														
55														
60														

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-776 | *Location:* Sta. 838+04.9, 122.1 ft. RT of SR 823 CL | *Date Drilled:* 08/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
5.8' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	759.2													
0.3	758.9						Topsoil - 3"							
		8 14 20	12	1		4.5+	Hard brown SILT (A-4b), little to some fine to coarse sand, little to some clay, trace gravel; dry to damp.	1	11	--	7	55	26	
		14 22 32	16	2		--								54
5		116 28 32	18	3		4.5+		3	13	--	11	58	15	60
		19 24 33	13	4		--								
10		18 23 22	18	5		--		6	11	--	9	57	17	57 Non-Plastic
13.0	746.2						Very stiff brown SANDY SILT (A-4a), some gravel, little clay; damp.							
		18 18 19	18	6		2.5								
15		8 8 11	17	7		3.0		22	7	--	5	48	18	
18.0	741.2						Stiff to very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp.							
		8 7 11	17	8		1.75								
20		6 8 10	18	9		1.75								
		6 10 14	18	10		3.75		7	13	--	6	43	31	
25		5 8 14	18	11		3.0								
							@ 26.0', Gray, contains shale fragments.							
		14 34 44	14	12		3.5								78
30														

Blows per foot - 10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-776 | *Location:* Sta. 838+04.9, 122.1 ft. RT of SR 823 CL | *Date Drilled:* 08/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
5.8' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
	729.2													Natural Moisture Content, % - ● PL ⊢——⊣ LL Blows per foot - ○ 10 20 30 40
30.0	729.2						Severely weathered gray SHALE arenaceous.							78
		50/4	4	13										50+
35.0	724.2	Core 60"	Rec 60"	RQD 100%	R1		Soft to medium hard gray SHALE; very fine grained, moderately weathered, micaceous, arenaceous, laminated to thinly laminated, unfractured, few arenaceous laminae.							
							@ 39.5', clay seam.							
40.0	719.2						Bottom of Boring - 40.0'							
45														
50														
55														
60														

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-777 | *Location:* Sta. 842+26.9, 8.4 ft. LT of SR 823 CL | *Date Drilled:* 08/23/05 to 08/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
6.5' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	757.8												
0.3	757.5						Topsoil - 4"						
		21 25 40	9	1			Very dense brown SILT (A-4b), some clay, trace fine to coarse sand, trace gravel; dry to damp.						
		30 50/5	11	2									
5.0	752.8						Brown SILT AND CLAY (A-6a), some fine to coarse sand, some gravel; contains rock, cobble and boulder fragments; damp.						
		Core 120"	Rec 101"	RQD 0%	R1		@ 8.5'-10.1', lost recovery.						
10													
15							@ 16.1'-20.7', lost recovery.						
		Core 120"	Rec 65"	RQD 0%	R2		@ 20.9'-21.0', high angle fracture.						
20													
25.0	732.8						Soft to medium hard gray SANDSTONE; very fine grained, moderately weathered to decomposed, micaceous, pyritic, thinly laminated to laminated, moderately fractured, contains abundant argillaceous laminations, fissile. @ 25.8'-26.0', high angle fracture. @ 26.7', 27.0', low angle fracture.						
		Core 120"	Rec 120"	RQD 84%	R3								
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
65
50+

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-777 | *Location:* Sta. 842+26.9, 8.4 ft. LT of SR 823 CL | *Date Drilled:* 08/23/05 to 08/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
6.5' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	727.8						Soft to medium hard gray SANDSTONE; very fine grained, moderately weathered to decomposed, micaceous, pyritic, thinly laminated to laminated, moderately fractured, contains abundant argillaceous laminations, fissile. @ 30.5', 30.8', 31.1', 32.0', 32.7', 32.9', 33.5', low angle fracture.						
35		Core 60"	Rec 60"	RQD 98%	R4								
40.0	717.8						Bottom of Boring - 40.0'						
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-778 | *Location:* Sta. 842+13.8, 86.5 ft. RT of SR 823 CL | *Date Drilled:* 08/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
3.8' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	736.0												
0.4	735.6						Topsoil - 5"						
		9 11 15	12	1			Medium dense brown SILT (A-4b), some clay, trace fine to coarse sand, trace gravel; dry to damp.	2	3	--	3	68	24
3.0	733.0												
		37 50/5	11	2			Very dense brown SANDY SILT (A-4a), some clay, little gravel; damp.	14	10	--	6	44	26
5.0	731.0						Very stiff to hard brown SILTY CLAY (A-6b), trace fine sand; organic, contains rock fragments; dry. @ 5.0', possible boulder. @ 7.0'-12.5', lost recovery.						
10		Core 120"	Rec 42"	RQD 0%	R1								
15							@ 14.3'-15.0', lost recovery.						
20		Core 120"	Rec 104"	RQD 0%	R2		@ 21.2'-22.5', lost recovery.						
25.0	711.0						Soft brown and gray SHALE/CLAYSTONE; very fine grained, decomposed.						
30		Core 120"	Rec 110"	RQD 30%	R3								

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
Non-Plastic
50+

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-778 | *Location:* Sta. 842+13.8, 86.5 ft. RT of SR 823 CL | *Date Drilled:* 08/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
3.8' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	706.0						Soft brown and gray SHALE/CLAYSTONE; very fine grained, decomposed. @ 30.2'-30.4', 30.7'- 30.9', high angle fractures. @ 31.5', 33.0', low angle fractures.						
35							@ 35.0'-35.8', clay seam.						
40		Core 120"	Rec 120"	RQD 40%	R4		@ 38.1', 40.5', 43.5', low angle fractures, rust staining.						
42.5	693.5						Medium hard gray SANDSTONE; very fine grained, moderately weathered, micaceous, argillaceous, thinly laminated to thinly bedded, slightly fractured, contains few to moderate argillaceous laminations, fissile.						
45		Core 60"	Rec 60"	RQD 100%	R5		@ 45.4', 47.9', 48.0', low angle fractures.						
50.0	686.0						Bottom of Boring - 50.0'						
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-779 | *Location:* Sta. 842+15.5, 128.4 ft. RT of SR 823 CL | *Date Drilled:* 08/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
8.1' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	730.0													Natural Moisture Content, % - ● PL ⊢⊣ LL; Blows per foot - ○ 10 20 30 40
0.3	729.7						Topsoil - 4"							
		11 14 21	10	1			Dense to very dense brown SILT (A-4b), some clay, trace fine to coarse sand; dry to damp.	0	2	--	2	67	29	● ○ 50+
		17 45 50/3	10	2										
5														
5.5	724.5						Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp.	3	11	--	6	44	36	
		40 41 41	14	3		4.5+								● ○ 82
		25 34 36	11	4		4.5+								○ 70
10														
10.5	719.5						Hard brown SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; damp.	6	5	--	3	47	39	
		25 27 45	18	5		4.5+								● ○ 72
		12 19 25	5	6		4.5+								
15														
15.5	714.5						Hard brown SANDY SILT (A-4a), little clay, little gravel; dry to damp.	19	23	--	9	33	16	
		22 25 27	13	7		4.5+								● ○ 52
		22 26 28	6	8		4.5+								
20														○ 54
20.5	709.5						Hard brown SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; damp.	1	4	--	5	56	34	
		13 13 15	14	9		4.25								● ○
		14 23 32	8	10		--	@ 25.0', auger refusal.							
25.0	705.0						Hard brown and gray SILTY CLAY (A-6b), little gravel; dry.							○ 55
		Core 120"	Rec 33"	RQD 0%	R1									
30														

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-779 | Location: Sta. 842+15.5, 128.4 ft. RT of SR 823 CL | Date Drilled: 08/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
8.1' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	700.0						Hard brown and gray SILTY CLAY (A-6b), little sand, trace gravel.						
35													
40		Core 120"	Rec 104"	RQD 0%	R2								
42.5	687.5						Soft to medium hard SHALE interbedded with SANDSTONE; very fine grained, decomposed.						
45							@ 46.3', highly weathered to decomposed.						
48.3	681.7						Medium hard gray SANDSTONE ; very fine grained, slightly to moderately weathered, moderately fractured, fractured along bedding planes infilled with clayey silt, contains moderate to abundant argillaceous laminations, fissile after dessication.						
50		Core 120"	Rec 110"	RQD 79%	R3								
55.0	675.0						Bottom of Boring - 55.0'						
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-780 | *Location:* Sta. 845+93.7, 87.9 ft. LT of SR 823 CL | *Date Drilled:* 08/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
6.1' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	739.1													
0.3	738.8						Topsoil - 4"							
		5 8 10	12	1		--	Very stiff to hard brown SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; damp.	2	9	--	4	44	41	
		14 18 12	14	2		4.5+								
5		15 25 28	18	3		4.5+		2	7	--	5	56	30	53
		12 18 27	12	4		4.5+								
10														
10.5	728.6						Hard brown SILTY CLAY (A-6b), little gravel, trace to little fine to coarse sand; contains shale fragments; damp.							
		18 26 37	16	5		4.5+		15	6	--	4	41	34	63
		24 50/6	9	6		4.5+								50+
15														
		20 39 50/5	15	7		--		17	9	--	7	39	28	50+
		50/5	5	8		--								50+
20.0	719.1						Hard grayish brown SILT AND CLAY (A-6a), "and" fine to coarse sand, trace gravel; damp.							
		21 50/3	7	9		--		1	30	--	13	35	21	50+
23.0	716.1						Severely weathered gray SHALE, arenaceous.							
		50/4	4	10										50+
25.0	714.1						Medium hard gray SHALE; very fine grained, moderately weathered, micaceous, thickly bedded, slightly fractured, moderate argillaceous laminae.							
30		Core 120"	Rec 120"	RQD 100%	R1									

Natural Moisture Content, % - ●
PL ⊢⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-780 | *Location:* Sta. 845+93.7, 87.9 ft. LT of SR 823 CL | *Date Drilled:* 08/25/05

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (Prior to coring)
6.1' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	709.1						Medium hard gray SHALE; very fine grained, moderately weathered, micaceous, thickly bedded, slightly fractured, moderate argillaceous laminae.						
35.0	704.1						Bottom of Boring - 35.0'						
40													
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-781 | *Location:* Sta. 846+10.6, 13.0 ft. LT of SR 823 CL | *Date Drilled:* 08/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
13.9' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	722.7													Natural Moisture Content, % - ● PL ⊢⊣ LL; Blows per foot - ○ 10 20 30 40
0.3	722.4						Topsoil - 3"							
		18 38 42	16	1		4.5+	Hard brown SILT AND CLAY (A-6a), some fine to coarse sand, trace gravel; damp.	6	14	--	8	50	22	○ 80
		15 24 29	18	2		4.5+								
5														○ 53
5.5	717.2						Hard brown SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; damp.							
		12 22 36	18	3		4.5+		1	8	--	3	47	41	○ 58
		18 34 38	18	4		4.5+								
10														○ 72
		8 14 20	16	5		4.5+		2	8	--	4	38	48	
		14 26 35	17	6		4.5+								
15														○ 61
15.5	707.2						Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; contains shale fragments; damp.							
		8 21 31	12	7		4.5+		1	11	--	7	48	33	○ 52
		20 31 46	14	8		--								
20														○ 77
		44 50/3	8	9		--		0	10	--	6	56	28	○ 50+
22.0	700.7						Severely weathered brown SHALE, arenaceous.							
		26 50/4	9	10										○ 50+
25.0	697.7						Soft to medium hard gray SHALE interbedded with SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, laminated to thinly bedded, moderately fractured. @ 28.2'-28.6', high angle fracture, some iron banding. @ 28.4'-28.5', low angle fracture.							
		Core 120"	Rec 114"	RQD 95%	R1									
30														

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-781 | *Location:* Sta. 846+10.6, 13.0 ft. LT of SR 823 CL | *Date Drilled:* 08/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
13.9' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	692.7						Soft to medium hard gray SHALE interbedded with SANDSTONE; very fine to fine grained, moderately to highly weathered, micaceous, laminated to thinly bedded, moderately fractured.						
35.0	687.7						Bottom of Boring - 35.0'						
40													
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-783 | *Location:* Sta. 845+96.2, 165.7 ft. RT of SR 823 CL | *Date Drilled:* 08/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
5.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	709.5													
0.3	709.2						Topsoil - 3"							
		6 8 10	10	1		4.5+	Hard brown SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; damp.	5	3	--	2	34	56	
		16 19 25	15	2		4.5+								
5		27 50/5	10	3		4.5+		2	1	--	1	54	42	50+
		17 34 50/4	14	4		4.5+								
10														50+
10.5	699.0						Hard grayish brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp.							
		27 24 50/3	14	5				2	12	--	7	44	35	50+
		50/6	5	6										50+
15														
16.0	693.5	50/6	6	7										
16.5	693.0						Hard gray SILT (A-4b), some clay, trace fine to coarse sand, trace gravel; contains sandstone fragments; dry.	7	5	--	4	58	26	50+
		50/4	3	8			Severely weathered gray SHALE, arenaceous.							50+
20.0	689.5						Soft to medium hard gray SANDSTONE interbedded with SHALE; very fine grained, highly weathered, micaceous, thinly laminated to laminated, slightly fractured, fissile.							
25		Core 114"	Rec 114"	RQD 86%	R1		@ 25.0'-25.1', iron concretion.							
30														

Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-783 | *Location:* Sta. 845+96.2, 165.7 ft. RT of SR 823 CL | *Date Drilled:* 08/24/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
5.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	679.5	Core 66"	Rec 66"	RQD 100%	R2		Soft to medium hard gray SANDSTONE interbedded with SHALE; very fine grained, highly weathered, micaceous, thinly laminated to laminated, slightly fractured, fissile.						
35.0	674.5						Bottom of Boring - 35.0'						
40													
45													
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:53 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-799 | Location: Sta. 873+23.0, 10.5 ft. RT of SR 823 CL | Date Drilled: 07/25/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
2.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	659.5												
0.3	659.2						Topsoil - 4"						
		2 3 3	14	1			Loose reddish brown SILT (A-4b), little clay, trace fine to coarse sand, trace gravel; damp.						
3.0	656.5												
		9 10 11	17	2		4.5+	Hard brown and gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; damp to moist.						
5													
		5 7 10	16	3		4.5+							
8.0	651.5												
		9 50/2	7	4			Severely weathered gray SANDSTONE argillaceous.						
10.0	649.5												
15		Core 120"	Rec 120"	RQD 73%	R1	*333	Medium hard to hard gray SANDSTONE; fine grained, moderately weathered, argillaceous, micaceous, medium bedded to thickly bedded, slightly fractured contains few to moderate argillaceous laminations. @ 10.0'-10.6', brown sand layer. @ 10.6'-10.8, 12.0'-12.1', broken zone. @ 12.0'-12.6', shale layer. @ 13.4'-14.2', iron stained. @ 17.0'-17.4', high angle fracture / partially healed. @ 19.1', clay filled fracture. @ 19.2', interbedded shale.						
20.0	639.5						Bottom of Boring - 20.0'						
25													
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:54 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-801 | *Location:* Sta. 877+06.0, 84.9 ft. LT of SR 823 CL | *Date Drilled:* 07/21/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
8.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	674.0												
0.4	673.6						Topsoil - 5"						
		2 4 4	12	1			Loose to medium dense brown SILT (A-4b), little clay, trace fine to coarse sand; damp.						
		5 8 17	18	2									
5		7 12 13	18	3									
8.0	666.0												
		4 12 17	18	4			Medium dense to dense brown SANDY SILT (A-4a), little clay, trace gravel; contains sandstone fragments; damp.						
10		6 13 19	16	5									
13.0	661.0												
		14 34 32	18	6		4.5+	Hard grayish brown CLAY (A-7-6), little silt, trace fine to coarse sand; damp.						
15													
15.5	658.5												
		6 14 24	17	7		4.5+	Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; contains sandstone fragments; damp.						
18.5	655.5												
		6 11 49	16	8			Severely weathered gray SHALE.						
20													
		22 50/3	7	9									
23.5	650.5												
25							Soft gray SHALE; highly weathered to decomposed, micaceous, fossiliferous, thickly bedded, highly fractured to broken.						
26.2	647.8												
		Core 96"	Rec 96"	RQD 91%	R1	*246	Hard gray SANDSTONE; fine grained, slightly to moderately weathered, argillaceous, micaceous, thickly bedded, slightly fractured. @ 26.8'-28.3', qu = 11,268 psi, SDI = 99.0%.						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
66
60
50+

FILE: 0121-3070-03 [11/5/2007 3:54 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-801 | *Location:* Sta. 877+06.0, 84.9 ft. LT of SR 823 CL | *Date Drilled:* 07/21/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
8.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	644.0						Hard gray SANDSTONE; fine grained, slightly to moderately weathered, argillaceous, micaceous, thickly bedded, slightly fractured.						
35		Core 120"	Rec 120"	RQD 97%	R2	*378	@ 36.6'-37.2', 37.6'-37.4', argillaceous zones. @ 38.2'-38.6', qu = 9,128 psi. @ 39.0'-40.0', SDI = 94.5%. @ 39.6'-40.2', high angle fracture.						
40							@ 41.5', contains turbidite bedding. @ 42.1'-42.4', high angle fracture.						
44.1	629.9	Core 60"	Rec 60"	RQD 90%	R3	*295	Medium hard gray SHALE; moderately to highly weathered, arenaceous, micaceous, thinly laminated to laminated, moderately fractured, contains few to moderate arenaceous laminations.						
45													
46.5	627.5						@ 44.8'-46.4', qu = 961 psi, SDI = 37.8%. Bottom of Boring - 46.5'						
50													
55													
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:54 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-802 | *Location:* Sta. 877+14.8, 98.5 ft. RT of SR 823 CL | *Date Drilled:* 07/26/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
7.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	685.7												
0.6	685.1						Topsoil - 7"						
		1 2 3	15	1			Loose dark brown SILT (A-4b), little clay, trace fine to coarse sand, trace gravel; damp to moist.						
3.0	682.7												
		2 5 7	18	2		4.0	Very stiff brown SILT AND CLAY (A-6a), trace gravel, trace fine to coarse sand; damp to moist.						
5													
		3 7 7	18	3		4.0							
		3 7 10	18	4		3.75							
10													
10.5	675.2						Hard brown and gray SILTY CLAY (A-6b), trace gravel, trace fine to coarse sand; damp.						
		9 10 11	18	5		4.5+							
13.0	672.7						Hard brown CLAY (A-7-6), trace fine to coarse sand; damp.						
		2 5 10	18	6		4.5+							
15													
		4 7 10	18	7		4.5+							
18.0	667.7						Hard brown SANDY SILT (A-4a), little clay, trace gravel; contains sandstone fragments; damp.						
		5 10 14	18	8		4.25							
20													
		24 40 50	17	9		4.25							
23.0	662.7						Hard brown CLAY (A-7-6); damp.						
		50/5	4	10		4.5+							
25.0	660.7						Severely weathered gray SHALE.						
		40 50/2	8	11									
28.5	657.2						Soft to medium hard gray SHALE; very fine grained, highly						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
90
50+
50+

FILE: 0121-3070-03 [11/5/2007 3:54 PM]

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring R-802 | Location: Sta. 877+14.8, 98.5 ft. RT of SR 823 CL | Date Drilled: 07/26/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
7.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION
30	655.7	Core 42"	Rec 42"	RQD 60%	R1		weathered, arenaceous, laminated, moderately fractured. Soft to medium hard gray SHALE; very fine grained, highly weathered, arenaceous, laminated, moderately fractured.
32.0	653.7						@ 30.0'-31.8', qu = 1,083 psi, SDI = 3.8%.
35		Core 120"	Rec 120"	RQD 81%	R2	*397	Hard gray SANDSTONE; very fine to fine grained, highly weathered, argillaceous, micaceous, very thickly bedded, slightly fractured, moderate shale laminae. @ 35.3'-35.6', fossiliferous. @ 35.4'-35.6', 37.6'-38.1', iron staining. @ 38.0'-39.5', qu = 10,521 psi, SDI = 92.8%.
40							
45		Core 120"	Rec 120"	RQD 96%	R3	*271	42.7'-43.2', 43.6'-43.8', argillaceous zones.
49.9	635.8						@ 49.9'-50.3', decomposed.
55		Core 60"	Rec 60"	RQD 100%	R4		Medium hard gray SHALE; fine grained, moderately to highly weathered, arenaceous, moderately fractured along bedding planes, fissile, contains few to moderate arenaceous laminations. @ 55.0'-56.9', qu = 3,534 psi, SDI = 54.9%.
57.0	628.7						Bottom of Boring - 57.0'
60							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:54 PM]

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-803 | *Location:* Sta. 881+28.1, 4.2 ft. RT of SR 823 CL | *Date Drilled:* 07/21/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
39.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	685.3												
0.3	685.0						Topsoil - 4"						
		2 3 4	15	1			Loose brown SILT (A-4b), little fine to coarse sand, trace gravel, trace clay; damp.						
		3 5 8	17	2									
5		5 15 14	18	3				1	3	--	5	69	22
8.0	677.3												
		4 10 13	16	4		--	Very stiff brown SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; damp.	9	10	--	9	40	32
10		6 14 14	18	5		--							
		8 13 14	18	6		--	@ 13.5', contains sandstone fragments.						
15													
15.5	669.8												
		5 12 11	18	7		--	Very stiff gray SILT AND CLAY (A-6a), little fine to coarse sand; damp.	0	1	--	11	56	32
		5 8 11	15	8		--							
20		6 8 9	18	9		--							
23.0	662.3												
		1 2 2	18	10			Loose gray and brown SILT (A-4b), some fine to coarse sand, some clay, trace gravel; moist.	3	1	--	22	52	22
25		1 4 2	18	11			@ 26.0', brown.						
28.0	657.3												
		17 50/5	11	12			Severely weathered gray SANDSTONE, argillaceous.						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
50+

FILE: 0121-3070-03 [11/5/2007 3:54 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-803 | *Location:* Sta. 881+28.1, 4.2 ft. RT of SR 823 CL | *Date Drilled:* 07/21/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
39.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30	655.3						Severely weathered gray SANDSTONE argillaceous.							
		38 50/1	6	13										50+
35.0	650.3	Core 18"	Rec 13"	RQD 39%	R1	*247	Hard to very hard gray SANDSTONE; very fine to fine grained, moderately to slightly weathered, micaceous, argillaceous, medium bedded to thickly bedded, slightly fractured. @ 35.0'-35.1'; turbidites.							
40		Core 120"	Rec 120"	RQD 88%	R2	*195	@ 39.6'-43.0', 44.0'-44.6', 45.1'-46.5', interbedded shale bands. @ 41.5'-43.2', qu = 3,503 psi, SDI = 88.0%. @ 42.7'-42.9', iron stained.							
45														
46.8	638.5						@ 46.8'-48.0', decomposed							
50		Core 120"	Rec 120"	RQD 20%	R3		Soft to medium hard gray SHALE; very fine grained, highly weathered to decomposed, micaceous, thinly laminated to very thinly laminated, highly fractured to broken, few sandstone laminae. @ 51.5'-53.0', SDI = 12.7%.							
55							@ 55.4'-55.9', sandstone layer.							
56.5	628.8						Bottom of Boring - 56.5'							
60														

Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:54 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

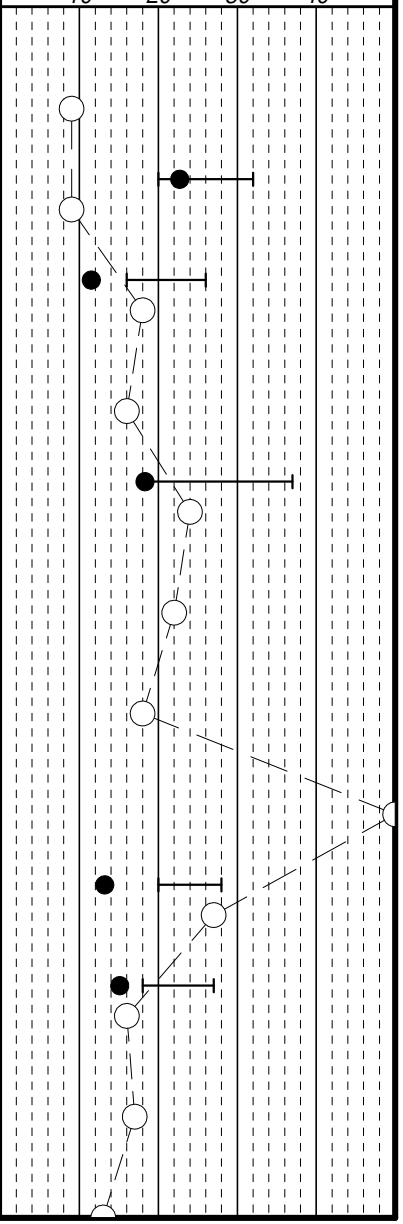
Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-806 | *Location:* Sta. 884+38.2, 121.8 ft. LT of SR 823 CL | *Date Drilled:* 07/19/05 to 07/20/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
28.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	689.6												
0.4	689.2						Topsoil - 5"						
		3 4 5	12	1		--	Stiff brown SILT AND CLAY (A-6a), trace fine to coarse sand; damp to moist.						
		2 4 5	18	2		--		0	0	--	2	75	23
5													
5.5	684.1						Hard brown and gray SILT (A-4b), some clay, little fine to coarse sand; damp.						
		4 8 10	18	3		4.5+		0	2	--	10	58	30
		2 6 10	18	4		4.5+							
10													
10.5	679.1						Hard brown SILTY CLAY (A-6b), trace fine sand; damp.						
		6 11 13	18	5		4.5+		0	0	--	2	55	43
		4 9 13	18	6		4.5+							
15													
		5 8 10	18	7		4.5+	@ 16.0', contains sandstone fragments.						
18.0	671.6						Medium dense to dense brown SANDY SILT (A-4a), little clay, little gravel; damp.						
		9 27 23	18	8									
20													
		7 12 15	18	9				16	14	--	13	37	20
23.0	666.6						Medium dense brown SILT (A-4b), some clay, trace fine to coarse sand; damp.						
		3 6 10	18	10				0	1	--	8	67	25
25													
		5 6 11	18	11									
		5 6 7	18	12									
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40



FILE: 0121-3070-03 [11/5/2007 3:54 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-806 | *Location:* Sta. 884+38.2, 121.8 ft. LT of SR 823 CL | *Date Drilled:* 07/19/05 to 07/20/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
28.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
30	659.6						Very dense brown SILT (A-4b), some clay, trace fine to coarse sand; damp.							
		8 50/5	11	13										50+
35														
37.0	652.6						Severely weathered gray SANDSTONE argillaceous.							
		50/1	1	14										50+
39.5	650.1													
40		Core 24"	Rec 24"	RQD 88%	R1	*584	Soft to hard gray SANDSTONE interbedded with SILTSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, medium bedded to thickly bedded, moderately fractured, iron stained. @ 41.5'-42.6', iron staining. @ 42.8'-43.2', qu = 10,253 psi. @ 43.3'-44.5', SDI = 93.1%.							
45		Core 120"	Rec 115"	RQD 49%	R2	*284	@ 45.6'-47.0', shale layer.							
50														
55		Core 120"	Rec 120"	RQD 53%	R3	*348/416	@ 56.5'-62.6', contains few to moderate argillaceous laminations. @ 57.5'-59.7', qu = 1,627 psi, SDI = 19.2%.							
60														

Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:54 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-806 | *Location:* Sta. 884+38.2, 121.8 ft. LT of SR 823 CL | *Date Drilled:* 07/19/05 to 07/20/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
28.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	629.6						Soft to hard gray SANDSTONE interbedded with SILTSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, medium bedded to thickly bedded, moderately fractured, iron stained.						
62.2	627.4						Soft gray SHALE; very fine grained, highly weathered, arenaceous, micaceous, thinly laminated to laminated, very fissile, highly fractured to broken.						
65		Core 120"	Rec 118"	RQD 79%	R4	*452							
70													
75		Core 120"	Rec 119"	RQD 68%	R5		@ 75.5'-77.0', SDI = 23.3%.						
80													
81.5	608.1						Bottom of Boring - 81.5'						
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:54 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-808 | *Location:* Sta. 884+13.6, 107.6 ft. RT of SR 823 CL | *Date Drilled:* 07/26/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
3.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	673.1												
0.7	672.4						Topsoil - 8"						
		0 1 2	16	1		2.0	Stiff to very stiff brown SILT (A-4b), some clay, trace fine to coarse sand; moist.	0	4	--	5	69	22
3.0	670.1												
		2 4 5	18	2		3.0	Very stiff brown SILT AND CLAY (A-6a), trace to little fine to coarse sand; damp to moist.	0	2	--	10	62	26
5													
		10 9 10	0	3		--							
		4 5 6	18	4		2.75		0	0	--	8	66	26
10													
		4 7 9	18	5		2.0							
		2 2 11	18	6		2.5	@ 13.5', some fine to coarse sand, trace gravel; contains sandstone fragments.						
15													
		2 2 3	18	7		3.25		6	12	--	15	42	25
		15 18 50/2	14	8		2.5							
20													
20.5	652.6						Severely weathered brown SANDSTONE.						
		50/1	1	9									
		50/2	2	10			@ 23.5', gray.						
25.0	648.1						@ 25.0'-27.0', qu = 6,089 psi, SDI = 90.0%.						
		Core 84"	Rec 75"	RQD 38%	R1	*230	Medium hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, thickly bedded, moderately fractured. @ 25.5'-25.9', high angle fracture. @ 26.5'-26.7', 28.9'-30.1', moderate argillaceous laminations.						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

50+
50+
50+

FILE: 0121-3070-03 [11/5/2007 3:54 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-808 | *Location:* Sta. 884+13.6, 107.6 ft. RT of SR 823 CL | *Date Drilled:* 07/26/05

WATER OBSERVATIONS: Water seepage at: None
Water level at completion: None (Prior to coring)
3.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
30	643.1						Medium hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, thickly bedded, moderately fractured.						
35		Core 120"	Rec 117"	RQD 32%	R2	*357							
40													
42.0	631.1						Medium hard gray SILTSHALE interbedded with SANDSTONE; very fine grained, highly weathered, argillaceous, micaceous, pyritic, very thinly bedded to thinly bedded, slightly fractured (on bedding planes), few sandstone beds; fissile after dessication.						
45		Core 120"	Rec 120"	RQD 83%	R3	*260							
50							@ 51.1'-51.6', qu = 2,009 psi.						
55		Core 120"	Rec 120"	RQD 94%	R4								
60													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:54 PM]

DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (614)888-0040

Client: TranSystems, Inc. | *Project:* SCI-823-0.00 | *Job No.* 0121-3070.03

LOG OF: Boring R-808 | *Location:* Sta. 884+13.6, 107.6 ft. RT of SR 823 CL | *Date Drilled:* 07/26/05

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (Prior to coring)
3.0' (Includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf) / * Point-Load Strength (psi)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
60	613.1						Medium hard gray SILTSHALE interbedded with SANDSTONE; very fine grained, highly weathered, argillaceous, micaceous, pyritic, very thinly bedded to thinly bedded, slightly fractured (on bedding planes), few sandstone beds; fissile after dessication.						
62.0	611.1						Bottom of Boring - 62.0'						
65													
70													
75													
80													
85													
90													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ *LL*
Blows per foot - ○
10 20 30 40

FILE: 0121-3070-03 [11/5/2007 3:54 PM]

Results of Slake Durability Index and Uniaxial Compressive Tests

	Slake Durability Index Sample Depth			Unconfined Sample Dpeth									
Cut	Boring	Run	Depth	Run	Depth (ft.)	Rock Type	Unit Top Elevation	Unit Bottom Elevation	Unit RQD	Slake Durability Index	ODOT Rock Index Property Classification	Unconfined Compressive Strength (psi)	Rock Cut Slope Recommendations (Table A GB3) H:V
16	R-2475	2		2	17.7'-18.2'	Sandstone	853	836.6	80%	75	Good	7525	0.25:1 or 0.5:1
16	R-2475	3	30.4'-31.5'	3	30'-30.4'	Sandstone	836.6	792	90%	95.1	Very Good	9833	0.25:1 or 0.5:1
16	R-2475	5	44.7'-45.7'	5	45.7'-46.1'	Sandstone	836.6	792	90%	97.6	Very Good	9682	0.25:1 or 0.5:1
16	R-2475	7	65.6'-66.5'	7	65.1'-65.6'	Sandstone	836.6	792	90%	74.7	Very Good	9144	0.25:1 or 0.5:1
16	R-2475	9	89.2'-90'	9	90'-90.5'	Sandstone	792	770	93%	95	Very Good	10492	0.25:1 or 0.5:1
16	R-2480	1	13.9'-15.0'	1	13.5'-13.9'	Sandstone	926	914.5	85%	33.8	Good	1243	2.0:1
16	R-2480	1	16.3-17.7'	1		Sandstone	926	914.5	85%	95.9	Very Good	1243	2.0:1
16	R-2480	2	21.9'-23.0'	2	23.0'-23.4'	Sandstone	914.5	906	68%	43.1	Fair	4770	1.0:1
16	R-2480	4		4	42.8'-43.4'	Sandstone	906	891.7	99%		Very Good	3111	1.0:1
16	R-2480	5	54.3-55.3'	5	53.5'-54.0'	Sandstone	819.7	877	99%	98.1	Very Good	9358	0.25:1 or 0.5:1
16	R-2480	7	75.3'-76.2	7	74.8'-75.3'	Sandstone	877	798.5	100%	97.9	Very Good	11352	0.25:1 or 0.5:1
16	R-2480	9	96.0'-97.0'	9	95.4'-96.0'	Sandstone	877	798.5	100%	94.4	Very Good	11635	0.25:1 or 0.5:1
16	R-2480	11	112.1'-113.1'	11	111.5'-112.1'	Sandstone	877	798.5	100%	94.2	Very Good	11983	0.25:1 or 0.5:1
16	R-2490	1	9.5'-11.0'	1	9.1'-9.5'	Sandstone	897	867	89%	97	Very Good	8610	0.25:1 or 0.5:1
16	R-2490	2	20.7'-21.7'	2	21.7'-22.2'	Sandstone	897	867	89%	96.4	Very Good	8597	0.25:1 or 0.5:1
16	R-2490	4	410'-42.0'	4	40.6'-41.0'	Sandstone	867	805.3	100%	77.3	Very Good	10529	0.25:1 or 0.5:1
16	R-2490	6	58.4'-59.4'	6	57.9'-58.4'	Sandstone	867	805.3	100%	96.7	Very Good	10085	0.25:1 or 0.5:1
16	R-2490	7	71.0'-72..1'	7	70.6'-71.0'	Sandstone	867	805.3	100%	97.1	Very Good	11170	0.25:1 or 0.5:1
17	R-510	2	15.5'-16.4'	2	16.4'-16.9'	Sandstone	907	819	98%	97.6	Very Good	9,929	0.25:1 or 0.5:1
19	R-533	2	25.7'-27.0'	2	23.5'-23.8'	Sandstone	955	937	56%	61.9	Fair	2,138	1.0:1 or 1.5:1
19	R-533	2	30.8'-32.0'	2	30.5'-30.8'	Shale	937	933	48%	44.9	Poor	1,874	1.5:1 or 2.0:1
19	R-533	3	37.2'-38.1'	3	38.6'-39.1'	Sandstone	933	924	92%	94.1	Very Good	9,410	0.25:1 or 0.5:1
19	R-533	5	57.9'-58.9'	5	58.9'-59.8'	Sandstone	924	870	99%	98.4	Very Good	10,714	0.25:1 or 0.5:1
20	R-542	3	25.7'-26.9'	3	26.9'-27.3'	Shale	817	807	56%	35.7	Fair	1,888	1.5:1 or 2.0:1
21	R-2560	3	22.8'-23.8'	3	23.8'-24.3'	Shale	969	945	70%	50.9	Fair	2,223	1.0:1 or 1.5:1
21	R-2560	4	30.0'-31.0'	4	31.0'-31.4'	Sandstone	945	936	75%	59.3	Good	7,774	0.25:1 or 0.5:1
21	R-2560	5	40.5'-51.4'	5	41.6'-42.2'	Sandstone	936	928	80%	99.5	Very Good	9,550	0.25:1 or 0.5:1
21	R-2560	6	51.6'-52.5'	6	51.1'-51.6'	Sandstone	928	824	99%	98.1	Very Good	11,414	0.25:1 or 0.5:1
22	R-2574	1	10.7'-11.5'	1	11.5'-12.1'	Sandstone	934	927	96%	98.3	Very Good	7,770	0.25:1 or 0.5:1
22	R-2574	7	64.6'-65.5'	7	65.5'-66.0'	Sandstone	927	850	99%	86.7	Very Good	9,892	0.25:1 or 0.5:1
22	R-2574	10	101.1'-102.0'	10	100.6'-101.1'	Sandstone	850	830	95%	97.9	Very Good	9,899	0.25:1 or 0.5:1
22	R-2584	1	10.5'-11.5'	1	8.1'-8.6'	Sandstone	912	905	87%	98.3	Very Good	8,035	0.25:1 or 0.5:1
22	R-2584	3	28.5'-29.5'	3	28.0'-28.4'	Sandstone	905	834	100%	93.8	Very Good	10,611	0.25:1 or 0.5:1
22	R-2584	9	86.0'-86.9'	9	87.6'-88.1'	Sandstone	834	808	100%	94.1	Very Good	7,836	0.25:1 or 0.5:1
23	R-608	2	22.5'-23.5'	2	21.7'-22.1'	Sandstone	984	958	75%	70.1	Good	1,679	1.0:1
23	R-608			4	44.1'-44.5	Sandstone	958	950	94%	97.3	Very Good	8,705	0.25:1 or 0.5:1
23	R-608	5	50.0'-51.0'	5	49.4'-49.9'	Sandstone	947	938	98%	97.3	Very Good	6,005	0.25:1 or 0.5:1
24	R-608	6	62.0'-63.0'	6	63.0'-64.5'	Sandstone	938	921	99%	94.4	Very Good	11,452	0.25:1 or 0.5:1
24	R-624	2	20.4'-21.4'	2	20.0'-20.4'	Sandstone	847	840	60%	75.4	Fair	2,142	1.0:1 or 1.5:1
24	R-624	3	27.5'-28.4'	3	32.5'-33.1'	Sandstone	840	824	63%	64.6	Fair	3,731	1.0:1 or 1.5:1
24	R-624	3	35.2'-36.3'	3	36.0'-36.3'	Sandstone	840	824	85%	79.8	Very Good	2,469	1.0:1
24	R-626	1	27.6'-28.5'	1	27.2'-27.6'	Sandstone	955	947	85%	98.6	Very Good	7,133	0.25:1 or 0.5:1

	Slake Durability Index Sample Depth			Unconfined Sample									
Cut	Boring	Run	Depth	Run	Depth (ft.)	Rock Type	Unit Top Elevation	Unit Bottom Elevation	Unit RQD	Slake Durability Index	ODOT Rock Index Property Classification	Unconfined Compressive Strength (psi)	Rock Cut Slope Recommendations (Table A GB3) H:V
25	R-626	4	50.4'-51.5'	4	51.5'-51.9'	Sandstone	947	888	89%	97.9	Very Good	10,850	0.25:1 or 0.5:1
25	R-633	2	13.4'-14.5'	2	13.0'-13.4'	Sandstone	1006	996	89%	84.0	Very Good	3,645	0.25:1 or 0.5:1
25	R-633	3	20.2'-21.4'	3	21.4'-21.8'	Sandstone	996	992	71%	63.4	Very Good	1,013	1.0:1
25	R-633	3	26.3'-27.5'	3	26.8'-27.2'	Sandstone	992	979	88%	91.4	Very Good	3,491	0.25:1 or 0.5:1
25	R-633	5	43.2'-44.1'	5	44.1'-44.5'	Sandstone	979	963	80%	13.2	Very Good	2,069	1.0:1
25	R-633	6	56.8'-57.7'	6	58.4'-58.8'	Sandstone	963	942	90%	97.2	Very Good	10,116	0.25:1 or 0.5:1
26	R-633	7	63.5'-64.5'	7	64.5'-65.0'	Sandstone	963	942	90%	90.0	Very Good	8,887	0.25:1 or 0.5:1
26	R-633	10	95.2'-96.2'	10	96.2'-96.6'	Sandstone	942	866	100%	98.0	Very Good	9,874	0.25:1 or 0.5:1
26	R-658	3	25.4'-26.5'	3	25.0'-25.4'	Sandstone	1015	999	93%	98.4	Very Good	5,299	0.25:1 or 0.5:1
26	R-658	4	42.9'-44.0'	4	42.5'-42.9'		999	984	92%	82.2	Very Good	6,074	0.25:1 or 0.5:1
26	R-658	5	49.8'-50.8'	5	50.9'-51.3'		984	966	92%	66.8	Very Good	6,752	0.25:1 or 0.5:1
26	R-658	7	67.4'-68.4'	7	66.9'-67.4'	Sandstone	966	839	100%	99.0	Very Good	7,969	0.25:1 or 0.5:1
26	R-658	19	184.4'-185.4'			Sandstone	839	823	100%	81.0	Very Good	5,000	0.25:1 or 0.5:1
27	R-679	1	10.4'-11.6'	1	11.7'-12.1'	Sandstone	957	947	87%	98.1	Very Good	8,786	0.25:1 or 0.5:1
27	R-679	2	18.4'-19.1'	2	18.0'-18.4'	Sandstone	947	857	95%	98.1	Very Good	10,057	0.25:1 or 0.5:1
27	R-679	10	97.5'-98.5'	10	98.5'-98.9'	Sandstone	947	857	95%	98.5	Very Good	12,043	0.25:1 or 0.5:1
27	R-679	11	105.4'-106.3'	11	106.3'-106.8'	Sandstone	857	847	100%	89.6	Very Good	11,379	0.25:1 or 0.5:1
27	R-679	13	133.1'-134.0'			Sandstone	847	827	100%	86.6	Very Good	9,000	0.25:1 or 0.5:1
27	R-679	14	142.5'-143.6'	14	141.8'-142.2'	Shale	827	812	100%	76.8	Very Good	9,517	0.25:1 or 0.5:1
27	R-679	15	154.0'-155.0'	15	153.7'-154.0'	Sandstone	812	802	100%	80.6	Very Good	5,116	0.25:1 or 0.5:1
28	R-701	2	27.9'-28.9'	2	28.3'-28.7'	Sandstone	959	888	90%	98.0	Very Good	9,776	0.25:1 or 0.5:1
29	R-724	1	10.4'-11.4'	1	10.0'-10.4'	Sandstone	1026	1016	47%	92.9	Very Good	8,014	0.25:1 or 0.5:1
29	R-724	2	18.3'-19.3'	2	17.9'-18.3'	Sandstone	1016	999	77%	8.7	Good	1,969	1.0:1
29	R-724	3	28.0'-28.9'	3	27.5'-28.0'	Sandstone	1016	999	77%	11.4	Good	2,858	1.0:1
29	R-724			4	37.5'-38.0'	Sandstone	999	981	73%	60.0	Very Good	8,519	0.25:1 or 0.5:1
29	R-724	6	60.5'-61.5'	6	60.0'-60.5'	Sandstone	981	881	95%	98.8	Very Good	11,315	0.25:1 or 0.5:1
29	R-724	14	140.5'-141.4'	14	140.0'-140.5'	Sandstone	981	881	95%	98.7	Very Good	12,267	0.25:1 or 0.5:1
32	R-801	1	27.3-28.3	1	26.8-27.3	Sandstone	647.8	629.9	90%	99.0	Very Good	11,268	0.25:1 or 0.5:1
32	R-801	2	39-40	1	38.2-38.6	Sandstone	647.8	629.9	90%	94.5	Very Good	9,128	0.25:1 or 0.5:1
32	R-801	3	44.8-46.0	1	46-46.4	Shale	629.9	627.5	90%	37.8	Good	961	2.0:1
32	R-802	1	30-31.4	1	31.4-31.8	Shale	657.2	653.2	60%	3.8	Fair	1,083	2.0:1
32	R-802	2	38-39	2	38.2-38.6	Sandstone	653.7	635.8	85%	92.8	Very Good	10,521	0.25:1 or 0.5:1
32	R-802	4	55-56.4	4	56.4-56.9	Shale	635.8	628.7	95%	54.9	Very Good	3,534	0.25:1 or 0.5:1
32	R-803	2	41.5-42.8	2	42.8-43.2	Sandstone interbedded w/Shale	650..3	638.5	80%	88.0	Good	3,503	0.5:1 or 1:1
32	R-803	3	51.5-53.0	3	56.4-56.9	Shale	638.5	628.8	20%	12.7	Very Poor	<1000*	2.0:1
32	R-806	2	42.8-43.2	2	42.8-43.2	Sandstone	635.8	628.7	50%	93.1	Very Good	10,253	0.25:1 or 0.5:1
32	R-806	3	57.5-59.2	4	59.2-59.7	Shale	637.8	627.4	53%	19.2	Fair	1,627	1.0:1 or 1.5:1
32	R-806	5	75.5-77	0	0	Shale	627.4	608.1	70%	23.3	Fair	<1000*	2.0:1
32	R-808	1		1	26.6-27	Sandstone	648.1	637	35%	70*	Fair	6,089	0.5:1 or 1:1
32	R-808	3		3	51.1-51.6	Siltshale interbedded w/SS	637	611.1	89%	50*	Good	2,009	1.0:1

* or NA Sample could not be tested

	Slake Durability Index Sample Depth			Unconfined Sample									
Cut	Boring	Run	Depth	Run	Depth (ft.)	Rock Type	Unit Top Elevation	Unit Bottom Elevation	Unit RQD	Slake Durability Index	ODOT Rock Index Property Classification	Unconfined Compressive Strength (psi)	Rock Cut Slope Recommendations (Table A GB3) H:V
31	R-769		NA	2	11.6-12	Sandstone	1019.8	1000.5	66%	25	Fair	8,960	0.5:1 or 1:1
31	R-769		NA	4	35.9-36.3	Sandstone	1000.5	984.8	83%	25	Good	4,932	0.5:1 or 1:1
31	R-769	6	52.7-53.8	6	53.8-54.2	Sandstone	984.8	925.6	100%	95.6	Very Good	8,852	0.25:1 or 0.5:1
31	R-769	8	75.8-77	8	75.3-75.8	Sandstone	984.8	925.6	100%	86.2	Very Good	9,386	0.25:1 or 0.5:1
31	R-769	11	101.4-102.7	11	102.7-103.2	Sandstone	925.6	912.8	50%	97.9	Very Good	9,288	0.25:1 or 0.5:1
31	R-769	12	114.7-115.7	12	115.7-116.2	Sandstone	912.8	898.2	90%	97.2	Very Good	9,515	0.25:1 or 0.5:1
31	R-769	13	128.1-129.1	13	127.5-128.1	Sandstone	989.2	894.5	90%	93.8	Very Good	10,868	0.25:1 or 0.5:1
31	R-769		NA	14	135-135.6	Sandstone	894.5	884.8	100%	75	Very Good	9,740	0.25:1 or 0.5:1
31	R-769	15	147-148.7	15	148.7-148.2	Sandstone interbedded w/Shale	884.8	874.8	53%	73	Fair	7,214	0.5:1 or 1:1
31	R-769	17	168.5-170	17	168-168.5	Sandstone interbedded w/Shale	874.8	804.8	95%	73.5	Very Good	5,774	0.25:1 or 0.5:1
31	R-769	21	205-206.5		NA	Sandstone interbedded w/Shale	874.8	804.8	90%	79.6	Very Good	2,500	1.0:1
30	R-744	2	25-26.9	2	25-26.9	Sandstone	1018.6	1010.6	69%	70	Fair	2886	1H:1V or 1.5H:1V
30	R-744	3	40.4-42	3	40.4-42	Sandstone	1010.6	998.1	80%	98.2	Very Good	8220	.5H:1V
30	R-744	4	48-49.5	4	48-49.5	Sandstone	998.1	990.9	100%	98.1	Very Good	8067	.5H:1V
30	R-744	6	68.6-69.7	6	67-67.7	Sandstone	990.9	870.1	95%	97.8	Very Good	9926	.5H:1V
30	R-744	10	112-113.6	10	112-113.6	Sandstone	990.9	870.1	95%	83.7	Very Good	7725	.5H:1V
30	R-744	12	127.4-129	12	127.4-129	Sandstone	990.9	870.1	95%	97.5	Very Good	15368	.5H:1V
30	R-744	15	159-161.1	15	159.0-161.1	Sandstone	990.9	870.1	95%	96.1	Very Good	4080	.5H:1V
30	R-744			17	175.1-175.5	Shale interbedded w/sandstone	870.1	840	99%	75*	Very Good	2933	1H:1V
30	R-744	18	187.8-189.5	18	187.8-189.5	Shale interbedded w/sandstone	870.1	840	99%	78.9	Very Good	8181	.5H:1V

Colorado Rock Fall Simulation Analysis Examples & Data Disk

STA 552+00 Left Long Term Average Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 6
Analysis Point 1 X-Coordinate: 77.3
Analysis Point 2 X-Coordinate: 82.3
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 84.7
Initial Y-Base Starting Zone Coordinate: 74.7

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.21	0.8	0.18	0	84.7	17.3	60.1
2	0.21	0.8	0.18	17.3	60.1	37.3	30.1
3	0.21	0.8	0.18	37.3	30.1	52.3	0
4	0.21	0.8	0.2	52.3	0	62.3	0
5	0.21	0.8	0.2	62.3	0	77.3	5
6	0.1	0.9	0.9	77.3	5	82.3	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 6
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 77.3, Y = 5

Total Rocks Passing Analysis Point: 24

CRSP Analysis Point 2 Data

Analysis Point 2: X = 82.3, Y = 5

Total Rocks Passing Analysis Point: 10

STA 552+00 Left Long Term Maximum Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 6
Analysis Point 1 X-Coordinate: 77.3
Analysis Point 2 X-Coordinate: 82.3
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 84.7
Initial Y-Base Starting Zone Coordinate: 74.7

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.3	0.8	0.18	0	84.7	17.3	60.1
2	0.3	0.8	0.18	17.3	60.1	37.3	30.1
3	0.3	0.8	0.18	37.3	30.1	52.3	0
4	0.3	0.8	0.2	52.3	0	62.3	0
5	0.3	0.8	0.2	62.3	0	77.3	5
6	0.1	0.9	0.9	77.3	5	82.3	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 6
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 77.3, Y = 5

Total Rocks Passing Analysis Point: 17

CRSP Analysis Point 2 Data

Analysis Point 2: X = 82.3, Y = 5

Total Rocks Passing Analysis Point: 10

STA 552+00 Left New Construction Average Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 8
Analysis Point 1 X-Coordinate: 77.3
Analysis Point 2 X-Coordinate: 82.3
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 84.7
Initial Y-Base Starting Zone Coordinate: 74.7

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.12	0.85	0.2	0	84.7	12.3	60.1
2	0.12	0.85	0.2	12.3	60.1	17.3	60.1
3	0.12	0.85	0.2	17.3	60.1	32.3	30.1
4	0.12	0.85	0.2	32.3	30.1	37.3	30.1
5	0.12	0.85	0.2	37.3	30.1	52.3	0
6	0.12	0.85	0.2	52.3	0	62.3	0
7	0.12	0.85	0.2	62.3	0	77.3	5
8	0.1	0.9	0.9	77.3	5	82.3	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 8
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 77.3, Y = 5

Total Rocks Passing Analysis Point: 6

CRSP Analysis Point 2 Data

Analysis Point 2: X = 82.3, Y = 5

Total Rocks Passing Analysis Point: 3

STA 552+00 Left New Construction Maximum Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 8
Analysis Point 1 X-Coordinate: 77.3
Analysis Point 2 X-Coordinate: 82.3
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 84.7
Initial Y-Base Starting Zone Coordinate: 74.7

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.15	0.85	0.2	0	84.7	12.3	60.1
2	0.15	0.85	0.2	12.3	60.1	17.3	60.1
3	0.15	0.85	0.2	17.3	60.1	32.3	30.1
4	0.15	0.85	0.2	32.3	30.1	37.3	30.1
5	0.15	0.85	0.2	37.3	30.1	52.3	0
6	0.15	0.85	0.2	52.3	0	62.3	0
7	0.15	0.85	0.2	62.3	0	77.3	5
8	0.1	0.9	0.9	77.3	5	82.3	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 8
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 77.3, Y = 5

Total Rocks Passing Analysis Point: 7

CRSP Analysis Point 2 Data

Analysis Point 2: X = 82.3, Y = 5

Total Rocks Passing Analysis Point: 3

STA 555+00 Left Long Term Average Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 6
Analysis Point 1 X-Coordinate: 90.8
Analysis Point 2 X-Coordinate: 95.8
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 95.2
Initial Y-Base Starting Zone Coordinate: 85.2

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.21	0.8	0.18	0	95.2	16.4	78.7
2	0.21	0.8	0.18	16.4	78.7	55.3	21
3	0.21	0.8	0.18	55.3	21	65.8	0
4	0.21	0.8	0.2	65.8	0	75.8	0
5	0.21	0.8	0.18	75.8	0	90.8	5
6	0.1	0.9	0.9	90.8	5	95.8	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 6
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 90.8, Y = 5

Total Rocks Passing Analysis Point: 16

CRSP Analysis Point 2 Data

Analysis Point 2: X = 95.8, Y = 5

Total Rocks Passing Analysis Point: 7

STA 555+00 Left Long Term Maximum Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 6
Analysis Point 1 X-Coordinate: 90.8
Analysis Point 2 X-Coordinate: 95.8
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 95.2
Initial Y-Base Starting Zone Coordinate: 85.2

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.3	0.8	0.18	0	95.2	16.4	78.7
2	0.3	0.8	0.18	16.4	78.7	55.3	21
3	0.3	0.8	0.18	55.3	21	65.8	0
4	0.3	0.8	0.2	65.8	0	75.8	0
5	0.3	0.8	0.18	75.8	0	90.8	5
6	0.1	0.9	0.9	90.8	5	95.8	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 6
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 90.8, Y = 5

Total Rocks Passing Analysis Point: 16

CRSP Analysis Point 2 Data

Analysis Point 2: X = 95.8, Y = 5

Total Rocks Passing Analysis Point: 10

STA 555+00 Left New Construction Average Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 9
Analysis Point 1 X-Coordinate: 90.8
Analysis Point 2 X-Coordinate: 95.8
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 95.2
Initial Y-Base Starting Zone Coordinate: 85.2

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin	End X	End Y
1	0.12	0.85	0.2	0	95.2	16.4	78.7
2	0.12	0.85	0.2	16.4	78.7	30.3	51
3	0.12	0.85	0.2	30.3	51	35.3	51
4	0.12	0.85	0.2	35.3	51	50.3	21
5	0.12	0.85	0.2	50.3	21	55.3	21
6	0.12	0.85	0.2	55.3	21	65.8	0
7	0.12	0.85	0.2	65.8	0	75.8	0
8	0.12	0.85	0.2	75.8	0	90.8	5
9	0.1	0.9	0.9	90.8	5	95.8	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 9
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 90.8, Y = 5

Total Rocks Passing Analysis Point: 12

CRSP Analysis Point 2 Data

Analysis Point 2: X = 95.8, Y = 5

Total Rocks Passing Analysis Point: 5

STA 555+00 Left New Construction Maximum Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 9
Analysis Point 1 X-Coordinate: 90.8
Analysis Point 2 X-Coordinate: 95.8
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 95.2
Initial Y-Base Starting Zone Coordinate: 85.2

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.15	0.85	0.2	0	95.2	16.4	78.7
2	0.15	0.85	0.2	16.4	78.7	30.3	51
3	0.15	0.85	0.2	30.3	51	35.3	51
4	0.15	0.85	0.2	35.3	51	50.3	21
5	0.15	0.85	0.2	50.3	21	55.3	21
6	0.15	0.85	0.2	55.3	21	65.8	0
7	0.15	0.85	0.2	65.8	0	75.8	0
8	0.15	0.85	0.2	75.8	0	90.8	5
9	0.1	0.9	0.9	90.8	5	95.8	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 9
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 90.8, Y = 5

Total Rocks Passing Analysis Point: 12

CRSP Analysis Point 2 Data

Analysis Point 2: X = 95.8, Y = 5

Total Rocks Passing Analysis Point: 4

STA 556+00 Left Long Term Average Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 7
Analysis Point 1 X-Coordinate: 92
Analysis Point 2 X-Coordinate: 97
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 95.6
Initial Y-Base Starting Zone Coordinate: 85.6

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.21	0.8	0.18	0	95.6	18.4	77.1
2	0.21	0.8	0.18	18.4	77.1	37.4	49.1
3	0.21	0.8	0.18	37.4	49.1	57.4	19.1
4	0.21	0.8	0.18	57.4	19.1	67	0
5	0.21	0.8	0.2	67	0	77	0
6	0.21	0.8	0.2	77	0	92	5
7	0.1	0.9	0.9	92	5	97	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 7
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 92, Y = 5

Total Rocks Passing Analysis Point: 26

CRSP Analysis Point 2 Data

Analysis Point 2: X = 97, Y = 5

Total Rocks Passing Analysis Point: 13

STA 556+00 Left Long Term Maximum Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 7
Analysis Point 1 X-Coordinate: 92
Analysis Point 2 X-Coordinate: 97
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 95.6
Initial Y-Base Starting Zone Coordinate: 85.6

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.3	0.8	0.18	0	95.6	18.4	77.1
2	0.3	0.8	0.18	18.4	77.1	37.4	49.1
3	0.3	0.8	0.18	37.4	49.1	57.4	19.1
4	0.3	0.8	0.18	57.4	19.1	67	0
5	0.3	0.8	0.2	67	0	77	0
6	0.3	0.8	0.2	77	0	92	5
7	0.1	0.9	0.9	92	5	97	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 7
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 92, Y = 5

Total Rocks Passing Analysis Point: 27

CRSP Analysis Point 2 Data

Analysis Point 2: X = 97, Y = 5

Total Rocks Passing Analysis Point: 16

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 556+00\Left\STA 556+00 Left NC-max.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 9
Analysis Point 1 X-Coordinate: 92
Analysis Point 2 X-Coordinate: 97
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 95.6
Initial Y-Base Starting Zone Coordinate: 85.6

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.12	.85	.2	0	95.6	18.4	77.1
2	.12	.85	.2	18.4	77.1	32.4	49.1
3	.12	.85	.2	32.4	49.1	37.4	49.1
4	.12	.85	.2	37.4	49.1	52.4	19.1
5	.12	.85	.2	52.4	19.1	57.4	19.1
6	.12	.85	.2	57.4	19.1	67	0
7	.12	.85	.2	67	0	77	0
8	.12	.85	.2	77	0	92	5
9	.1	.9	.9	92	5	97	5.4

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 556+00\Left\STA 556+00 Left NC-max.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 9
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 556+00\Left\STA 556+00 Left NC-max.dat

Analysis Point 1: X = 92, Y = 5

Total Rocks Passing Analysis Point: 10

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	7.24	167	0.02
75%	8.66	226	3.55
90%	9.94	279	6.72
95%	10.71	311	8.63
98%	11.57	347	10.77

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 10.04	Maximum: .09	Maximum: 297
Average: 7.24	Average: .04	Average: 167
Minimum: 4.06	G. Mean: .02	Std. Dev.: 87
Std. Dev.: 2.11	Std. Dev.: 5.23	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 556+00\Left\STA 556+00 Left NC-max.dat

Analysis Point 2: X = 97, Y = 5

Total Rocks Passing Analysis Point: 7

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	5.7	98	0.25
75%	6.96	142	1.36
90%	8.1	182	2.36
95%	8.78	205	2.97
98%	9.54	232	3.64

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 8.3 Maximum: .41	Maximum: 193	
Average: 5.7 Average: .27	Average: 98	
Minimum: 3.56	G. Mean: .25	Std. Dev.: 65
Std. Dev.: 1.87	Std. Dev.: 1.65	

Remarks:

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 556+00\Left\STA 556+00 Left NC-max.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	28	22	2.88	1	0
2	50	42	4.41	13	3
3	49	14	6.2	4	0
4	55	36	4.11	23	8
5	47	23	14.48	16	3
6	59	36	11.67	21	7
7	61	13	8.59	11	0
8	10	7	2.11	0	0
9	8	6	1.87	0	0

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 556+00\Left\STA 556+00 Left NC-max.dat

X Interval	Rocks Stopped
0 To 10 ft	0
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	0
50 To 60 ft	17
60 To 70 ft	1
70 To 80 ft	242
80 To 90 ft	221
90 To 97 ft	12

STA 556+00 Left New Construction Maximun Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 9
Analysis Point 1 X-Coordinate: 92
Analysis Point 2 X-Coordinate: 97
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 95.6
Initial Y-Base Starting Zone Coordinate: 85.6

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.15	0.85	0.2	0	95.6	18.4	77.1
2	0.15	0.85	0.2	18.4	77.1	32.4	49.1
3	0.15	0.85	0.2	32.4	49.1	37.4	49.1
4	0.15	0.85	0.2	37.4	49.1	52.4	19.1
5	0.15	0.85	0.2	52.4	19.1	57.4	19.1
6	0.15	0.85	0.2	57.4	19.1	67	0
7	0.15	0.85	0.2	67	0	77	0
8	0.15	0.85	0.2	77	0	92	5
9	0.1	0.9	0.9	92	5	97	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 9
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 92, Y = 5

Total Rocks Passing Analysis Point: 10

CRSP Analysis Point 2 Data

Analysis Point 2: X = 97, Y = 5

Total Rocks Passing Analysis Point: 3

STA 556+00 Left New Construction Average Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 9
Analysis Point 1 X-Coordinate: 92
Analysis Point 2 X-Coordinate: 97
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 95.6
Initial Y-Base Starting Zone Coordinate: 85.6

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.12	0.85	0.2	0	95.6	18.4	77.1
2	0.12	0.85	0.2	18.4	77.1	32.4	49.1
3	0.12	0.85	0.2	32.4	49.1	37.4	49.1
4	0.12	0.85	0.2	37.4	49.1	52.4	19.1
5	0.12	0.85	0.2	52.4	19.1	57.4	19.1
6	0.12	0.85	0.2	57.4	19.1	67	0
7	0.12	0.85	0.2	67	0	77	0
8	0.12	0.85	0.2	77	0	92	5
9	0.1	0.9	0.9	92	5	97	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 9
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 92, Y = 5

Total Rocks Passing Analysis Point: 10

CRSP Analysis Point 2 Data

Analysis Point 2: X = 97, Y = 5

Total Rocks Passing Analysis Point: 7

STA 556+50 Right Long Term Average Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 8
Analysis Point 1 X-Coordinate: 121.6
Analysis Point 2 X-Coordinate: 126.6
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 108.8
Initial Y-Base Starting Zone Coordinate: 94.9

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.21	0.8	0.18	0	108.8	27.9	94.4
2	0.21	0.8	0.18	27.9	94.4	50.8	72
3	0.21	0.8	0.18	50.8	72	69.6	44.4
4	0.21	0.8	0.18	69.6	44.4	89.6	14.4
5	0.21	0.8	0.18	89.6	14.4	96.6	0
6	0.21	0.8	0.2	96.6	0	106.6	0
7	0.21	0.8	0.2	106.6	0	121.6	5
8	0.1	0.9	0.9	121.6	5	126.6	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 8
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 121.6, Y = 5

Total Rocks Passing Analysis Point: 12

CRSP Analysis Point 2 Data

Analysis Point 2: X = 126.6, Y = 5

Total Rocks Passing Analysis Point: 7

STA 556+50 Right Long Term Maximum Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 8
Analysis Point 1 X-Coordinate: 121.6
Analysis Point 2 X-Coordinate: 126.6
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 108.8
Initial Y-Base Starting Zone Coordinate: 94.9

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.3	0.8	0.18	0	108.8	27.9	94.4
2	0.3	0.8	0.18	27.9	94.4	50.8	72
3	0.3	0.8	0.18	50.8	72	69.6	44.4
4	0.3	0.8	0.18	69.6	44.4	89.6	14.4
5	0.3	0.8	0.18	89.6	14.4	96.6	0
6	0.3	0.8	0.2	96.6	0	106.6	0
7	0.3	0.8	0.2	106.6	0	121.6	5
8	0.1	0.9	0.9	121.6	5	126.6	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 8
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 121.6, Y = 5

Total Rocks Passing Analysis Point: 32

CRSP Analysis Point 2 Data

Analysis Point 2: X = 126.6, Y = 5

Total Rocks Passing Analysis Point: 21

STA 556+50 Right New Construction Average Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 10
Analysis Point 1 X-Coordinate: 121.6
Analysis Point 2 X-Coordinate: 126.6
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 108.8
Initial Y-Base Starting Zone Coordinate: 98.8

Cell Data

Cell	S.R.	Tang. C.	Norm. C	Begin X	Begin Y	End X	End Y
1	0.12	0.85	0.2	0	108.8	27.9	94.9
2	0.12	0.85	0.2	27.9	94.9	50.8	72
3	0.12	0.85	0.2	50.8	72	64.6	44.4
4	0.12	0.85	0.2	64.6	44.4	69.6	44.4
5	0.12	0.85	0.2	69.6	44.4	84.6	14.4
6	0.12	0.85	0.2	84.6	14.4	89.6	14.4
7	0.12	0.85	0.2	89.6	14.4	96.6	0
8	0.12	0.85	0.2	96.6	0	106.6	0
9	0.12	0.85	0.2	106.6	0	121.6	5
10	0.1	0.9	0.9	121.6	5	126.6	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 10
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 121.6, Y = 5

NO ROCKS PAST ANALYSIS POINT 1

CRSP Analysis Point 2 Data

Analysis Point 2: X = 126.6, Y = 5

NO ROCKS PAST ANALYSIS POINT 2

STA 556+50 Right New Construction Maximum Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 10
Analysis Point 1 X-Coordinate: 121.6
Analysis Point 2 X-Coordinate: 126.6
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 108.8
Initial Y-Base Starting Zone Coordinate: 98.8

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.15	0.85	0.2	0	108.8	27.9	94.9
2	0.15	0.85	0.2	27.9	94.9	50.8	72
3	0.15	0.85	0.2	50.8	72	64.6	44.4
4	0.15	0.85	0.2	64.6	44.4	69.6	44.4
5	0.15	0.85	0.2	69.6	44.4	84.6	14.4
6	0.15	0.85	0.2	84.6	14.4	89.6	14.4
7	0.15	0.85	0.2	89.6	14.4	96.6	0
8	0.15	0.85	0.2	96.6	0	106.6	0
9	0.15	0.85	0.2	106.6	0	121.6	5
10	0.1	0.9	0.9	121.6	5	126.6	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 10
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 121.6, Y = 5

NO ROCKS PAST ANALYSIS POINT 1

CRSP Analysis Point 2 Data

Analysis Point 2: X = 126.6, Y = 5

NO ROCKS PAST ANALYSIS POINT 2

STA 562+50 Right Long Term Average Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 7
Analysis Point 1 X-Coordinate: 90.2
Analysis Point 2 X-Coordinate: 95.2
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 87.5
Initial Y-Base Starting Zone Coordinate: 77.5

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.21	0.8	0.18	0	87.5	20.4	67.1
2	0.21	0.8	0.18	20.4	67.1	39.4	39.1
3	0.21	0.8	0.18	39.4	39.1	59.4	9.1
4	0.21	0.8	0.18	59.4	9.1	64	0
5	0.21	0.8	0.2	64	0	74	0
6	0.21	0.8	0.2	74	0	90.2	5
7	0.1	0.9	0.9	90.2	5	95.2	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 7
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 90.2, Y = 5

Total Rocks Passing Analysis Point: 42

CRSP Analysis Point 2 Data

Analysis Point 2: X = 95.2, Y = 5

Total Rocks Passing Analysis Point: 21

STA 562+50 Right Long Term Maximum Average Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 7
Analysis Point 1 X-Coordinate: 90.2
Analysis Point 2 X-Coordinate: 95.2
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 87.5
Initial Y-Base Starting Zone Coordinate: 77.5

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.3	0.8	0.18	0	87.5	20.4	67.1
2	0.3	0.8	0.18	20.4	67.1	39.4	39.1
3	0.3	0.8	0.18	39.4	39.1	59.4	9.1
4	0.3	0.8	0.18	59.4	9.1	64	0
5	0.3	0.8	0.2	64	0	74	0
6	0.3	0.8	0.2	74	0	90.2	5
7	0.1	0.9	0.9	90.2	5	95.2	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 7
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 90.2, Y = 5

Total Rocks Passing Analysis Point: 44

CRSP Analysis Point 2 Data

Analysis Point 2: X = 95.2, Y = 5

Total Rocks Passing Analysis Point: 21

STA 562+50 Right New Construction Average Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 9
Analysis Point 1 X-Coordinate: 90.2
Analysis Point 2 X-Coordinate: 95.2
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 87.5
Initial Y-Base Starting Zone Coordinate: 77.5

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.12	0.85	0.2	0	87.5	21.7	67.1
2	0.12	0.85	0.2	21.7	67.1	35.7	39.1
3	0.12	0.85	0.2	35.7	39.1	40.7	39.1
4	0.12	0.85	0.2	40.7	39.1	55.7	9.1
5	0.12	0.85	0.2	55.7	9.1	60.7	9.1
6	0.12	0.85	0.2	60.7	9.1	65.2	0
7	0.12	0.85	0.2	65.2	0	75.2	0
8	0.12	0.85	0.2	75.2	0	90.2	5
9	0.1	0.9	0.9	90.2	5	95.2	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 9
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 90.2, Y = 5

Total Rocks Passing Analysis Point: 2

CRSP Analysis Point 2 Data

Analysis Point 2: X = 95.2, Y = 5

Total Rocks Passing Analysis Point: 1

STA 562+50 Right New Construction Maximum Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 9
Analysis Point 1 X-Coordinate: 90.2
Analysis Point 2 X-Coordinate: 95.2
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 87.5
Initial Y-Base Starting Zone Coordinate: 77.5

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.15	0.85	0.2	0	87.5	21.7	67.1
2	0.15	0.85	0.2	21.7	67.1	35.7	39.1
3	0.15	0.85	0.2	35.7	39.1	40.7	39.1
4	0.15	0.85	0.2	40.7	39.1	55.7	9.1
5	0.15	0.85	0.2	55.7	9.1	60.7	9.1
6	0.15	0.85	0.2	60.7	9.1	65.2	0
7	0.15	0.85	0.2	65.2	0	75.2	0
8	0.15	0.85	0.2	75.2	0	90.2	5
9	0.1	0.9	0.9	90.2	5	95.2	5.4

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 9
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 90.2, Y = 5

Total Rocks Passing Analysis Point: 1

CRSP Analysis Point 2 Data

Analysis Point 2: X = 95.2, Y = 5

Total Rocks Passing Analysis Point: 1

STA 585+00\Left\STA 585+00 LT AVG.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 8
Analysis Point 1 X-Coordinate: 81
Analysis Point 2 X-Coordinate: 84.7
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 82.1
Initial Y-Base Starting Zone Coordinate: 72.1

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.21	.8	.18	0	82.1	15.5	61
2	.21	.8	.18	15.5	61	23	46
3	.21	.8	.18	23	46	35.5	31
4	.21	.8	.18	35.5	31	43	6
5	.21	.8	.18	43	6	56	0
6	.21	.8	.2	56	0	66	0
7	.21	.8	.2	66	0	81	5
8	.21	.8	.2	81	5	84.7	5.3

STA 585+00\Left\STA 585+00 LT AVG.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 8
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

STA 585+00\Left\STA 585+00 LT AVG.dat

Analysis Point 1: X = 81, Y = 5

Total Rocks Passing Analysis Point: 13

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)

50%	4.85	91	0.02
75%	6.22	141	4.01
90%	7.45	185	7.6
95%	8.19	212	9.75
98%	9.02	242	12.17

Velocity (ft/sec) Bounce Height (ft) Kinetic Energy (ft-lb)

Maximum: 8.43 Maximum: .23 Maximum: 266
Average: 4.85 Average: .05 Average: 91
Minimum: 2.5 G. Mean: .02 Std. Dev.: 73
Std. Dev.: 2.03 Std. Dev.: 5.91

Remarks:

STA 585+00\Left\STA 585+00 LT AVG.dat

Analysis Point 2: X = 84.7, Y = 5

Total Rocks Passing Analysis Point: 3

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	4.44	59	0
75%	4.44	59	0.68
90%	4.44	59	1.28
95%	4.44	59	1.65
98%	4.44	59	2.06

Velocity (ft/sec) Bounce Height (ft) Kinetic Energy (ft-lb)

Maximum: 6.2 Maximum: .01 Maximum: 109
Average: 4.44 Average: -.04 Average: 59
Minimum: 3.08 G. Mean: 0 Std. Dev.: 0
Std. Dev.: 0 Std. Dev.: 1

Remarks:

Phase II CRSP Analyses\STA 585+00\Left\STA 585+00 LT AVG.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	32	24	2.87	3	0
2	44	35	3.68	9	3
3	50	36	3.64	6	2
4	62	44	4.53	22	17
5	61	39	15.26	13	2
6	27	16	5.15	2	0
7	8	5	2.03	0	0
8	6	4	0	0	-1

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 585+00\Left\STA 585+00 LT AVG.dat

X Interval	Rocks Stopped
0 To 10 ft	0
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	134
70 To 80 ft	342
80 To 84.7 ft	21

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope LT max.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 11
Analysis Point 1 X-Coordinate: 107.2
Analysis Point 2 X-Coordinate: 112.2
Analysis Point 3 X-Coordinate: 115
Initial Y-Top Starting Zone Coordinate: 87.6
Initial Y-Base Starting Zone Coordinate: 70

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.3	0.5	0.15	0	87.6	37.9	68.5
2	0.3	0.8	0.18	37.9	68.5	51.3	42
3	0.3	0.8	0.18	51.3	42	57.9	38.7
4	0.3	0.8	0.18	57.9	38.7	71.2	12
5	0.3	0.8	0.18	71.2	12	77.9	8.7
6	0.3	0.8	0.18	77.9	8.7	82.2	0
7	0.3	0.8	0.3	82.2	0	92.2	0
8	0.3	0.8	0.3	92.2	0	107.2	5
9	0.3	0.8	0.3	107.2	5	112.2	6
10	0.1	0.9	0.9	112.2	6	115	6
11	0.1	0.9	0.9	115	6	116	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope LT max.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 11
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope LT max.dat

Analysis Point 1: X = 107.2, Y = 5

NO ROCKS PAST ANALSYSIS POINT 1

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope LT max.dat

Analysis Point 2: X = 112.2, Y = 6

NO ROCKS PAST ANALSYSIS POINT 2

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope LT max.dat

Analysis Point 3: X = 115, Y = 6

NO ROCKS PAST ANALSYSIS POINT 3

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope LT max.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	14	8	2.12	0	0
2	40	32	4.16	8	3
3	39	21	4.79	2	0
4	54	36	5.22	21	12
5	49	35	12.45	15	4
6	54	40	12.95	16	6
7	31	12	5	2	0
8	No rocks past end of cell				
9	No rocks past end of cell				
10	No rocks past end of cell				

11 No rocks past end of cell

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope LT max.dat

X Interval	Rocks Stopped
0 To 10 ft	113
10 To 20 ft	115
20 To 30 ft	120
30 To 40 ft	64
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	0
80 To 90 ft	22
90 To 100 ft	56
100 To 110 ft	10
110 To 116 ft	0

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope LT max.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 11
Analysis Point 1 X-Coordinate: 107.2
Analysis Point 2 X-Coordinate: 112.2
Analysis Point 3 X-Coordinate: 115
Initial Y-Top Starting Zone Coordinate: 87.6
Initial Y-Base Starting Zone Coordinate: 70

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.3	0.5	0.15	0	87.6	37.9	68.5
2	0.3	0.8	0.18	37.9	68.5	51.3	42
3	0.3	0.8	0.18	51.3	42	57.9	38.7
4	0.3	0.8	0.18	57.9	38.7	71.2	12
5	0.3	0.8	0.18	71.2	12	77.9	8.7
6	0.3	0.8	0.18	77.9	8.7	82.2	0
7	0.3	0.8	0.3	82.2	0	92.2	0
8	0.3	0.8	0.3	92.2	0	107.2	5
9	0.3	0.8	0.3	107.2	5	112.2	6
10	0.1	0.9	0.9	112.2	6	115	6
11	0.1	0.9	0.9	115	6	116	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope LT max.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 11
Rock Density: 165 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope LT max.dat

Analysis Point 1: X = 107.2, Y = 5

Total Rocks Passing Analysis Point: 6

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	5.02	277	0.01
75%	5.57	332	4.8
90%	6.07	382	9.1
95%	6.36	411	11.69
98%	6.7	445	14.59

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 6.17	Maximum: .05	Maximum: 391
Average: 5.02	Average: .02	Average: 277
Minimum: 3.86	G. Mean: .01	Std. Dev.: 81
Std. Dev.: .82	Std. Dev.: 7.09	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope LT max.dat

Analysis Point 2: X = 112.2, Y = 6

NO ROCKS PAST ANALSYSIS POINT 2

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope LT max.dat

Analysis Point 3: X = 115, Y = 6

NO ROCKS PAST ANALSYSIS POINT 3

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope LT max.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	16	9	2.58	0	0
2	42	33	3.36	5	2
3	30	23	3.01	2	0
4	46	38	2.91	21	13
5	51	41	10.29	17	5
6	56	45	11.08	20	6
7	55	14	6.75	4	0
8	6	5	.82	0	0
9	No rocks	past end of cell			
10	No rocks	past end of cell			
11	No rocks	past end of cell			

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope LT max.dat

X Interval	Rocks Stopped
0 To 10 ft	78
10 To 20 ft	96
20 To 30 ft	95
30 To 40 ft	64
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	0
80 To 90 ft	5
90 To 100 ft	115
100 To 110 ft	47
110 To 116 ft	0

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Left\STA 593+50 Left Slope LT.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 11
Analysis Point 1 X-Coordinate: 107.2
Analysis Point 2 X-Coordinate: 112.2
Analysis Point 3 X-Coordinate: 115
Initial Y-Top Starting Zone Coordinate: 87.6
Initial Y-Base Starting Zone Coordinate: 70

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.3	.5	.15	0	87.6	37.9	68.5
2	.15	.85	.2	37.9	68.5	51.3	42.0
3	.15	.85	.2	51.3	42.0	57.9	38.7
4	.15	.85	.2	57.9	38.7	71.2	12
5	.15	.85	.2	71.2	12	77.9	8.7
6	.15	.85	.2	77.9	8.7	82.2	0
7	.15	.85	.2	82.2	0	92.2	0
8	.15	.85	.2	92.2	0	107.2	5
9	.15	.85	.2	107.2	5	112.2	6
10	.1	.9	.9	112.2	6	115	6
11	.1	.9	.9	115	6	116	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Left\STA 593+50 Left Slope LT.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 11
Rock Density: 165 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.0 ft
Thickness: 1.0 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Left\STA 593+50 Left Slope LT.dat

Analysis Point 1: X = 107.2, Y = 5

Total Rocks Passing Analysis Point: 1

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	8.65	265	0.34
75%	8.65	265	1.02
90%	8.65	265	1.62
95%	8.65	265	1.99
98%	8.65	265	2.4

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 8.65	Maximum: .34	Maximum: 265
Average: 8.65	Average: .34	Average: 265
Minimum: 8.65	G. Mean: .34	Std. Dev.: 0
Std. Dev.: 0	Std. Dev.: 1	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Left\STA 593+50 Left Slope LT.dat

Analysis Point 2: X = 112.2, Y = 6

Total Rocks Passing Analysis Point: 1

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	4	48	0
75%	4	48	0.68
90%	4	48	1.28
95%	4	48	1.65
98%	4	48	2.06

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 4	Maximum: 0	Maximum: 48
Average: 4	Average: -.06	Average: 48
Minimum: 4	G. Mean: 0	Std. Dev.: 0
Std. Dev.: 0	Std. Dev.: 1	

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Left\STA 593+50 Left Slope LT.dat

Analysis Point 3: X = 115, Y = 6

NO ROCKS PAST ANALSYSIS POINT 3

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Left\STA 593+50 Left Slope LT.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	13	8	2.02	0	0
2	39	34	2.65	4	1
3	29	25	2.24	1	0
4	42	38	2.26	20	14
5	50	43	7.68	15	6
6	56	48	8.61	18	7
7	24	12	4.29	1	0
8	9	9	0	0	0
9	4	4	0	0	-1
10	No rocks	past end of cell			
11	No rocks	past end of cell			

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Left\STA 593+50 Left Slope LT.dat

X Interval	Rocks Stopped
0 To 10 ft	112
10 To 20 ft	119
20 To 30 ft	118
30 To 40 ft	65
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	0
80 To 90 ft	1
90 To 100 ft	72
100 To 110 ft	12
110 To 116 ft	1

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Left\STA 593+50 Left Slope.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 14
Analysis Point 1 X-Coordinate: 107.2
Analysis Point 2 X-Coordinate: 112.2
Analysis Point 3 X-Coordinate: 115
Initial Y-Top Starting Zone Coordinate: 87.6
Initial Y-Base Starting Zone Coordinate: 70

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.3	.5	.15	0	87.6	17.8	78.9
2	.15	.85	.2	17.8	78.9	27.8	78.9
3	.15	.85	.2	27.8	78.9	31.2	72
4	.15	.85	.2	31.2	72	36.2	72
5	.15	.85	.2	36.2	72	51.2	42.2
6	.15	.85	.2	51.2	42.2	56.2	42.2
7	.15	.85	.2	56.2	42.2	71.2	12
8	.15	.85	.2	71.2	12	76.2	12
9	.15	.85	.2	76.2	12	82.2	0
10	.15	.85	.2	82.2	0	92.2	0
11	.15	.85	.2	92.2	0	107.2	5
12	.15	.85	.2	107.2	5	112.2	6
13	.15	.85	.2	112.2	6	115	6
14	.1	.9	.9	115	6	116	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Left\STA 593+50 Left Slope.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 14
Rock Density: 150 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Left\STA 593+50 Left Slope.dat

Analysis Point 1: X = 107.2, Y = 5

Total Rocks Passing Analysis Point: 4

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	6.93	174	0.02
75%	6.93	174	0.7
90%	6.93	174	1.3
95%	6.93	174	1.67
98%	6.93	174	2.08

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 11.69	Maximum: .22	Maximum: 439
Average: 6.93	Average: .07	Average: 174
Minimum: 4.05	G. Mean: .02	Std. Dev.: 0
Std. Dev.: 0 Std. Dev.: 1		

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Left\STA 593+50 Left Slope.dat

Analysis Point 2: X = 112.2, Y = 6

Total Rocks Passing Analysis Point: 1

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	7.13	152	0.16
75%	7.13	152	0.84
90%	7.13	152	1.44
95%	7.13	152	1.81
98%	7.13	152	2.22

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 7.13	Maximum: .16	Maximum: 152
Average: 7.13	Average: .16	Average: 152
Minimum: 7.13	G. Mean: .16	Std. Dev.: 0
Std. Dev.: 0 Std. Dev.: 1		

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Left\STA 593+50 Left Slope.dat

Analysis Point 3: X = 115, Y = 6

Total Rocks Passing Analysis Point: 1

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	6.29	108	0
75%	6.29	108	0.68
90%	6.29	108	1.29
95%	6.29	108	1.65
98%	6.29	108	2.06

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 6.29	Maximum: 0	Maximum: 108
Average: 6.29	Average: 0	Average: 108
Minimum: 6.29	G. Mean: 0	Std. Dev.: 0
Std. Dev.: 0	Std. Dev.: 1	

Remarks:

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Left\STA 593+50 Left Slope.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	No rocks	past end of cell			
2	No rocks	past end of cell			
3	20	12	3.75	1	0
4	9	5	1.5	0	-1
5	40	34	2.54	5	1
6	20	14	3.23	1	0
7	46	37	3.99	19	8
8	47	22	16.05	11	2
9	55	32	13.02	12	4
10	34	11	6.2	2	0
11	12	7	0	0	0
12	7	7	0	0	0

13	6	6	0	0	0
14	6	6	0	0	0

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Left\STA 593+50 Left Slope.dat

X Interval	Rocks Stopped
0 To 10 ft	248
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	134
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	10
80 To 90 ft	25
90 To 100 ft	74
100 To 110 ft	7
110 To 116 ft	1

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 14
Analysis Point 1 X-Coordinate: 107.2
Analysis Point 2 X-Coordinate: 112.2
Analysis Point 3 X-Coordinate: 115
Initial Y-Top Starting Zone Coordinate: 87.6
Initial Y-Base Starting Zone Coordinate: 70

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.3	.5	.15	0	87.6	17.8	78.9
2	.15	.85	.2	17.8	78.9	27.8	78.9
3	.15	.85	.2	27.8	78.9	31.2	72
4	.15	.85	.2	31.2	72	36.2	72
5	.15	.85	.2	36.2	72	51.2	42.2
6	.15	.85	.2	51.2	42.2	56.2	42.2
7	.15	.85	.2	56.2	42.2	71.2	12
8	.15	.85	.2	71.2	12	76.2	12
9	.15	.85	.2	76.2	12	82.2	0
10	.15	.85	.2	82.2	0	92.2	0
11	.15	.85	.2	92.2	0	107.2	5
12	.15	.85	.2	107.2	5	112.2	6
13	.15	.85	.2	112.2	6	115	6
14	.1	.9	.9	115	6	116	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 14
Rock Density: 165 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope.dat

Analysis Point 1: X = 107.2, Y = 5

Total Rocks Passing Analysis Point: 2

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	6.31	437	0
75%	6.31	437	0.68
90%	6.31	437	1.29
95%	6.31	437	1.65
98%	6.31	437	2.06

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 7.75	Maximum: .02	Maximum: 614
Average: 6.31	Average: -.01	Average: 437
Minimum: 4.87	G. Mean: 0	Std. Dev.: 0
Std. Dev.: 0	Std. Dev.: 1	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope.dat

Analysis Point 2: X = 112.2, Y = 6

NO ROCKS PAST ANALSYSIS POINT 2

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope.dat

Analysis Point 3: X = 115, Y = 6

NO ROCKS PAST ANALSYSIS POINT 3

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	No rocks	past end of cell			
2	No rocks	past end of cell			
3	20	13	3.8	1	0
4	9	6	1.54	0	-1
5	40	35	1.91	3	1
6	21	15	2.37	1	0
7	45	37	3.41	20	11
8	47	24	17.12	12	2
9	54	33	12.52	12	3
10	31	12	6.06	2	0
11	8	6	0	0	-1
12	No rocks	past end of cell			
13	No rocks	past end of cell			
14	No rocks	past end of cell			

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50\STA 593+50 Left\STA 593+50 Left Slope.dat

X Interval	Rocks Stopped
0 To 10 ft	248
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	93
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	4
80 To 90 ft	33
90 To 100 ft	88
100 To 110 ft	33
110 To 116 ft	1

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Right\STA 593+50 Right Slope LT.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 10
Analysis Point 1 X-Coordinate: 103.3
Analysis Point 2 X-Coordinate: 108.3
Analysis Point 3 X-Coordinate: 115
Initial Y-Top Starting Zone Coordinate: 85.8
Initial Y-Base Starting Zone Coordinate: 50

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.3	0.5	0.15	0	85.8	33.3	69.8
2	0.15	0.85	0.2	33.3	69.8	43.3	50
3	0.15	0.85	0.2	43.3	50	49.8	46.9
4	0.15	0.85	0.2	49.8	46.9	63.3	20
5	0.15	0.85	0.2	63.3	20	69.7	17.2
6	0.15	0.85	0.2	69.7	17.2	78.3	0
7	0.15	0.85	0.2	78.3	0	88.3	0
8	0.15	0.85	0.2	88.3	0	103.3	5
9	0.1	0.9	0.9	103.3	5	108.3	6
10	0.1	0.9	0.9	108.3	6	115	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Right\STA 593+50 Right Slope LT.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 10
Rock Density: 165 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Right\STA 593+50 Right Slope LT.dat

Analysis Point 1: X = 103.3, Y = 5

Total Rocks Passing Analysis Point: 7

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	5.18	357	0
75%	6.71	609	5.42
90%	8.08	836	10.3
95%	8.91	973	13.22
98%	9.84	1126	16.5

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 10.07	Maximum: .2	Maximum: 1193
Average: 5.18	Average: .01	Average: 357
Minimum: 3.12	G. Mean: 0	Std. Dev.: 374
Std. Dev.: 2.26	Std. Dev.: 8.02	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Right\STA 593+50 Right Slope LT.dat

Analysis Point 2: X = 108.3, Y = 6

Total Rocks Passing Analysis Point: 1

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	8.01	715	0.14
75%	8.01	715	0.82
90%	8.01	715	1.42
95%	8.01	715	1.79
98%	8.01	715	2.2

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 8.01	Maximum: .14	Maximum: 715
Average: 8.01	Average: .14	Average: 715
Minimum: 8.01	G. Mean: .14	Std. Dev.: 0
Std. Dev.: 0 Std. Dev.: 1		

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Right\STA 593+50 Right Slope LT.dat

Analysis Point 3: X = 115, Y = 6

Total Rocks Passing Analysis Point: 1

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	7.47	542	0.16
75%	7.47	542	0.83
90%	7.47	542	1.44
95%	7.47	542	1.81
98%	7.47	542	2.22

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 7.47	Maximum: .16	Maximum: 542
Average: 7.47	Average: .16	Average: 542
Minimum: 7.47	G. Mean: .16	Std. Dev.: 0
Std. Dev.: 0	Std. Dev.: 1	

Remarks:

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Right\STA 593+50 Right Slope LT.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	No rocks	past end of cell			
2	32	20	6.4	2	0
3	26	18	3.84	1	0
4	44	38	3.2	18	8
5	50	31	10.99	13	1
6	60	37	9.63	16	8
7	45	19	9.34	4	0
8	10	5	2.26	0	0
9	8	8	0	0	0
10	7	7	0	0	0

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Right\STA 593+50 Right Slope LT.dat

X Interval	Rocks Stopped
0 To 10 ft	223
10 To 20 ft	1
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	23
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	0
80 To 90 ft	8
90 To 100 ft	216
100 To 110 ft	28
110 To 115 ft	0

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Right\STA 593+50 Right Slope.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 11
Analysis Point 1 X-Coordinate: 103.3
Analysis Point 2 X-Coordinate: 108.3
Analysis Point 3 X-Coordinate: 115
Initial Y-Top Starting Zone Coordinate: 85.8
Initial Y-Base Starting Zone Coordinate: 50

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.3	0.5	0.15	0	85.8	20.5	75.5
2	.15	.85	.2	20.5	75.5	30.5	75.5
3	.15	.85	.2	30.5	75.5	43.3	50
4	.15	.85	.2	43.3	50	48.3	50
5	.15	.85	.2	48.3	50	63.3	20
6	.15	.85	.2	63.3	20	68.3	20
7	.15	.85	.2	68.3	20	78.3	0
8	.15	.85	.2	78.3	0	88.3	0
9	.15	.85	.2	88.3	0	103.3	5
10	.1	.9	.9	103.3	5	108.3	6
11	.1	.9	.9	108.3	6	115	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Right\STA 593+50 Right Slope.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 11
Rock Density: 165 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Right\STA 593+50 Right Slope.dat

Analysis Point 1: X = 103.3, Y = 5

Total Rocks Passing Analysis Point: 1

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	6.22	456	0.08
75%	6.22	456	0.76
90%	6.22	456	1.37
95%	6.22	456	1.73
98%	6.22	456	2.14

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 6.22	Maximum: .08	Maximum: 456
Average: 6.22	Average: .08	Average: 456
Minimum: 6.22	G. Mean: .08	Std. Dev.: 0
Std. Dev.: 0	Std. Dev.: 1	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Right\STA 593+50 Right Slope.dat

Analysis Point 2: X = 108.3, Y = 6

NO ROCKS PAST ANALSYSIS POINT 2

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Right\STA 593+50 Right Slope.dat

Analysis Point 3: X = 115, Y = 6

NO ROCKS PAST ANALSYSIS POINT 3

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Right\STA 593+50 Right Slope.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	13	7	2.22	0	0
2	No rocks	past end of cell			
3	35	22	7.24	2	0
4	19	10	3.45	0	0
5	46	37	3.61	20	4
6	47	16	9.83	12	0
7	60	30	6.28	17	7
8	41	13	8.01	6	0
9	6	6	0	0	0
10	No rocks	past end of cell			
11	No rocks	past end of cell			

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 593+50 Right\STA 593+50 Right Slope.dat

X Interval	Rocks Stopped
0 To 10 ft	40
10 To 20 ft	45
20 To 30 ft	59
30 To 40 ft	0
40 To 50 ft	44
50 To 60 ft	0
60 To 70 ft	8
70 To 80 ft	0
80 To 90 ft	68
90 To 100 ft	232
100 To 110 ft	4
110 To 115 ft	0

STA 627+00 Right Slope Long Term Average Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 13
Analysis Point 1 X-Coordinate: 111.3
Analysis Point 2 X-Coordinate: 116.3
Analysis Point 3 X-Coordinate: 126.3
Initial Y-Top Starting Zone Coordinate: 93.9
Initial Y-Base Starting Zone Coordinate: 71.6

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.5	0.2	0.5	0	93.9	32.2	78.1
2	0.21	0.8	0.18	32.2	78.1	35.3	71.9
3	0.21	0.8	0.18	35.3	71.9	45.8	61
4	0.21	0.8	0.18	45.8	61	55.3	42.4
5	0.21	0.8	0.18	55.3	42.4	64.9	32.7
6	0.21	0.8	0.18	64.9	32.7	74.9	12.7
7	0.21	0.8	0.18	74.9	12.7	83.1	6.4
8	0.21	0.8	0.18	83.1	6.4	86.3	0
9	0.21	0.8	0.2	86.3	0	96.3	0
10	0.21	0.8	0.2	96.3	0	111.3	5
11	0.15	0.9	0.2	111.3	5	116.3	6
12	0.15	0.9	0.2	116.3	6	126.3	6
13	0.1	0.9	0.9	126.3	6	130	6

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 13
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 111.3, Y = 5

Total Rocks Passing Analysis Point: 17

CRSP Analysis Point 2 Data

Analysis Point 2: X = 116.3, Y = 6

Total Rocks Passing Analysis Point: 3

STA 627+00 Right Slope Long Term Maximum Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 13
Analysis Point 1 X-Coordinate: 111.3
Analysis Point 2 X-Coordinate: 116.3
Analysis Point 3 X-Coordinate: 126.3
Initial Y-Top Starting Zone Coordinate: 93.9
Initial Y-Base Starting Zone Coordinate: 71.6

Cell Data

Cell	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.5	0.5	0.15	0	93.9	32.2	78.1
2	0.3	0.8	0.3	32.2	78.1	35.3	71.9
3	0.3	0.8	0.3	35.3	71.9	45.8	61
4	0.3	0.8	0.3	45.8	61	55.3	42.4
5	0.3	0.8	0.3	55.3	42.4	64.9	32.7
6	0.3	0.8	0.3	64.9	32.7	74.9	12.7
7	0.3	0.8	0.3	74.9	12.7	83.1	6.4
8	0.3	0.8	0.3	83.1	6.4	86.3	0
9	0.3	0.8	0.3	86.3	0	96.3	0
10	0.3	0.8	0.3	96.3	0	111.3	5
11	0.3	0.8	0.2	111.3	5	116.3	6
12	0.3	0.8	0.2	116.3	6	126.3	6
13	0.1	0.9	0.9	126.3	6	130	6

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 13
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 111.3, Y = 5

Total Rocks Passing Analysis Point: 36

CRSP Analysis Point 2 Data

Analysis Point 2: X = 116.3, Y = 6

Total Rocks Passing Analysis Point: 22

STA 627+00 Right Slope New Construction Maximum Size Rock

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 15
Analysis Point 1 X-Coordinate: 111.3
Analysis Point 2 X-Coordinate: 116.3
Analysis Point 3 X-Coordinate: 126.3
Initial Y-Top Starting Zone Coordinate: 93.9
Initial Y-Base Starting Zone Coordinate: 71.6

Cell Data

Cell
S.R.
Tang. C.
Norm. C.
Begin X
Begin Y
End X
End Y
1
0.5
0.5
0.15
0
93.9
16.4
85.7
2
0.15
0.9
0.3
16.4
85.7
26.4
85.7
3
0.15
0.9
0.3
26.4
85.7
30.4
85.7
4
0.15
0.9
0.3
30.4
85.7
35.4
71.6
5
0.15
0.9

0.3
35.4
71.6
39.4
71.6
6
0.15
0.9
0.3
39.4
71.6
55.3
41.9
7
0.15
0.9
0.3
55.3
41.9
60.3
41.9
8
0.15
0.9
0.3
60.3
41.9
75.2
12.2
9
0.15
0.9
0.3
75.2
12.2
80.2
12.2
10
0.15
0.9
0.3
80.2
12.2
86.3
0
11
0.15
0.9
0.3
86.3
0
96.3
0
12
0.15
0.9
0.3

96.3
0
111.3
5
13
0.15
0.9
0.2
111.3
5
116.3
6
14
0.15
0.9
0.2
116.3
6
126.3
6
15
0.1
0.9
0.9
126.3
6
130
6

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 15
Rock Density: 165 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data

Analysis Point 1: X = 111.3, Y = 5

Total Rocks Passing Analysis Point: 30

CRSP Analysis Point 2 Data

Analysis Point 2: X = 116.3, Y = 6

Total Rocks Passing Analysis Point: 19

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope NC.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 14
Analysis Point 1 X-Coordinate: 126.3
Analysis Point 2 X-Coordinate: 131.3
Analysis Point 3 X-Coordinate: 141.3
Initial Y-Top Starting Zone Coordinate: 109.5
Initial Y-Base Starting Zone Coordinate: 73.1

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.5	0.5	0.15	0	109.5	16.4	101.3
2	0.15	0.9	0.3	16.4	101.3	26.4	101.3
3	0.15	0.9	0.3	26.4	101.3	44.6	83.1
4	0.15	0.9	0.3	44.6	83.1	49.6	73.1
5	0.15	0.9	0.3	49.6	73.1	54.6	73.1
6	0.15	0.9	0.3	54.6	73.1	69.4	43.4
7	0.15	0.9	0.3	69.4	43.4	74.4	43.4
8	0.15	0.9	0.3	74.4	43.4	89.3	13.7
9	0.15	0.9	0.3	89.3	13.7	94.3	13.7
10	0.15	0.9	0.3	94.3	13.7	101.3	0
11	0.15	0.9	0.3	101.3	0	111.3	0
12	0.15	0.9	0.3	111.3	0	126.3	5
13	0.15	0.9	0.2	126.3	5	131.3	6
14	0.1	0.9	0.9	131.3	6	141.3	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope NC.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 14
Rock Density: 165 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope NC.dat

Analysis Point 1: X = 126.3, Y = 5

Total Rocks Passing Analysis Point: 41

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	9.55	339	0.06
75%	11.6	480	4.91
90%	13.44	607	9.26
95%	14.55	683	11.88
98%	15.79	768	14.82

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 17.54	Maximum: 1.25	Maximum: 1063
Average: 9.55	Average: .18	Average: 339
Minimum: 2.91	G. Mean: .06	Std. Dev.: 208
Std. Dev.: 3.03	Std. Dev.: 7.17	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope NC.dat

Analysis Point 2: X = 131.3, Y = 6

Total Rocks Passing Analysis Point: 22

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	7.83	230	0.01
75%	10.14	367	4.92
90%	12.23	490	9.33
95%	13.48	564	11.98
98%	14.89	647	14.96

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 15.84	Maximum: .23	Maximum: 805
Average: 7.83	Average: .03	Average: 230
Minimum: 2.3 G. Mean: .01	Std. Dev.: 202	
Std. Dev.: 3.43	Std. Dev.: 7.27	

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope NC.dat

Analysis Point 3: X = 141.3, Y = 6

Total Rocks Passing Analysis Point: 13

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	7.92	228	0.12
75%	10.75	383	6.76
90%	13.29	522	12.73
95%	14.81	605	16.32
98%	16.53	699	20.35

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 16.43	Maximum: .76	Maximum: 787
Average: 7.92	Average: .32	Average: 228
Minimum: 3.23	G. Mean: .12	Std. Dev.: 229
Std. Dev.: 4.18	Std. Dev.: 9.84	

Remarks:

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope NC.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	4	4	0	0	0
2	No rocks	past end of cell			
3	28	18	5.81	2	0
4	37	23	7.6	7	1
5	36	11	5.29	2	0
6	56	37	4.44	21	4
7	46	17	9.64	12	1
8	64	36	5.95	27	11
9	52	28	13.63	23	5
10	60	36	12.72	28	9

11	57	18	12.2	13	1
12	18	10	3.03	1	0
13	16	8	3.43	0	0
14	16	8	4.18	1	0

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope NC.dat

X Interval	Rocks Stopped
0 To 10 ft	67
10 To 20 ft	46
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	6
50 To 60 ft	64
60 To 70 ft	1
70 To 80 ft	12
80 To 90 ft	1
90 To 100 ft	3
100 To 110 ft	22
110 To 120 ft	210
120 To 130 ft	39
130 To 140 ft	15
140 To 141.3 ft	1

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope LT.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 13
Analysis Point 1 X-Coordinate: 126.3
Analysis Point 2 X-Coordinate: 131.3
Analysis Point 3 X-Coordinate: 141.3
Initial Y-Top Starting Zone Coordinate: 90
Initial Y-Base Starting Zone Coordinate: 80

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.5	.5	.15	0	109.5	35.6	92.1
2	.3	.8	.18	35.6	92.1	44.6	83.1
3	.3	.8	.18	44.6	83.1	49.5	73.1
4	.3	.8	.18	49.5	73.1	59.4	63.5
5	.3	.8	.18	59.4	63.5	69.4	43.4
6	.3	.8	.18	69.4	43.4	79.4	33.5
7	.3	.8	.18	79.4	33.5	89.3	13.7
8	.3	.8	.18	89.3	13.7	99.2	3.9
9	.3	.8	.18	99.2	3.9	101.3	0
10	.3	.8	.2	101.3	0	111.3	0
11	.3	.8	.2	111.3	0	126.3	5
12	.15	.9	.2	126.3	5	131.3	6
13	.1	.9	.9	131.3	6	141.3	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope LT.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 2
Ending Cell Number: 13
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope LT.dat

Analysis Point 1: X = 126.3, Y = 5

Total Rocks Passing Analysis Point: 72

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	8.83	956	0.05
75%	10.79	1355	5.97
90%	12.55	1715	11.3
95%	13.61	1931	14.5
98%	14.8	2173	18.09

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 15.17	Maximum: .96	Maximum: 2592
Average: 8.83	Average: .17	Average: 956
Minimum: 2.74	G. Mean: .05	Std. Dev.: 591
Std. Dev.: 2.9	Std. Dev.: 8.78	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope LT.dat

Analysis Point 2: X = 131.3, Y = 6

Total Rocks Passing Analysis Point: 36

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	7.42	620	0.01
75%	9.3	917	4.18
90%	11	1184	7.94
95%	12.01	1345	10.19
98%	13.16	1525	12.72

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 12.95	Maximum: .17	Maximum: 1664
Average: 7.42	Average: .01	Average: 620
Minimum: 3.29	G. Mean: .01	Std. Dev.: 439
Std. Dev.: 2.79	Std. Dev.: 6.18	

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope LT.dat

Analysis Point 3: X = 141.3, Y = 6

Total Rocks Passing Analysis Point: 24

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	7.29	556	0.14
75%	9.11	825	3.88
90%	10.75	1067	7.24
95%	11.74	1212	9.27
98%	12.84	1375	11.53

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 13.21	Maximum: .62	Maximum: 1517
Average: 7.29	Average: .25	Average: 556
Minimum: 3.37	G. Mean: .14	Std. Dev.: 398
Std. Dev.: 2.7	Std. Dev.: 5.54	

Remarks:

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope LT.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	No rocks	past end of cell			
2	17	11	3.21	1	0
3	31	22	3.42	5	1
4	32	25	2.8	2	0
5	47	39	4.42	13	6
6	52	36	6.92	10	1
7	63	44	6.14	15	8
8	59	48	6.8	15	4
9	61	50	7.12	17	5
10	56	16	7.07	3	0
11	15	9	2.9	1	0

12	13	7	2.79	0	0
13	13	7	2.7	1	0

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope LT.dat

X Interval	Rocks Stopped
0 To 10 ft	1
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	0
80 To 90 ft	0
90 To 100 ft	0
100 To 110 ft	3
110 To 120 ft	323
120 To 130 ft	129
130 To 140 ft	18
140 To 141.3 ft	2

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope NC.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 14
Analysis Point 1 X-Coordinate: 126.3
Analysis Point 2 X-Coordinate: 131.3
Analysis Point 3 X-Coordinate: 141.3
Initial Y-Top Starting Zone Coordinate: 109.5
Initial Y-Base Starting Zone Coordinate: 73.1

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.5	0.5	0.15	0	109.5	16.4	101.3
2	0.15	0.9	0.3	16.4	101.3	26.4	101.3
3	0.15	0.9	0.3	26.4	101.3	44.6	83.1
4	0.15	0.9	0.3	44.6	83.1	49.6	73.1
5	0.15	0.9	0.3	49.6	73.1	54.6	73.1
6	0.15	0.9	0.3	54.6	73.1	69.4	43.4
7	0.15	0.9	0.3	69.4	43.4	74.4	43.4
8	0.15	0.9	0.3	74.4	43.4	89.3	13.7
9	0.15	0.9	0.3	89.3	13.7	94.3	13.7
10	0.15	0.9	0.3	94.3	13.7	101.3	0
11	0.15	0.9	0.3	101.3	0	111.3	0
12	0.15	0.9	0.3	111.3	0	126.3	5
13	0.15	0.9	0.2	126.3	5	131.3	6
14	0.1	0.9	0.9	131.3	6	141.3	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope NC.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 14
Rock Density: 165 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope NC.dat

Analysis Point 1: X = 126.3, Y = 5

Total Rocks Passing Analysis Point: 47

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	9.8	1165	0.03
75%	12.11	1664	4.6
90%	14.19	2112	8.71
95%	15.44	2382	11.18
98%	16.84	2684	13.95

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 16.32	Maximum: .43	Maximum: 2794
Average: 9.8	Average: .07	Average: 1165
Minimum: 4.22	G. Mean: .03	Std. Dev.: 739
Std. Dev.: 3.43	Std. Dev.: 6.77	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope NC.dat

Analysis Point 2: X = 131.3, Y = 6

Total Rocks Passing Analysis Point: 24

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	9.02	957	0.02
75%	11	1356	4.35
90%	12.77	1715	8.24
95%	13.84	1930	10.58
98%	15.03	2172	13.2

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 13.99	Maximum: .3	Maximum: 2128
Average: 9.02	Average: .04	Average: 957
Minimum: 3.43	G. Mean: .02	Std. Dev.: 591
Std. Dev.: 2.92	Std. Dev.: 6.41	

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope NC.dat

Analysis Point 3: X = 141.3, Y = 6

Total Rocks Passing Analysis Point: 23

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	7.75	704	0.15
75%	10.03	1088	3
90%	12.08	1434	5.57
95%	13.32	1642	7.11
98%	14.7	1875	8.84

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 13.9	Maximum: .61	Maximum: 1928
Average: 7.75	Average: .25	Average: 704
Minimum: 2.36	G. Mean: .15	Std. Dev.: 569
Std. Dev.: 3.38	Std. Dev.: 4.23	

Remarks:

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope NC.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	7	5	1.37	1	0
2	No rocks	past end of cell			
3	29	18	5.83	1	0
4	37	23	7.44	6	1
5	35	11	4.23	1	0
6	56	37	4.04	23	5
7	47	19	11.03	17	1
8	64	38	7.65	24	10
9	47	27	13.05	18	4
10	56	35	12.68	22	9

11	58	19	11.61	10	1
12	16	10	3.43	0	0
13	14	9	2.92	0	0
14	14	8	3.38	1	0

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope NC.dat

X Interval	Rocks Stopped
0 To 10 ft	50
10 To 20 ft	62
20 To 30 ft	1
30 To 40 ft	0
40 To 50 ft	7
50 To 60 ft	30
60 To 70 ft	0
70 To 80 ft	2
80 To 90 ft	0
90 To 100 ft	0
100 To 110 ft	15
110 To 120 ft	230
120 To 130 ft	72
130 To 140 ft	8
140 To 141.3 ft	0

CRSP Input File –M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope LT.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 13
Analysis Point 1 X-Coordinate: 126.3
Analysis Point 2 X-Coordinate: 131.3
Analysis Point 3 X-Coordinate: 141.3
Initial Y-Top Starting Zone Coordinate: 109.5
Initial Y-Base Starting Zone Coordinate: 80

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.5	.5	.15	0	109.5	35.6	92.1
2	.21	.8	.18	35.6	92.1	44.6	83.1
3	.21	.8	.18	44.6	83.1	49.5	73.1
4	.21	.8	.18	49.5	73.1	59.4	63.5
5	.21	.8	.18	59.4	63.5	69.4	43.4
6	.21	.8	.18	69.4	43.4	79.4	33.5
7	.21	.8	.18	79.4	33.5	89.3	13.7
8	.21	.8	.18	89.3	13.7	99.2	3.9
9	.21	.8	.18	99.2	3.9	101.3	0
10	.21	.8	.2	101.3	0	111.3	0
11	.21	.8	.2	111.3	0	126.3	5
12	.15	.9	.2	126.3	5	131.3	6
13	.1	.9	.9	131.3	6	141.3	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope LT.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 13
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope LT.dat

Analysis Point 1: X = 126.3, Y = 5

Total Rocks Passing Analysis Point: 33

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	8.91	296	0.06
75%	11.46	451	3.8
90%	13.75	589	7.17
95%	15.12	672	9.2
98%	16.66	766	11.46

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 19.67	Maximum: .35	Maximum: 1098
Average: 8.91	Average: .12	Average: 296
Minimum: 2.88	G. Mean: .06	Std. Dev.: 228
Std. Dev.: 3.77	Std. Dev.: 5.55	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope LT.dat

Analysis Point 2: X = 131.3, Y = 6

Total Rocks Passing Analysis Point: 14

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	8.47	257	0.02
75%	10.88	411	5.64
90%	13.05	549	10.7
95%	14.36	633	13.74
98%	15.82	726	17.15

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 16.66	Maximum: .78	Maximum: 891
Average: 8.47	Average: .07	Average: 257
Minimum: 3.39	G. Mean: .02	Std. Dev.: 228
Std. Dev.: 3.58	Std. Dev.: 8.33	

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope LT.dat

Analysis Point 3: X = 141.3, Y = 6

Total Rocks Passing Analysis Point: 8

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	8.98	263	0.38
75%	11.67	431	2.07
90%	14.09	582	3.58
95%	15.54	672	4.49
98%	17.17	774	5.51

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 17.01	Maximum: 1.09	Maximum: 826
Average: 8.98	Average: .52	Average: 263
Minimum: 4.43	G. Mean: .38	Std. Dev.: 248
Std. Dev.: 3.98	Std. Dev.: 2.49	

Remarks:

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope LT.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	No rocks	past end of cell			
2	19	12	3.8	1	0
3	32	23	3.79	5	1
4	31	26	2.8	2	0
5	47	39	4.32	13	6
6	53	35	6.57	10	1
7	63	44	6.28	14	9
8	60	47	7.65	13	4

9	62	48	8.04	14	5
10	34	16	6.64	2	0
11	20	9	3.77	0	0
12	17	8	3.58	1	0
13	17	9	3.98	1	0

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 627+50\STA 627+50 Right\STA 627+50 Right Slope LT.dat

X Interval	Rocks Stopped
0 To 10 ft	295
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	0
80 To 90 ft	0
90 To 100 ft	0
100 To 110 ft	3
110 To 120 ft	128
120 To 130 ft	56
130 To 140 ft	10
140 To 141.3 ft	0

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\LT max.doc

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 12
Analysis Point 1 X-Coordinate: 143
Analysis Point 2 X-Coordinate: 148
Analysis Point 3 X-Coordinate: 158
Initial Y-Top Starting Zone Coordinate: 90
Initial Y-Base Starting Zone Coordinate: 80

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.5	.5	.15	0	123.8	44.1	101.6
2	.3	.8	.18	44.1	101.6	60.4	85.3
3	.3	.8	.18	60.4	85.3	65.4	75.3
4	.3	.8	.18	65.4	75.3	75.5	65.1
5	.3	.8	.18	75.5	65.1	85.4	45.3
6	.3	.8	.18	85.4	45.3	96.4	33.3
7	.3	.8	.18	96.4	33.3	105.4	15.3
8	.3	.8	.2	105.4	15.3	118.1	0
9	.3	.8	.2	118.1	0	128.1	0
10	.3	.8	.2	128.1	0	143.1	5
11	.1	.9	.9	143.1	5	148.1	6
12	.1	.9	.9	148.1	6	158.1	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\LT max.doc

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 2
Ending Cell Number: 12
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\LT max.doc

Analysis Point 1: X = 143, Y = 5

Total Rocks Passing Analysis Point: 91

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	8.3	883	0.04
75%	10.66	1328	6.25
90%	12.78	1728	11.84
95%	14.06	1968	15.19
98%	15.49	2238	18.96

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 17.09	Maximum: 1.13	Maximum: 2914
Average: 8.3 Average: .16	Average: 883	
Minimum: 1.71	G. Mean: .04	Std. Dev.: 658
Std. Dev.: 3.5	Std. Dev.: 9.2	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\LT max.doc

Analysis Point 2: X = 148, Y = 6

Total Rocks Passing Analysis Point: 51

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	7.7	719	0.22
75%	9.88	1095	3.49
90%	11.85	1433	6.42
95%	13.04	1636	8.18
98%	14.36	1864	10.16

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 16.57	Maximum: .88	Maximum: 2556
Average: 7.7 Average: .37	Average: 719	
Minimum: 2.11	G. Mean: .22	Std. Dev.: 556
Std. Dev.: 3.24	Std. Dev.: 4.83	

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\LT max.doc

Analysis Point 3: X = 158, Y = 6

Total Rocks Passing Analysis Point: 33

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	8.11	695	0.29
75%	10.21	1037	2.68
90%	12.1	1345	4.82
95%	13.24	1530	6.11
98%	14.51	1737	7.56

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 15.09	Maximum: 1.22	Maximum: 2021
Average: 8.11	Average: .43	Average: 695
Minimum: 2.07	G. Mean: .29	Std. Dev.: 506
Std. Dev.: 3.11	Std. Dev.: 3.53	

Remarks:

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\LT max.doc

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	No rocks	past end of cell			
2	14	9	2.56	1	0
3	29	20	3.44	5	0
4	32	25	2.72	2	0
5	47	39	4	13	5
6	53	36	6.23	10	1
7	63	44	5.41	14	8
8	62	50	6.82	16	4
9	59	17	6.96	2	0
10	17	8	3.36	1	0
11	16	8	3.18	1	0
12	15	8	3.02	1	0

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\LT max.doc

X Interval	Rocks Stopped
0 To 10 ft	1
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	0
80 To 90 ft	0
90 To 100 ft	0
100 To 110 ft	0
110 To 120 ft	0
120 To 130 ft	58
130 To 140 ft	305
140 To 150 ft	88
150 To 158.1 ft	15

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope LT max.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 12
Analysis Point 1 X-Coordinate: 143
Analysis Point 2 X-Coordinate: 148
Analysis Point 3 X-Coordinate: 158
Initial Y-Top Starting Zone Coordinate: 116
Initial Y-Base Starting Zone Coordinate: 80

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.5	0.5	0.15	0	123.8	44.1	101.6
2	0.21	0.8	0.18	44.1	101.6	60.4	85.3
3	0.21	0.8	0.18	60.4	85.3	65.4	75.3
4	0.21	0.8	0.18	65.4	75.3	75.5	65.1
5	0.21	0.8	0.18	75.5	65.1	85.4	45.3
6	0.21	0.8	0.18	85.4	45.3	96.4	33.3
7	0.21	0.8	0.18	96.4	33.3	105.4	15.3
8	0.21	0.8	0.18	105.4	15.3	118.1	0
9	0.21	0.8	0.2	118.1	0	128.1	0
10	0.21	0.8	0.2	128.1	0	143.1	5
11	0.1	0.9	0.9	143.1	5	148.1	6
12	0.1	0.9	0.9	148.1	6	158.1	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope LT max.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 12
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope LT max.dat

Analysis Point 1: X = 143, Y = 5

Total Rocks Passing Analysis Point: 46

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	8.65	278	0.04
75%	11.04	429	5.09
90%	13.18	565	9.64
95%	14.47	647	12.37
98%	15.92	739	15.43

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 19.55	Maximum: .69	Maximum: 1152
Average: 8.65	Average: .12	Average: 278
Minimum: 2.95	G. Mean: .04	Std. Dev.: 224
Std. Dev.: 3.53	Std. Dev.: 7.49	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope LT max.dat

Analysis Point 2: X = 148, Y = 6

Total Rocks Passing Analysis Point: 24

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	7.7	221	0.13
75%	10.63	367	6.91
90%	13.25	499	13
95%	14.83	578	16.66
98%	16.6	666	20.77

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 17.09	Maximum: 1.05	Maximum: 884
Average: 7.7 Average: .39	Average: 221	
Minimum: 1.86	G. Mean: .13	Std. Dev.: 216
Std. Dev.: 4.33	Std. Dev.: 10.04	

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope LT max.dat

Analysis Point 3: X = 158, Y = 6

Total Rocks Passing Analysis Point: 11

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	8.22	223	0.34
75%	10.99	388	5.57
90%	13.47	536	10.27
95%	14.96	625	13.1
98%	16.63	725	16.27

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 17.54	Maximum: 1.31	Maximum: 827
Average: 8.22	Average: .65	Average: 223
Minimum: 4.8 G. Mean: .34	Std. Dev.: 243	
Std. Dev.: 4.09	Std. Dev.: 7.75	

Remarks:

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope LT max.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	6	4	0	0	0
2	26	16	5.32	1	0
3	35	24	5.38	7	1
4	41	27	3.52	4	1
5	54	40	4.24	14	6
6	56	38	7.51	11	2
7	65	45	7.2	14	8
8	62	50	7.2	17	5
9	57	18	8.41	5	0

10	20	8	3.46	1	0
11	17	7	4.4	1	0
12	17	8	4.35	1	0

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope LT max.dat

X Interval	Rocks Stopped
0 To 10 ft	1
10 To 20 ft	29
20 To 30 ft	69
30 To 40 ft	68
40 To 50 ft	31
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	0
80 To 90 ft	0
90 To 100 ft	0
100 To 110 ft	0
110 To 120 ft	0
120 To 130 ft	24
130 To 140 ft	209
140 To 150 ft	47
150 To 158.1 ft	11

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope LT max.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 12
Analysis Point 1 X-Coordinate: 143
Analysis Point 2 X-Coordinate: 148
Analysis Point 3 X-Coordinate: 158
Initial Y-Top Starting Zone Coordinate: 116
Initial Y-Base Starting Zone Coordinate: 80

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.5	0.5	0.15	0	123.8	44.1	101.6
2	0.3	0.8	0.18	44.1	101.6	60.4	85.3
3	0.3	0.8	0.18	60.4	85.3	65.4	75.3
4	0.3	0.8	0.18	65.4	75.3	75.5	65.1
5	0.3	0.8	0.18	75.5	65.1	85.4	45.3
6	0.3	0.8	0.18	85.4	45.3	96.4	33.3
7	0.3	0.8	0.18	96.4	33.3	105.4	15.3
8	0.3	0.8	0.18	105.4	15.3	118.1	0
9	0.3	0.8	0.18	118.1	0	128.1	0
10	0.3	0.8	0.18	128.1	0	143.1	5
11	0.1	0.9	0.9	143.1	5	148.1	6
12	0.1	0.9	0.9	148.1	6	158.1	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope LT max.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 12
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope LT max.dat

Analysis Point 1: X = 143, Y = 5

Total Rocks Passing Analysis Point: 43

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	7.99	809	0.03
75%	10.09	1261	6.28
90%	11.98	1668	11.9
95%	13.12	1912	15.27
98%	14.39	2186	19.06

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 17	Maximum: .58	Maximum: 3225
Average: 7.99	Average: .1	Average: 809
Minimum: 2.95	G. Mean: .03	Std. Dev.: 669
Std. Dev.: 3.11	Std. Dev.: 9.25	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope LT max.dat

Analysis Point 2: X = 148, Y = 6

Total Rocks Passing Analysis Point: 19

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	7.47	727	0.18
75%	10.3	1221	2.9
90%	12.85	1665	5.34
95%	14.39	1931	6.8
98%	16.11	2231	8.45

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 16.06	Maximum: .64	Maximum: 2492
Average: 7.47	Average: .27	Average: 727
Minimum: 2.01	G. Mean: .18	Std. Dev.: 731
Std. Dev.: 4.2	Std. Dev.: 4.02	

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope LT max.dat

Analysis Point 3: X = 158, Y = 6

Total Rocks Passing Analysis Point: 9

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	9.82	1016	0.21
75%	12.26	1439	5.61
90%	14.45	1820	10.47
95%	15.77	2049	13.38
98%	17.24	2306	16.66

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 14.1	Maximum: 1.11	Maximum: 1926
Average: 9.82	Average: .41	Average: 1016
Minimum: 3.46	G. Mean: .21	Std. Dev.: 627
Std. Dev.: 3.61	Std. Dev.: 8	

Remarks:

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope LT max.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	10	6	1.56	0	0
2	28	17	5.5	2	0
3	37	25	5.55	7	2
4	43	28	4.26	3	0
5	55	40	4.03	14	6
6	56	39	7.62	15	2
7	65	46	7.34	20	8
8	66	50	6.88	16	4
9	60	18	8.05	3	0
10	17	8	3.17	1	0
11	16	8	4.19	1	0
12	14	10	3.76	1	0

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope LT max.dat

X Interval	Rocks Stopped
0 To 10 ft	1
10 To 20 ft	18
20 To 30 ft	48
30 To 40 ft	51
40 To 50 ft	24
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	0
80 To 90 ft	0
90 To 100 ft	0
100 To 110 ft	0
110 To 120 ft	0
120 To 130 ft	36
130 To 140 ft	238
140 To 150 ft	67
150 To 158.1 ft	8

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\results LT max fail .doc

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 12
Analysis Point 1 X-Coordinate: 143
Analysis Point 2 X-Coordinate: 148
Analysis Point 3 X-Coordinate: 158
Initial Y-Top Starting Zone Coordinate: 90
Initial Y-Base Starting Zone Coordinate: 80

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.5	.5	.15	0	123.8	44.1	101.6
2	.3	.8	.18	44.1	101.6	60.4	85.3
3	.3	.8	.18	60.4	85.3	65.4	75.3
4	.3	.8	.18	65.4	75.3	75.5	65.1
5	.3	.8	.18	75.5	65.1	85.4	45.3
6	.3	.8	.18	85.4	45.3	96.4	33.3
7	.3	.8	.18	96.4	33.3	105.4	15.3
8	.3	.8	.2	105.4	15.3	118.1	0
9	.3	.8	.2	118.1	0	128.1	0
10	.3	.8	.2	128.1	0	143.1	5
11	.1	.9	.9	143.1	5	148.1	6
12	.1	.9	.9	148.1	6	158.1	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\results LT max fail .doc

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 2
Ending Cell Number: 12
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\results LT max fail .doc

Analysis Point 1: X = 143, Y = 5

Total Rocks Passing Analysis Point: 93

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	8.62	951	0.04
75%	11.1	1462	7.17
90%	13.34	1921	13.58
95%	14.68	2197	17.43
98%	16.19	2506	21.75

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 18.32	Maximum: 1.02	Maximum: 3415
Average: 8.62	Average: .16	Average: 951
Minimum: 2.73	G. Mean: .04	Std. Dev.: 756
Std. Dev.: 3.68	Std. Dev.: 10.56	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\results LT max fail .doc

Analysis Point 2: X = 148, Y = 6

Total Rocks Passing Analysis Point: 53

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	8.27	847	0.17
75%	10.81	1301	4.65
90%	13.09	1710	8.68
95%	14.46	1955	11.09
98%	16	2231	13.81

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 17.11	Maximum: 1.33	Maximum: 3140
Average: 8.27	Average: .36	Average: 847
Minimum: 1.18	G. Mean: .17	Std. Dev.: 672
Std. Dev.: 3.76	Std. Dev.: 6.63	

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\results LT max fail .doc

Analysis Point 3: X = 158, Y = 6

Total Rocks Passing Analysis Point: 38

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	8.21	764	0.44
75%	10.72	1186	1.63
90%	12.98	1567	2.71
95%	14.34	1795	3.36
98%	15.86	2051	4.08

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 16.9	Maximum: 1.49	Maximum: 2754
Average: 8.21	Average: .51	Average: 764
Minimum: 1.61	G. Mean: .44	Std. Dev.: 626
Std. Dev.: 3.72	Std. Dev.: 1.77	

Remarks:

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\results LT max fail .doc

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	No rocks	past end of cell			
2	15	9	2.66	1	0
3	29	20	3.21	5	0
4	32	25	2.79	3	0
5	48	39	4.11	13	5
6	52	36	5.65	10	1
7	62	44	5.23	14	8
8	63	50	6.83	14	4
9	34	16	6.56	2	0
10	18	9	3.7	1	0
11	17	8	3.49	1	0
12	17	8	3.58	1	0

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\results LT max fail .doc

X Interval	Rocks Stopped
0 To 10 ft	1
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	0
80 To 90 ft	0
90 To 100 ft	0
100 To 110 ft	0
110 To 120 ft	0
120 To 130 ft	55
130 To 140 ft	303
140 To 150 ft	91
150 To 158.1 ft	11

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope NC max.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 16
Analysis Point 1 X-Coordinate: 143
Analysis Point 2 X-Coordinate: 148
Analysis Point 3 X-Coordinate: 158
Initial Y-Top Starting Zone Coordinate: 116
Initial Y-Base Starting Zone Coordinate: 80

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.5	0.5	0.15	0	123.8	14.4	116.3
2	0.12	0.85	0.18	14.4	116.3	24.4	116.3
3	0.12	0.85	0.18	24.4	116.3	35.4	105.3
4	0.12	0.85	0.18	35.4	105.3	40.4	105.3
5	0.12	0.85	0.18	40.4	105.3	60.4	85.3
6	0.12	0.85	0.18	60.4	85.3	65.4	75.3
7	0.12	0.85	0.18	65.4	75.3	70.4	75.3
8	0.12	0.85	0.18	70.4	75.3	85.3	45.3
9	0.12	0.85	0.18	85.3	45.3	90.4	45.3
10	0.12	0.85	0.18	90.4	45.3	105.4	15.3
11	0.12	0.85	0.18	105.4	15.3	110.3	15.3
12	0.12	0.85	0.18	110.3	15.3	118.1	0
13	0.12	0.85	0.2	118.1	0	128.1	0
14	0.12	0.85	0.2	128.1	0	143	5
15	0.1	0.9	0.9	143	5	148	6
16	0.1	0.9	0.9	148	6	158	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope NC max.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 16
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope NC max.dat

Analysis Point 1: X = 143, Y = 5

Total Rocks Passing Analysis Point: 2

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	5.9	115	0.01
75%	5.9	115	0.68
90%	5.9	115	1.29
95%	5.9	115	1.66
98%	5.9	115	2.07

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 6.05	Maximum: .08	Maximum: 124
Average: 5.9	Average: .01	Average: 115
Minimum: 5.75	G. Mean: .01	Std. Dev.: 0
Std. Dev.: 0	Std. Dev.: 1	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope NC max.dat

Analysis Point 2: X = 148, Y = 6

NO ROCKS PAST ANALSYSIS POINT 2

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope NC max.dat

Analysis Point 3: X = 158, Y = 6

NO ROCKS PAST ANALSYSIS POINT 3

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope NC max.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	No rocks	past end of cell			
2	No rocks	past end of cell			
3	21	13	4.62	1	0
4	14	8	2.67	0	0
5	30	19	7.28	1	0
6	37	27	5.99	7	2
7	38	11	4.7	2	0
8	57	37	4.42	21	4
9	47	17	11.34	13	0
10	64	38	6.02	22	6
11	47	20	13.65	15	1
12	57	31	10.46	16	6
13	37	13	7.62	6	0
14	6	6	0	0	0
15	No rocks	past end of cell			
16	No rocks	past end of cell			

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope NC max.dat

X Interval	Rocks Stopped
0 To 10 ft	0
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	55
40 To 50 ft	3
50 To 60 ft	0
60 To 70 ft	10
70 To 80 ft	3
80 To 90 ft	15
90 To 100 ft	6
100 To 110 ft	11
110 To 120 ft	1
120 To 130 ft	148
130 To 140 ft	228
140 To 150 ft	20
150 To 158 ft	0

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope NC max.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 16
Analysis Point 1 X-Coordinate: 143
Analysis Point 2 X-Coordinate: 148
Analysis Point 3 X-Coordinate: 158
Initial Y-Top Starting Zone Coordinate: 90
Initial Y-Base Starting Zone Coordinate: 80

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.5	0.5	0.15	0	123.8	14.4	116.3
2	0.15	0.85	0.18	14.4	116.3	24.4	116.3
3	0.15	0.85	0.18	24.4	116.3	35.4	105.3
4	0.15	0.85	0.18	35.4	105.3	40.4	105.3
5	0.15	0.85	0.18	40.4	105.3	60.4	85.3
6	0.15	0.85	0.18	60.4	85.3	65.4	75.3
7	0.15	0.85	0.18	65.4	75.3	70.4	75.3
8	0.15	0.85	0.18	70.4	75.3	85.3	45.3
9	0.15	0.85	0.18	85.3	45.3	90.4	45.3
10	0.15	0.85	0.18	90.4	45.3	105.4	15.3
11	0.15	0.85	0.18	105.4	15.3	110.3	15.3
12	0.15	0.85	0.18	110.3	15.3	118.1	0
13	0.15	0.85	0.2	118.1	0	128.1	0
14	0.15	0.85	0.2	128.1	0	143	5
15	0.1	0.9	0.9	143	5	148	6
16	0.1	0.9	0.9	148	6	158	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope NC max.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 2
Ending Cell Number: 16
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope NC max.dat

Analysis Point 1: X = 143, Y = 5

Total Rocks Passing Analysis Point: 3

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	5.21	85	0.01
75%	5.21	85	0.69
90%	5.21	85	1.3
95%	5.21	85	1.66
98%	5.21	85	2.07

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 6.62	Maximum: .07	Maximum: 126
Average: 5.21	Average: .03	Average: 85
Minimum: 4.14	G. Mean: .01	Std. Dev.: 0
Std. Dev.: 0	Std. Dev.: 1	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope NC max.dat

Analysis Point 2: X = 148, Y = 6

NO ROCKS PAST ANALSYSIS POINT 2

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope NC max.dat

Analysis Point 3: X = 158, Y = 6

NO ROCKS PAST ANALSYSIS POINT 3

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope NC max.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	No rocks	past end of cell			
2	No rocks	past end of cell			
3	No rocks	past end of cell			
4	No rocks	past end of cell			
5	15	10	2.71	0	0
6	29	20	3.08	3	0
7	15	8	2.63	0	0
8	45	35	3.51	14	2
9	45	13	4.17	1	0
10	53	37	4.11	24	8
11	47	21	15.56	17	2
12	57	33	11.5	18	5
13	38	12	5.51	4	0
14	7	5	0	0	0
15	No rocks	past end of cell			
16	No rocks	past end of cell			

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+00\STA 628+00 Right\STA 628+00 Right Slope NC max.dat

X Interval	Rocks Stopped
0 To 10 ft	1
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	90
70 To 80 ft	13
80 To 90 ft	17
90 To 100 ft	1
100 To 110 ft	19
110 To 120 ft	7
120 To 130 ft	154
130 To 140 ft	187
140 To 150 ft	11
150 To 158 ft	0

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope LT.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 9
Analysis Point 1 X-Coordinate: 107.9
Analysis Point 2 X-Coordinate: 112.9
Analysis Point 3 X-Coordinate: 122.9
Initial Y-Top Starting Zone Coordinate: 73.4
Initial Y-Base Starting Zone Coordinate: 70

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.5	.5	.15	0	89.4	36.2	73.4
2	.21	.8	.18	36.2	73.4	50	45.8
3	.21	.8	.18	50	45.8	60.1	35.7
4	.21	.8	.18	60.1	35.7	70	15.8
5	.21	.8	.18	70	15.8	82.9	0
6	.21	.8	.2	82.9	0	92.9	0
7	.21	.8	.2	92.9	0	107.9	5
8	.1	.9	.9	107.9	5	112.9	6
9	.1	.9	.9	112.9	6	122.9	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope LT.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 9
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope LT.dat

Analysis Point 1: X = 107.9, Y = 5

Total Rocks Passing Analysis Point: 58

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	6.83	171	0.02
75%	8.67	258	5.51
90%	10.31	336	10.44
95%	11.3	382	13.41
98%	12.41	435	16.73

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 12.52	Maximum: .57	Maximum: 512
Average: 6.83	Average: .07	Average: 171
Minimum: 1.8 G. Mean: .02	Std. Dev.: 128	
Std. Dev.: 2.71	Std. Dev.: 8.13	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope LT.dat

Analysis Point 2: X = 112.9, Y = 6

Total Rocks Passing Analysis Point: 18

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	6.71	149	0.14
75%	8.1	206	5.74
90%	9.35	258	10.78
95%	10.09	289	13.8
98%	10.93	324	17.2

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 10.01	Maximum: 1	Maximum: 309
Average: 6.71	Average: .34	Average: 149
Minimum: 3.27	G. Mean: .14	Std. Dev.: 84
Std. Dev.: 2.05	Std. Dev.: 8.3	

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope LT.dat

Analysis Point 3: X = 122.9, Y = 6

Total Rocks Passing Analysis Point: 9

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	6.54	115	0.09
75%	8.12	171	5.02
90%	9.55	221	9.45
95%	10.4	251	12.11
98%	11.36	285	15.1

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 10.28	Maximum: .66	Maximum: 278
Average: 6.54	Average: .23	Average: 115
Minimum: 3.33	G. Mean: .09	Std. Dev.: 82
Std. Dev.: 2.34	Std. Dev.: 7.3	

Remarks:

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope LT.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	No rocks	past end of cell			
2	39	31	2.95	6	2
3	37	31	2.55	4	1
4	49	42	3.42	15	8
5	61	46	8.74	15	3
6	29	17	6.39	2	0
7	13	7	2.71	1	0
8	10	7	2.05	1	0
9	10	7	2.34	1	0

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope LT.dat

X Interval	Rocks Stopped
0 To 10 ft	1
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	0
80 To 90 ft	6
90 To 100 ft	227
100 To 110 ft	230
110 To 120 ft	25
120 To 122.9 ft	2

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope LT.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 9
Analysis Point 1 X-Coordinate: 107.9
Analysis Point 2 X-Coordinate: 112.9
Analysis Point 3 X-Coordinate: 122.9
Initial Y-Top Starting Zone Coordinate: 73.4
Initial Y-Base Starting Zone Coordinate: 70

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.5	.5	.15	0	89.4	36.2	73.4
2	.3	.8	.18	36.2	73.4	50	45.8
3	.3	.8	.18	50	45.8	60.1	35.7
4	.3	.8	.18	60.1	35.7	70	15.8
5	.3	.8	.18	70	15.8	82.9	0
6	.3	.8	.2	82.9	0	92.9	0
7	.3	.8	.2	92.9	0	107.9	5
8	.1	.9	.9	107.9	5	112.9	6
9	.1	.9	.9	112.9	6	122.9	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope LT.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 9
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope LT.dat

Analysis Point 1: X = 107.9, Y = 5

Total Rocks Passing Analysis Point: 61

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	7.41	724	0.03
75%	9.62	1145	5.95
90%	11.61	1524	11.27
95%	12.81	1751	14.47
98%	14.15	2006	18.05

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 15.75	Maximum: .42	Maximum: 2667
Average: 7.41	Average: .1	Average: 724
Minimum: 2.25	G. Mean: .03	Std. Dev.: 623
Std. Dev.: 3.28	Std. Dev.: 8.77	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope LT.dat

Analysis Point 2: X = 112.9, Y = 6

Total Rocks Passing Analysis Point: 25

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	8.08	765	0.12
75%	10.31	1155	4.28
90%	12.32	1506	8.02
95%	13.53	1716	10.26
98%	14.89	1953	12.78

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 14.39	Maximum: .54	Maximum: 2142
Average: 8.08	Average: .24	Average: 765
Minimum: 2.52	G. Mean: .12	Std. Dev.: 577
Std. Dev.: 3.31	Std. Dev.: 6.16	

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope LT.dat

Analysis Point 3: X = 122.9, Y = 6

Total Rocks Passing Analysis Point: 18

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	7.94	664	0.21
75%	10.08	997	2.22
90%	12	1296	4.02
95%	13.16	1476	5.1
98%	14.46	1678	6.32

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 13.32	Maximum: 1.02	Maximum: 1663
Average: 7.94	Average: .35	Average: 664
Minimum: 1.56	G. Mean: .21	Std. Dev.: 493
Std. Dev.: 3.17	Std. Dev.: 2.97	

Remarks:

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope LT.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	No rocks	past end of cell			
2	39	32	3	5	2
3	37	31	2.39	4	1
4	49	42	3.33	14	8
5	59	46	8.44	17	3
6	55	17	6.31	3	0
7	16	7	3.28	0	0
8	14	8	3.31	1	0
9	13	8	3.17	1	0

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope LT.dat

X Interval	Rocks Stopped
0 To 10 ft	1
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	0
80 To 90 ft	1
90 To 100 ft	226
100 To 110 ft	225
110 To 120 ft	27
120 To 122.9 ft	2

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 13
Analysis Point 1 X-Coordinate: 107.9
Analysis Point 2 X-Coordinate: 112.9
Analysis Point 3 X-Coordinate: 122.9
Initial Y-Top Starting Zone Coordinate: 73.4
Initial Y-Base Starting Zone Coordinate: 70

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.5	0.5	0.15	0	89.4	17.6	80.6
2	0.12	0.85	0.2	17.6	80.6	27.6	80.6
3	0.12	0.85	0.2	27.6	80.6	30	75.8
4	0.12	0.85	0.2	30	75.8	35	75.8
5	0.12	0.85	0.2	35	75.8	50	45.8
6	0.12	0.85	0.2	50	45.8	55	45.8
7	0.12	0.85	0.2	55	45.8	70	15.8
8	0.12	0.85	0.2	70	15.8	75	15.8
9	0.12	0.85	0.2	75	15.8	82.9	0
10	0.12	0.85	0.2	82.9	0	92.9	0
11	0.12	0.85	0.2	92.9	0	107.9	5
12	0.1	0.9	0.9	107.9	5	112.9	6
13	0.1	0.9	0.9	112.9	6	122.9	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 13
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Analysis Point 1: X = 107.9, Y = 5

Total Rocks Passing Analysis Point: 12

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	5.95	122	0.01
75%	7.35	176	4.85
90%	8.61	226	9.21
95%	9.36	255	11.82
98%	10.21	288	14.76

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 9.45	Maximum: .16	Maximum: 257
Average: 5.95	Average: .03	Average: 122
Minimum: 3.98	G. Mean: .01	Std. Dev.: 81
Std. Dev.: 2.07	Std. Dev.: 7.17	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Analysis Point 2: X = 112.9, Y = 6

Total Rocks Passing Analysis Point: 3

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	3.69	47	0.36
75%	3.69	47	1.04
90%	3.69	47	1.64
95%	3.69	47	2.01
98%	3.69	47	2.42

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 4.76	Maximum: .43	Maximum: 68
Average: 3.69	Average: .36	Average: 47
Minimum: 2.74	G. Mean: .36	Std. Dev.: 0
Std. Dev.: 0 Std. Dev.: 1		

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Analysis Point 3: X = 122.9, Y = 6

NO ROCKS PAST ANALSYSIS POINT 3

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	No rocks	past end of cell			
2	No rocks	past end of cell			
3	No rocks	past end of cell			
4	No rocks	past end of cell			
5	38	33	2.08	3	1
6	21	14	2.91	1	0
7	46	37	3.95	23	8
8	47	22	16.18	16	1
9	57	33	10.84	18	4
10	37	13	7.02	6	0
11	9	6	2.07	0	0
12	5	4	0	0	0
13	No rocks	past end of cell			

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

X Interval	Rocks Stopped
0 To 10 ft	0
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0

40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	32
80 To 90 ft	50
90 To 100 ft	310
100 To 110 ft	103
110 To 120 ft	5
120 To 122.9 ft	0

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 13
Analysis Point 1 X-Coordinate: 107.9
Analysis Point 2 X-Coordinate: 112.9
Analysis Point 3 X-Coordinate: 122.9
Initial Y-Top Starting Zone Coordinate: 73.4
Initial Y-Base Starting Zone Coordinate: 70

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.5	0.5	0.15	0	89.4	17.6	80.6
2	0.15	0.85	0.2	17.6	80.6	27.6	80.6
3	0.15	0.85	0.2	27.6	80.6	30	75.8
4	0.15	0.85	0.2	30	75.8	35	75.8
5	0.15	0.85	0.2	35	75.8	50	45.8
6	0.15	0.85	0.2	50	45.8	55	45.8
7	0.15	0.85	0.2	55	45.8	70	15.8
8	0.15	0.85	0.2	70	15.8	75	15.8
9	0.15	0.85	0.2	75	15.8	82.9	0
10	0.15	0.85	0.2	82.9	0	92.9	0
11	0.15	0.85	0.2	92.9	0	107.9	5
12	0.1	0.9	0.9	107.9	5	112.9	6
13	0.1	0.9	0.9	112.9	6	122.9	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 13
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Analysis Point 1: X = 107.9, Y = 5

Total Rocks Passing Analysis Point: 9

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	6.22	450	0
75%	7.74	655	4.55
90%	9.11	840	8.64
95%	9.93	951	11.09
98%	10.85	1075	13.85

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 8.81	Maximum: .13	Maximum: 856
Average: 6.22	Average: 0	Average: 450
Minimum: 3.72	G. Mean: 0	Std. Dev.: 303
Std. Dev.: 2.25	Std. Dev.: 6.73	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Analysis Point 2: X = 112.9, Y = 6

Total Rocks Passing Analysis Point: 4

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	4.37	180	0.12
75%	4.37	180	0.79
90%	4.37	180	1.4
95%	4.37	180	1.77
98%	4.37	180	2.18

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 5.53	Maximum: .29	Maximum: 254
Average: 4.37	Average: .15	Average: 180
Minimum: 3.65	G. Mean: .12	Std. Dev.: 0
Std. Dev.: 0 Std. Dev.: 1		

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Analysis Point 3: X = 122.9, Y = 6

NO ROCKS PAST ANALSYSIS POINT 3

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	No rocks	past end of cell			
2	No rocks	past end of cell			
3	No rocks	past end of cell			
4	No rocks	past end of cell			
5	38	33	1.88	3	0
6	20	14	2.57	0	0
7	46	38	3.74	23	9
8	47	21	16.39	16	1
9	57	34	10.83	16	3
10	38	13	6.03	2	0
11	9	6	2.25	0	-1
12	6	4	0	0	0
13	No rocks	past end of cell			

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

X Interval	Rocks Stopped
0 To 10 ft	0
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	0

50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	14
80 To 90 ft	64
90 To 100 ft	319
100 To 110 ft	98
110 To 120 ft	5
120 To 122.9 ft	0

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 13
Analysis Point 1 X-Coordinate: 107.9
Analysis Point 2 X-Coordinate: 112.9
Analysis Point 3 X-Coordinate: 122.9
Initial Y-Top Starting Zone Coordinate: 73.4
Initial Y-Base Starting Zone Coordinate: 70

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	0.5	0.5	0.15	0	89.4	17.6	80.6
2	0.15	0.85	0.2	17.6	80.6	27.6	80.6
3	0.15	0.85	0.2	27.6	80.6	30	75.8
4	0.15	0.85	0.2	30	75.8	35	75.8
5	0.15	0.85	0.2	35	75.8	50	45.8
6	0.15	0.85	0.2	50	45.8	55	45.8
7	0.15	0.85	0.2	55	45.8	70	15.8
8	0.15	0.85	0.2	70	15.8	75	15.8
9	0.15	0.85	0.2	75	15.8	82.9	0
10	0.15	0.85	0.2	82.9	0	92.9	0
11	0.15	0.85	0.2	92.9	0	107.9	5
12	0.1	0.9	0.9	107.9	5	112.9	6
13	0.1	0.9	0.9	112.9	6	122.9	6

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 13
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1.5 ft
Thickness: 1.5 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Analysis Point 1: X = 107.9, Y = 5

Total Rocks Passing Analysis Point: 8

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	4.91	302	0
75%	6.46	498	5.48
90%	7.85	675	10.4
95%	8.69	781	13.36
98%	9.63	900	16.67

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 9.08	Maximum: .12	Maximum: 862
Average: 4.91	Average: 0	Average: 302
Minimum: 2.76	G. Mean: 0	Std. Dev.: 290
Std. Dev.: 2.3	Std. Dev.: 8.11	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Analysis Point 2: X = 112.9, Y = 6

Total Rocks Passing Analysis Point: 2

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	4.75	236	0.12
75%	4.75	236	0.79
90%	4.75	236	1.4
95%	4.75	236	1.76
98%	4.75	236	2.17

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 5.44	Maximum: .18	Maximum: 320
Average: 4.75	Average: .13	Average: 236
Minimum: 4.06	G. Mean: .12	Std. Dev.: 0
Std. Dev.: 0 Std. Dev.: 1		

Remarks:

CRSP Analysis Point 3 Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Analysis Point 3: X = 122.9, Y = 6

NO ROCKS PAST ANALSYSIS POINT 3

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	No rocks	past end of cell			
2	No rocks	past end of cell			
3	No rocks	past end of cell			
4	No rocks	past end of cell			
5	38	33	1.9	3	0
6	21	14	2.56	0	0
7	46	37	3.59	23	9
8	47	23	16.85	16	1
9	57	35	11.11	16	3
10	38	13	6.01	3	0
11	9	5	2.3	0	-1
12	5	5	0	0	0
13	No rocks	past end of cell			

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\GB-3\Phase II CRSP Analyses\STA 628+50\STA 628+50\STA 628+50 Left\STA 628+50 Left Slope NC.dat

X Interval	Rocks Stopped
0 To 10 ft	0
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	0

50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	11
80 To 90 ft	56
90 To 100 ft	307
100 To 110 ft	124
110 To 120 ft	1
120 To 122.9 ft	1

CRSP Input File -M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 629+00\STA 629+00 Left\STA 629+00 Left Slope LT-max.dat

Input File Specifications

Units of Measure: U.S.
Total Number of Cells: 7
Analysis Point 1 X-Coordinate: 96.3
Analysis Point 2 X-Coordinate: 101.3
Analysis Point 3 X-Coordinate:
Initial Y-Top Starting Zone Coordinate: 99
Initial Y-Base Starting Zone Coordinate: 85.1

Remarks:

Cell Data

Cell No.	S.R.	Tang. C.	Norm. C.	Begin X	Begin Y	End X	End Y
1	.21	.8	.18	0	99	13.9	85.1
2	.21	.8	.18	13.9	85.1	22.4	78.1
3	.21	.8	.18	22.4	78.1	62.4	18.1
4	.21	.8	.18	62.4	18.1	71.3	0
5	.21	.8	.2	71.3	0	81.3	0
6	.21	.8	.18	81.3	0	96.3	5
7	.1	.9	.9	96.3	5	101.3	5.4

CRSP Simulation Specifications: Used with M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 629+00\STA 629+00 Left\STA 629+00 Left Slope LT-max.dat

Total Number of Rocks Simulated: 500
Starting Velocity in X-Direction: 1 ft/sec
Starting Velocity in Y-Direction: -1 ft/sec
Starting Cell Number: 1
Ending Cell Number: 7
Rock Density: 155 lb/ft^3
Rock Shape: Discoidal
Diameter: 1 ft
Thickness: 1 ft

CRSP Analysis Point 1 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 629+00\STA 629+00 Left\STA 629+00 Left Slope LT-max.dat

Analysis Point 1: X = 96.3, Y = 5

Total Rocks Passing Analysis Point: 22

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	6.24	149	0.04
75%	7.88	232	3.2
90%	9.35	307	6.04
95%	10.24	352	7.75
98%	11.23	403	9.66

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 12.98	Maximum: .32	Maximum: 534
Average: 6.24	Average: .08	Average: 149
Minimum: 2.78	G. Mean: .04	Std. Dev.: 123
Std. Dev.: 2.43	Std. Dev.: 4.68	

Remarks:

CRSP Analysis Point 2 Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 629+00\STA 629+00 Left\STA 629+00 Left Slope LT-max.dat

Analysis Point 2: X = 101.3, Y = 5

Total Rocks Passing Analysis Point: 9

Cumulative Probability	Velocity (ft/sec)	Energy (ft-lb)	Bounce Ht. (ft)
50%	6.24	142	0.15
75%	8.7	244	4.83
90%	10.91	336	9.04
95%	12.23	391	11.56
98%	13.72	453	14.4

Velocity (ft/sec)	Bounce Height (ft)	Kinetic Energy (ft-lb)
Maximum: 12.45	Maximum: .65	Maximum: 434
Average: 6.24	Average: .27	Average: 142
Minimum: 2.15	G. Mean: .15	Std. Dev.: 151
Std. Dev.: 3.64	Std. Dev.: 6.93	

Remarks:

CRSP Data Collected at End of Each Cell - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 629+00\STA 629+00 Left\STA 629+00 Left Slope LT-max.dat

Velocity Units: ft/sec Bounce Height Units: ft

Cell #	Max. Vel.	Avg. Vel.	S.D. Vel.	Max. Bounce Ht.	Avg. Bounce Ht.
1	24	15	4.74	1	0
2	28	20	3.33	2	0
3	61	48	5.51	10	3
4	69	55	6.26	16	7
5	61	18	10.76	3	0
6	13	6	2.43	0	0
7	12	6	3.64	1	0

CRSP Rocks Stopped Data - M:\proj\0121\3070.03\Cut Slope Designs\CRSP Analyses\Phase II CRSP Analyses\STA 629+00\STA 629+00 Left\STA 629+00 Left Slope LT-max.dat

X Interval	Rocks Stopped
0 To 10 ft	0
10 To 20 ft	0
20 To 30 ft	0
30 To 40 ft	0
40 To 50 ft	0
50 To 60 ft	0
60 To 70 ft	0
70 To 80 ft	7
80 To 90 ft	319
90 To 100 ft	161
100 To 101.3 ft	4

APPENDIX C

ODOT General Earthwork Design Checklist - Centerline Cuts Checklist

III.A. Centerline Cuts Checklist

C-R-S: SCI-823-6.81	PID: 19415	Reviewer: B. Mott & E.Tse	Date: 11-29-06

If you do not have a centerline cut on the project, you do not have to fill out this checklist.

Soil Cuts			
(Y) N X	1	Does drilling provide continuous stratigraphic sections for the range of elevations that represent proposed cut slope areas?	
(Y) N X	2	Do the cut slopes have a minimum stability F.S. of 1.30 and are not steeper than 2:1? Check stability calculation method used: ☒ STABL or equivalent software ☐ hand calculations	
(Y) N X	3	If there is a "red bed" or other historically unstable soil or rock layer through the cut slopes, was this layer considered as a possible failure zone?	
Y N (X)	4	Have erosion protection measures been addressed for backslopes, side slopes, and ditches (including riprap recommendations or special slope treatments)?	
Y N (X)	5	Have issues related to any special usage of excavated soils been addressed?	
	6	If the cut is not completely above the water table,	
Y N (X)		a Did the design consider the construction or long term ramifications of cutting below the water table?	
Y N (X)		b Did the design consider additional drainage in the cut slope (springs / seeps) and roadway base?	

III.A. Centerline Cuts Checklist

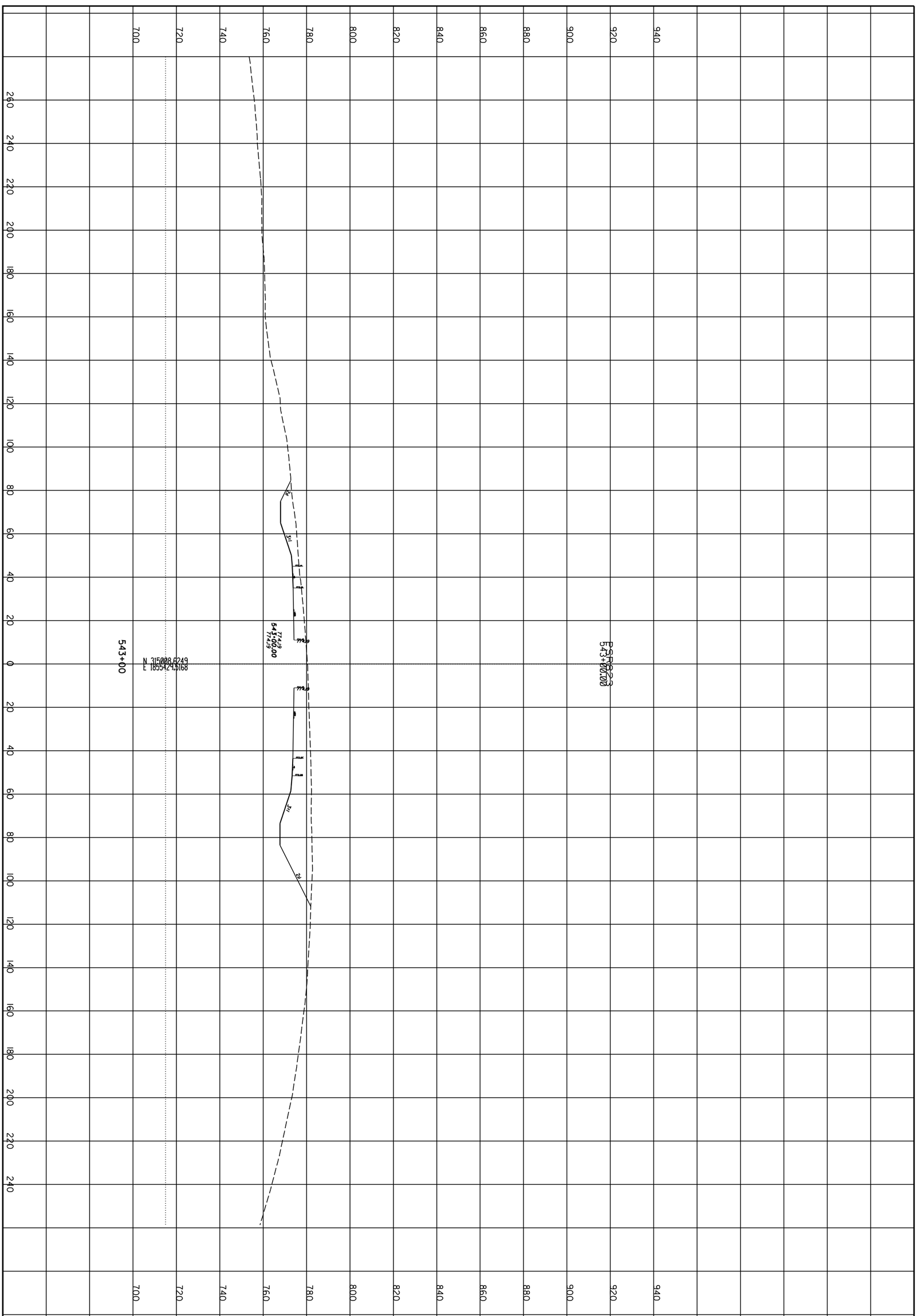
Rock Slopes			
		For rockfall and additional design considerations, see the "Rockfall Corrections Checklist."	
(Y) N X	7	Has the subsurface exploration adequately characterized the rock in accordance with the Geotechnical Bulletin 3: Rock Cut Slope and Catchment Design (GB 3)?	
(Y) N X	8	Have the slope angles, benching scheme, rockfall catchment design, and drainage controls been determined as prescribed in GB 3?	
Y N (X)		In accordance with GB 3, are the rock cut slopes, benches, and catchment areas indicated on all appropriate cross-sections?	
(Y) N X	10	In accordance with GB 3, has the rockfall catchment output and the cost analysis comparing configurations been provided?	

Notes:

Stage 1:

APPENDIX D

Cut Slope Cross Sections



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CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 543+50

PSR823
543+50.00

776.19
543+50.00
776.19

N 315094.4227
E 185538.8204

543+50

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 544+00

SCI-823-10.13

980
960
940
920
900
880
860
840
820
800
780
760
740
720
700

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

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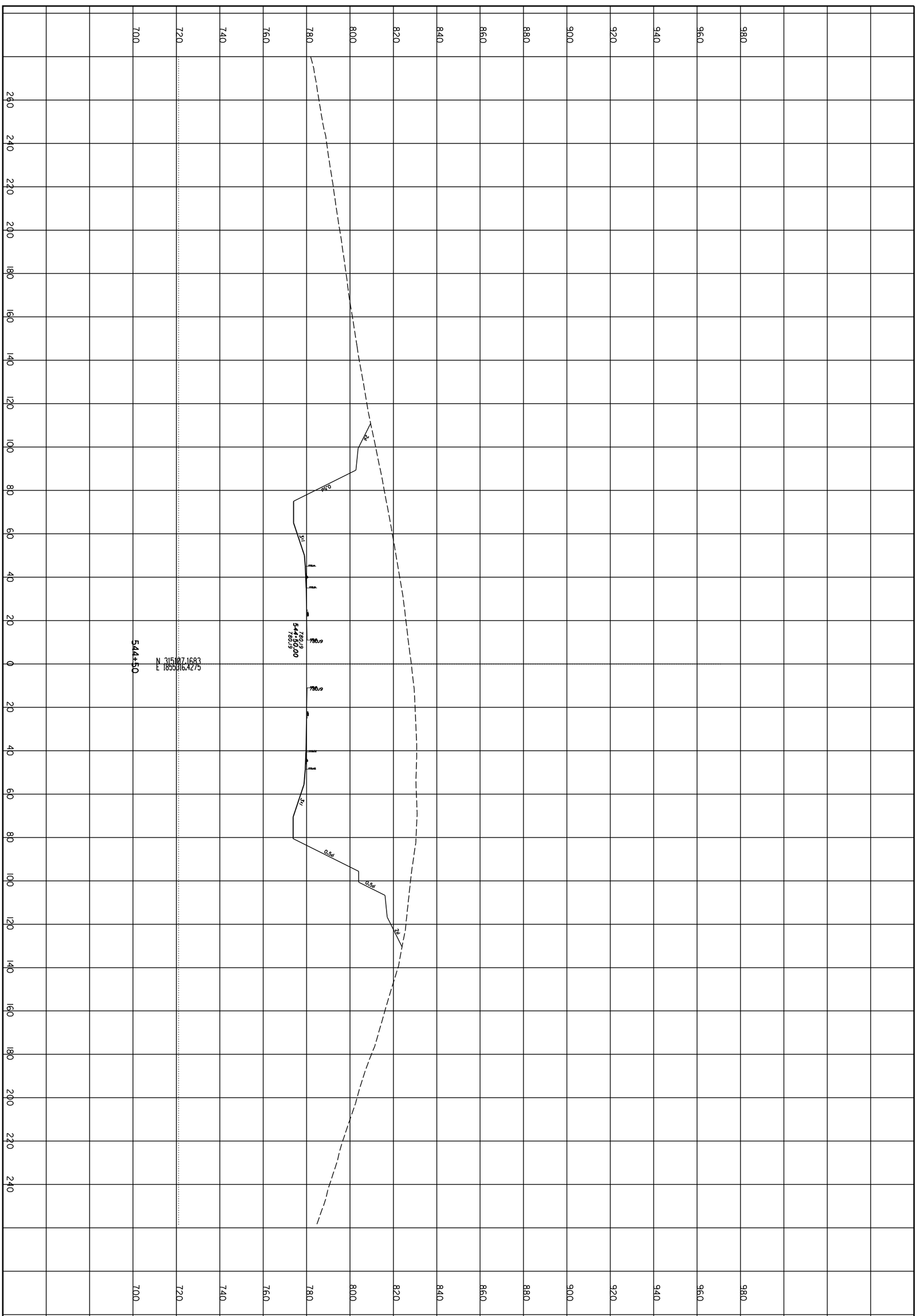
2H
778.19
544+00.00
778.19
N 3150274.3295
E 1855.941239
544+00



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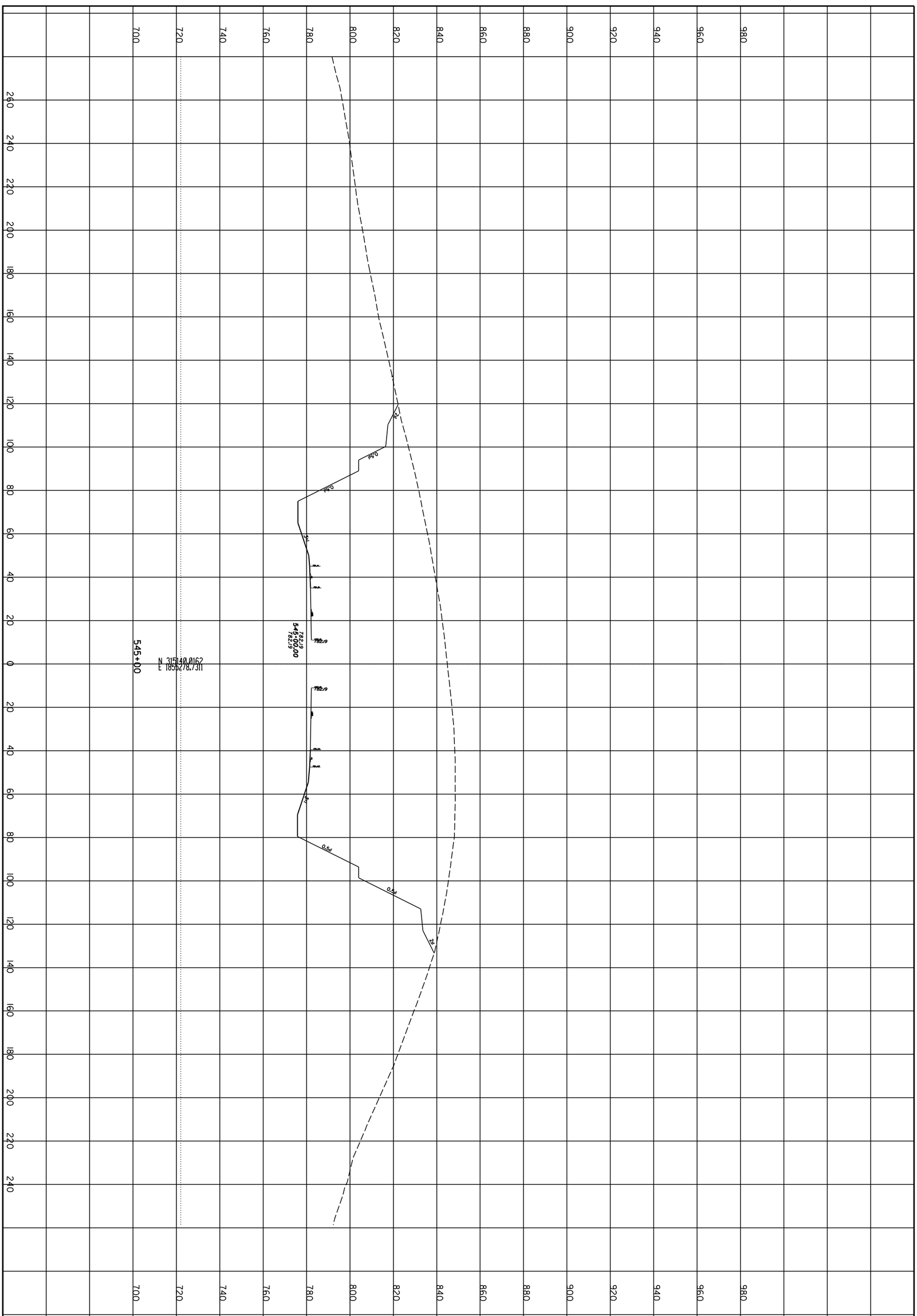

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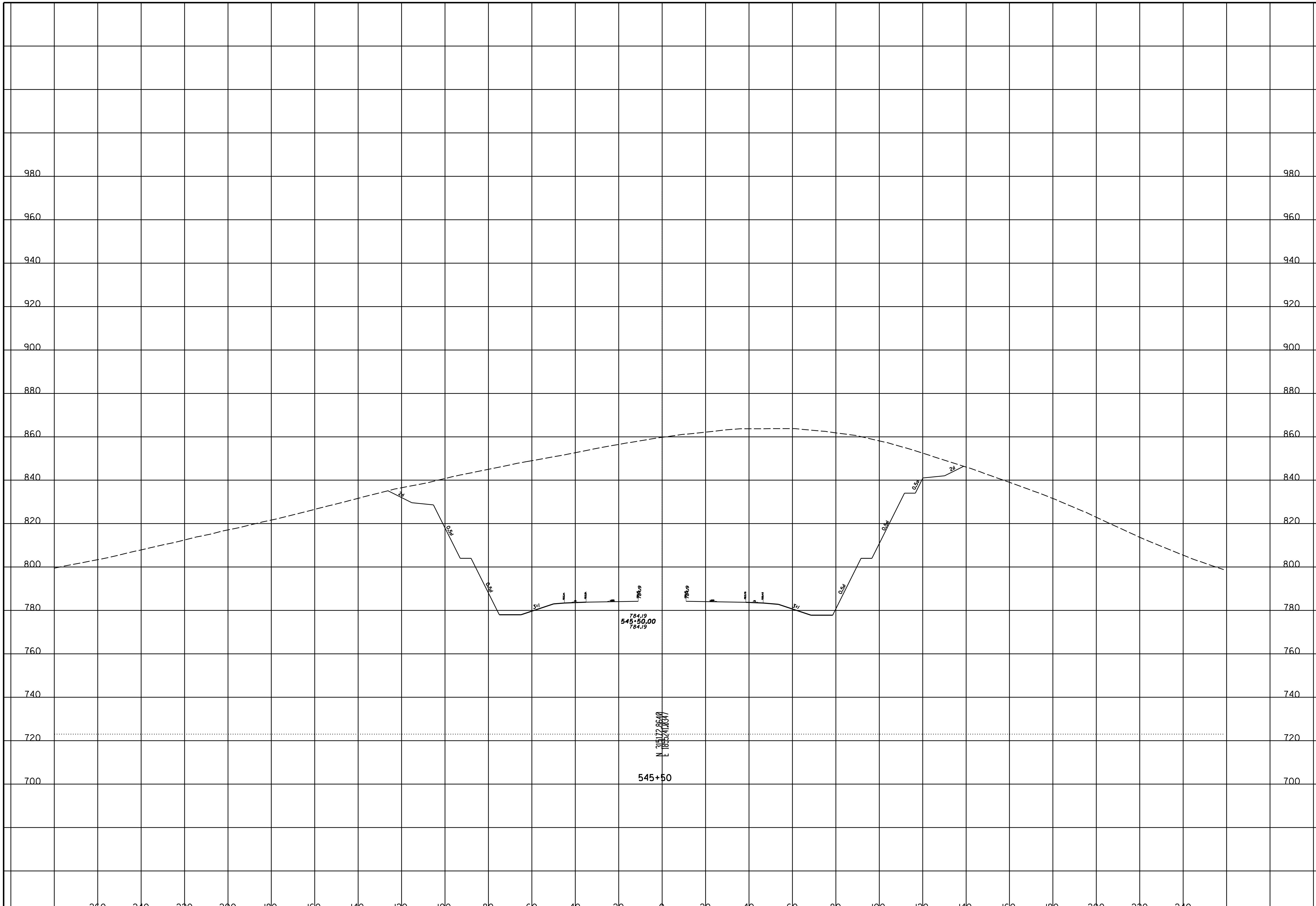

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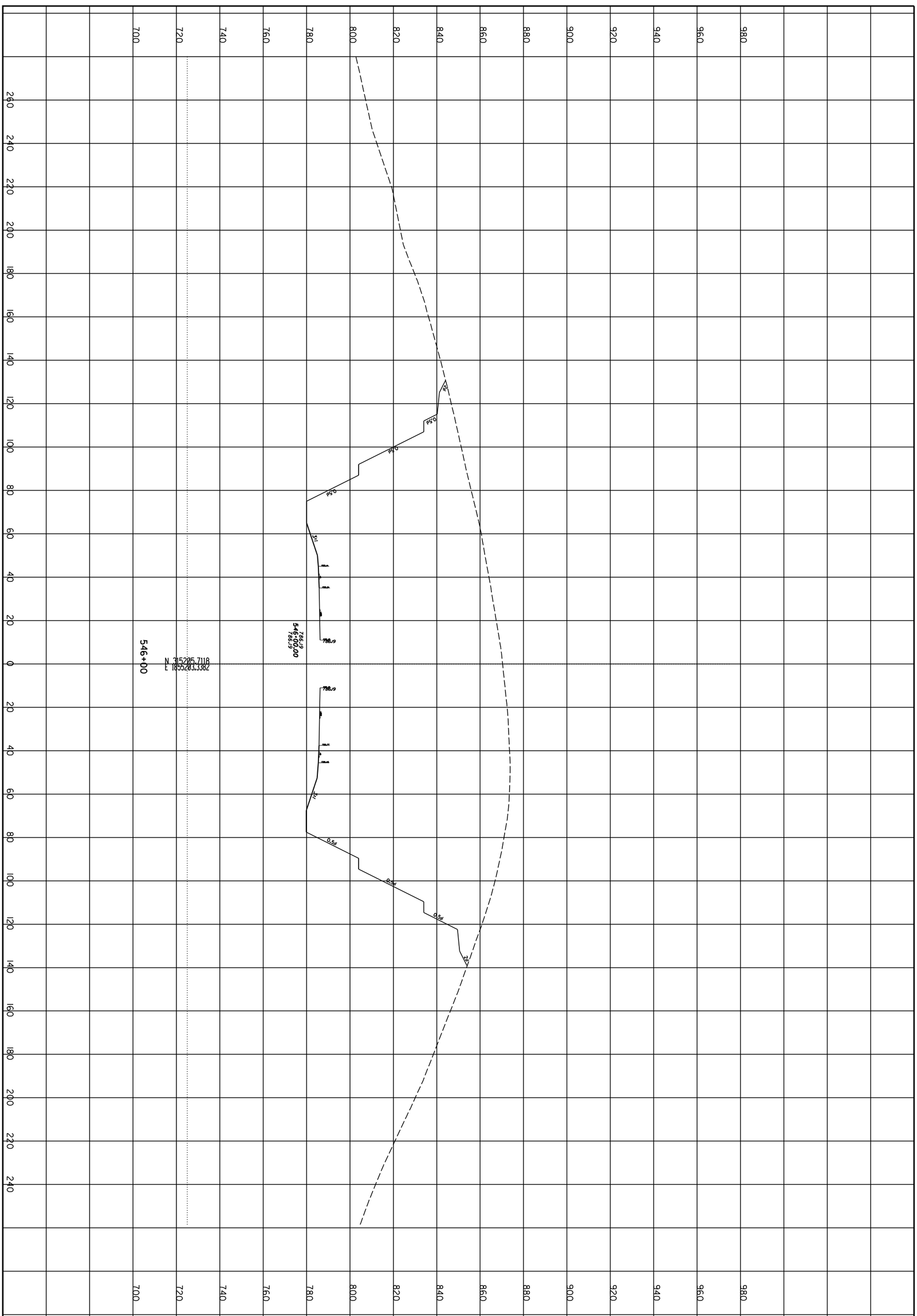
STA 545+50

SCI-823-10.13



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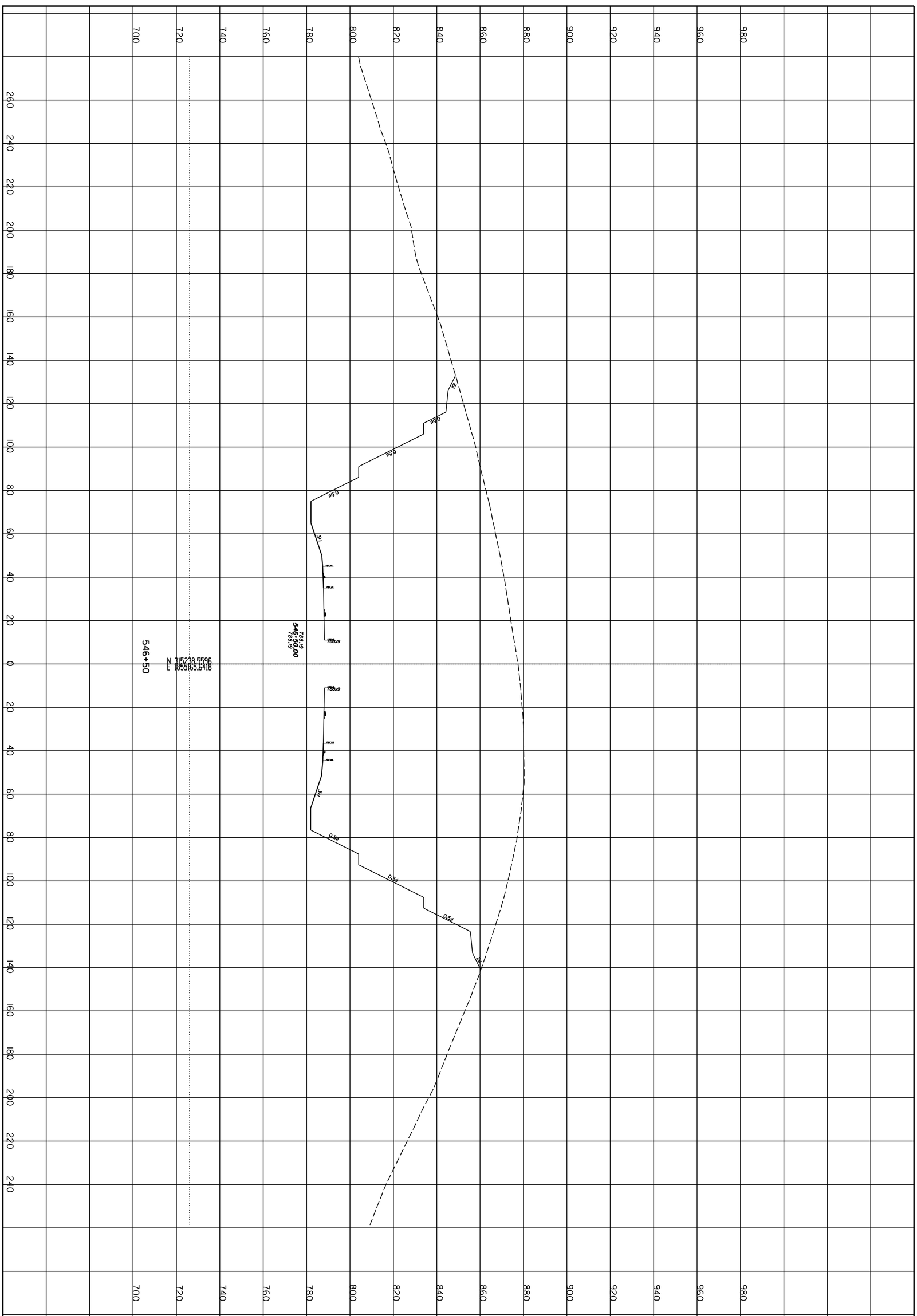

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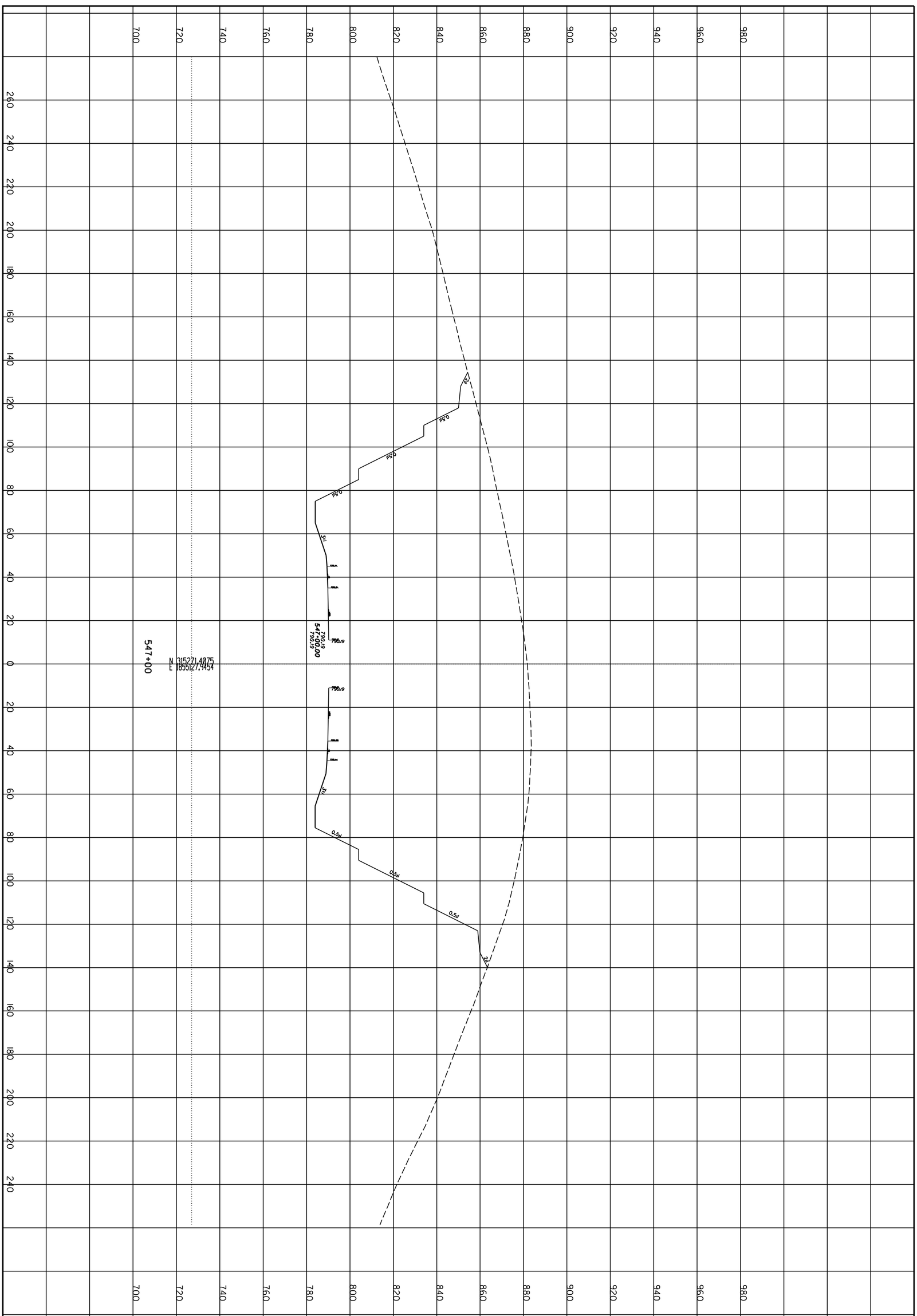

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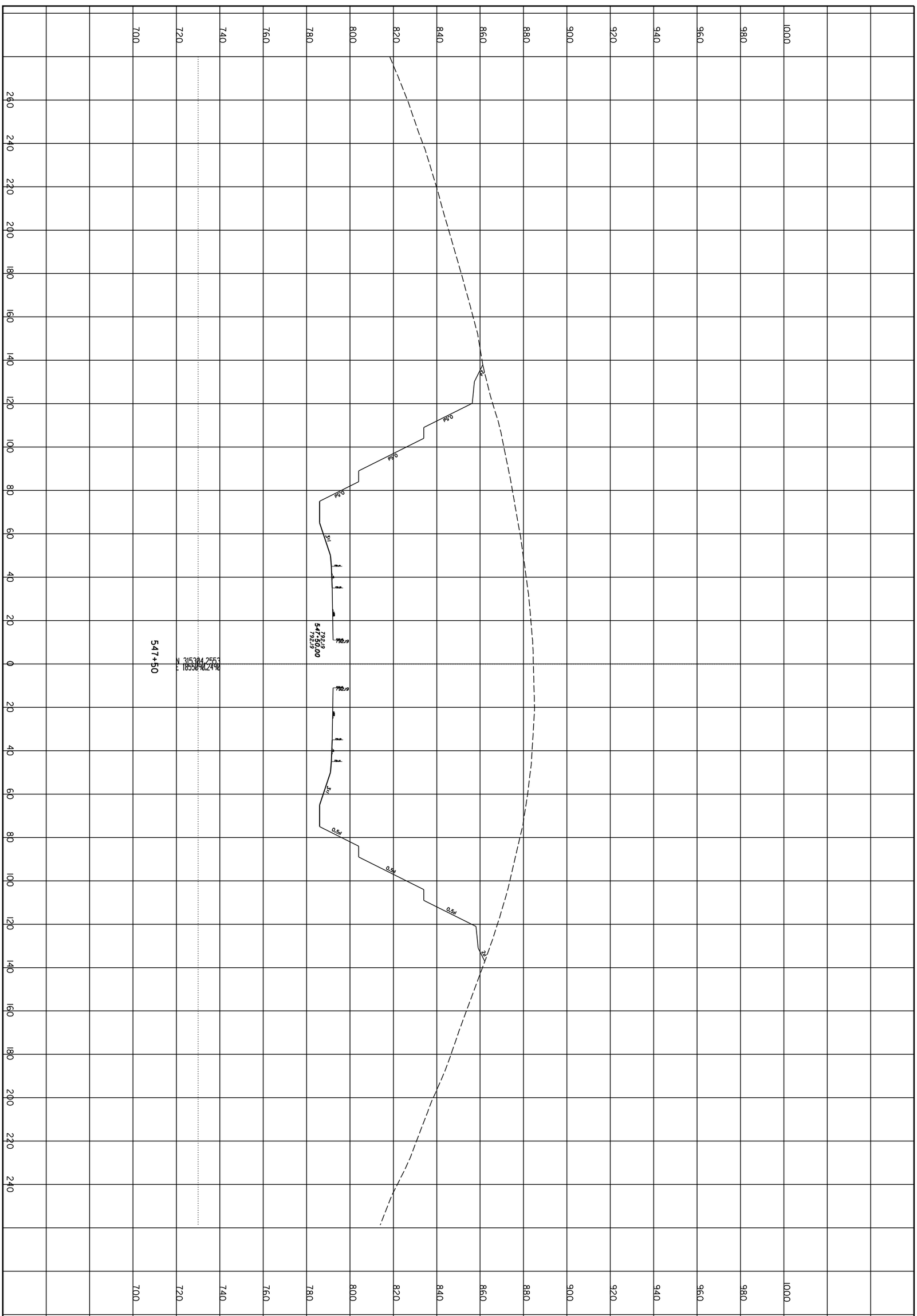

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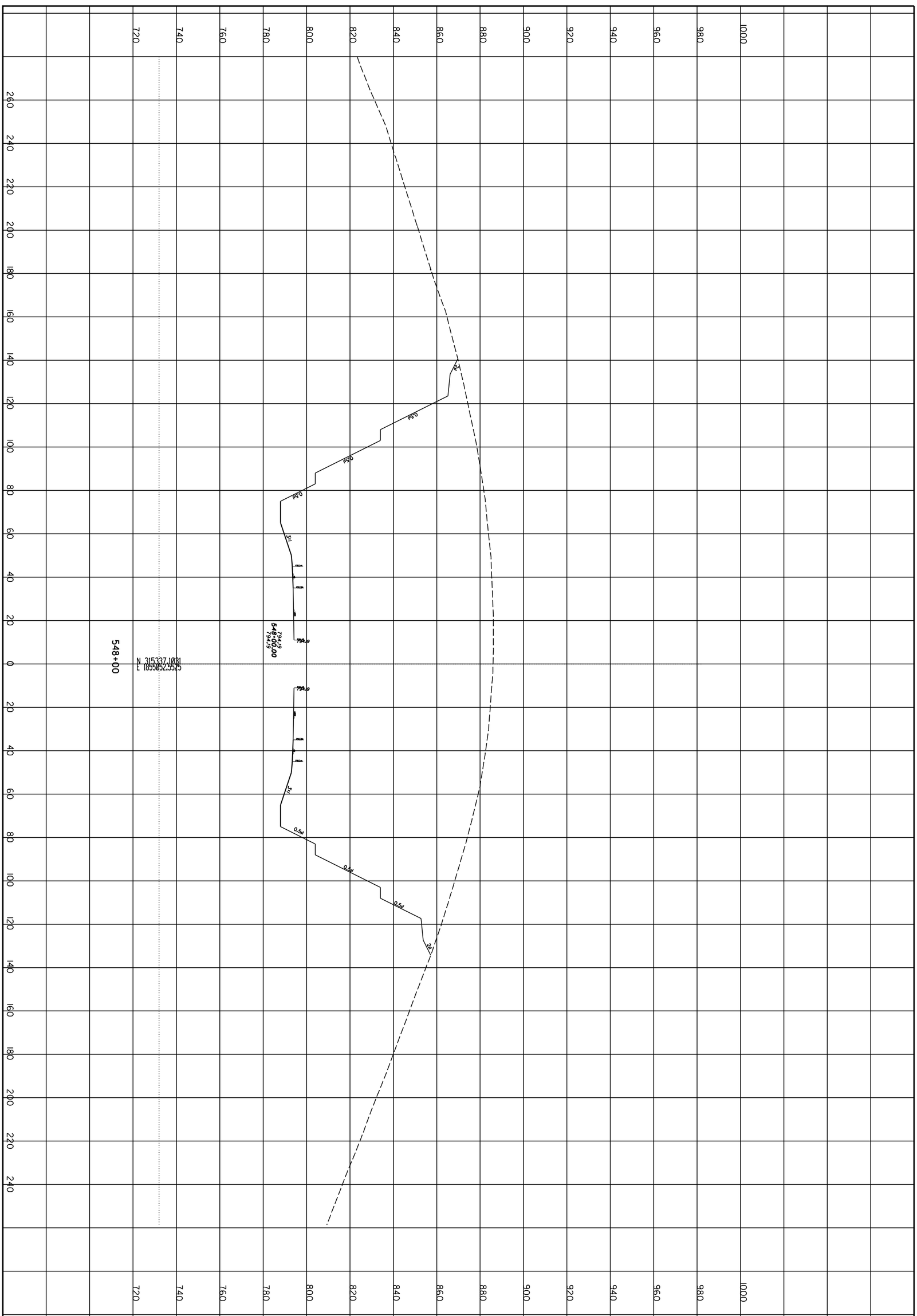

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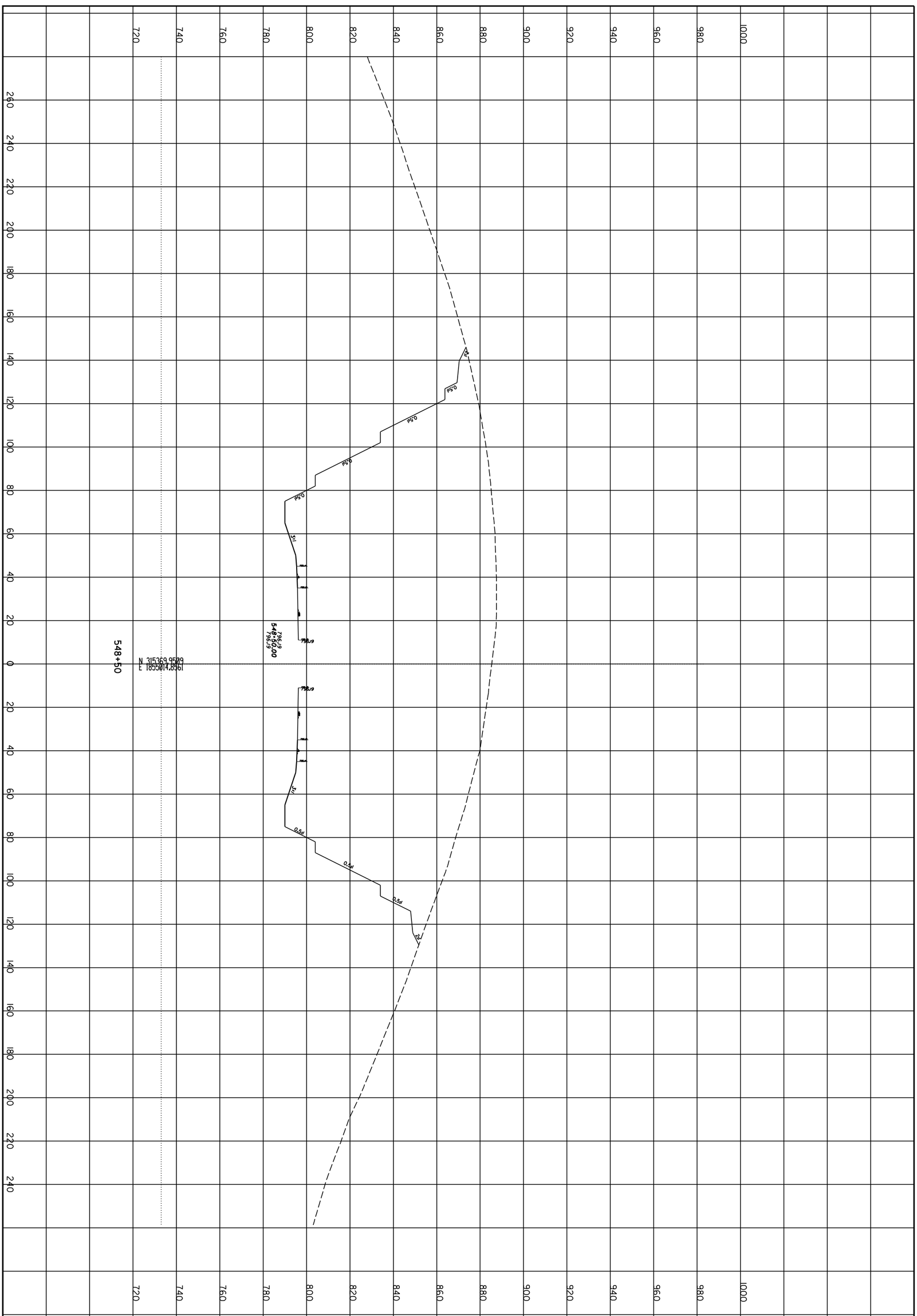

12 / 63	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 548+50
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 549+00

0.5H
0.5H
0.5H
0.5H
3:1
798.9
798.19
549+00.00
798.19
3:1
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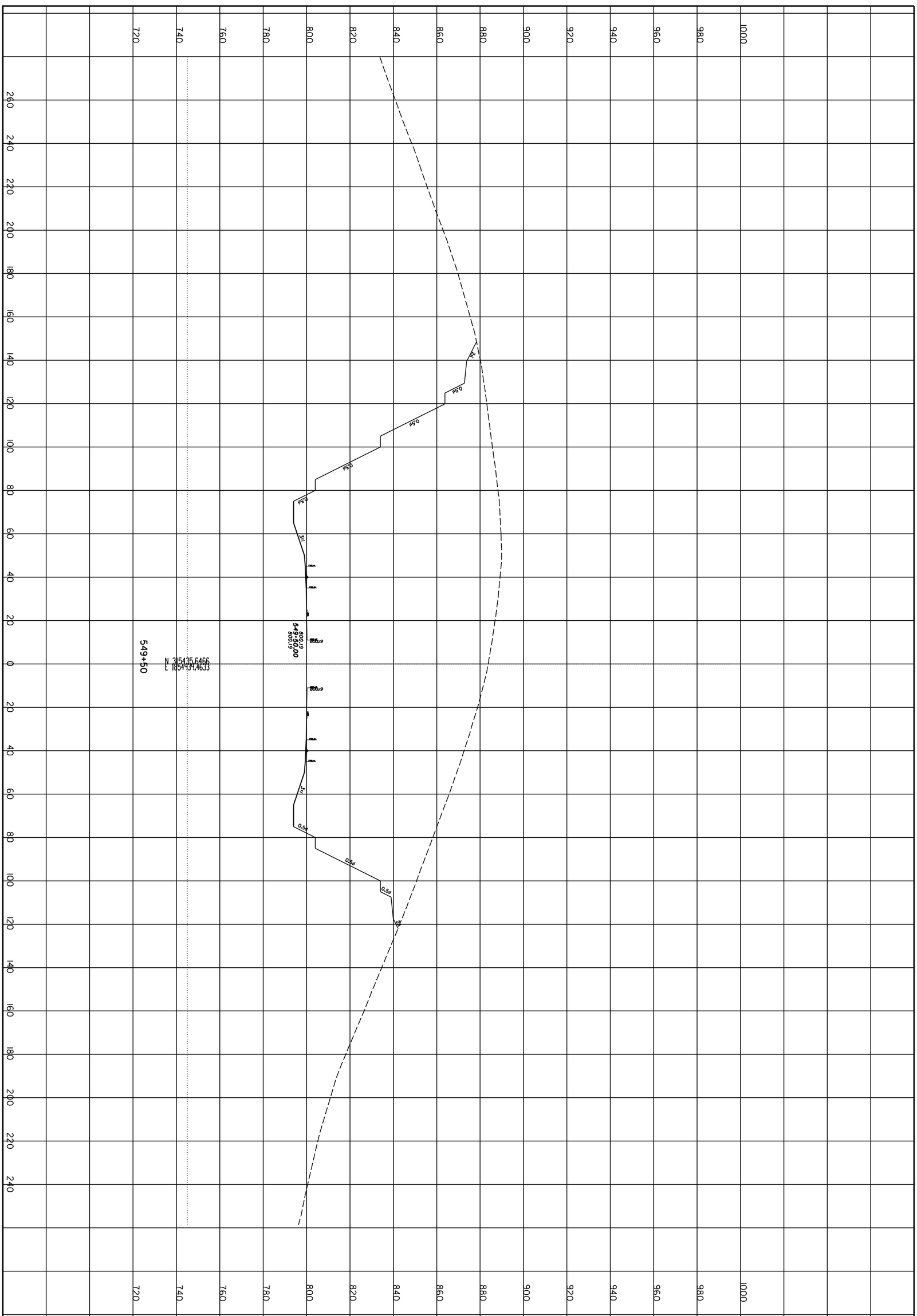
N 315407.7988
E 183497.1597
549+00

SCI-823-10.13

13
63



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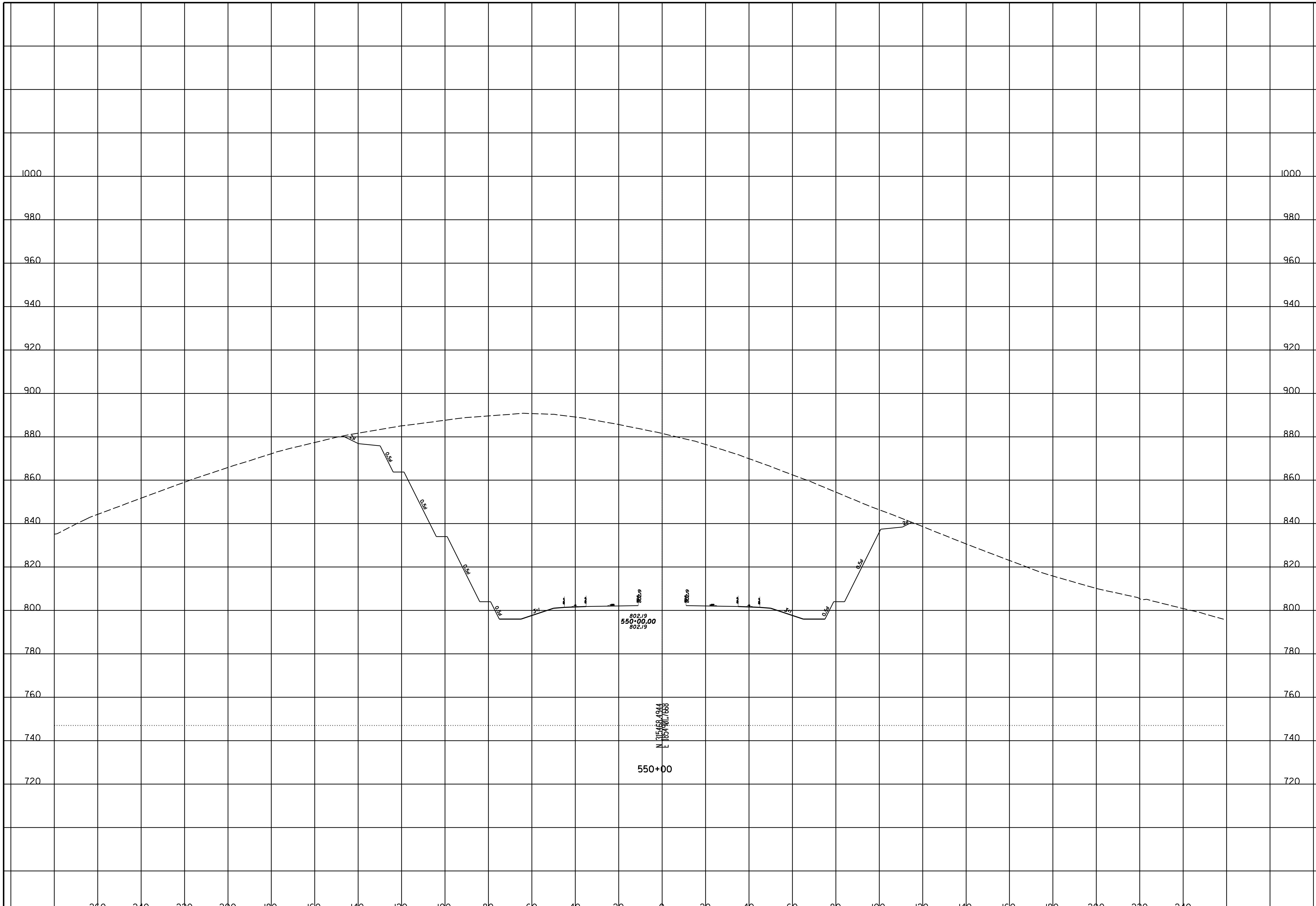

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STA 550+00

SCI-823-10.13

15
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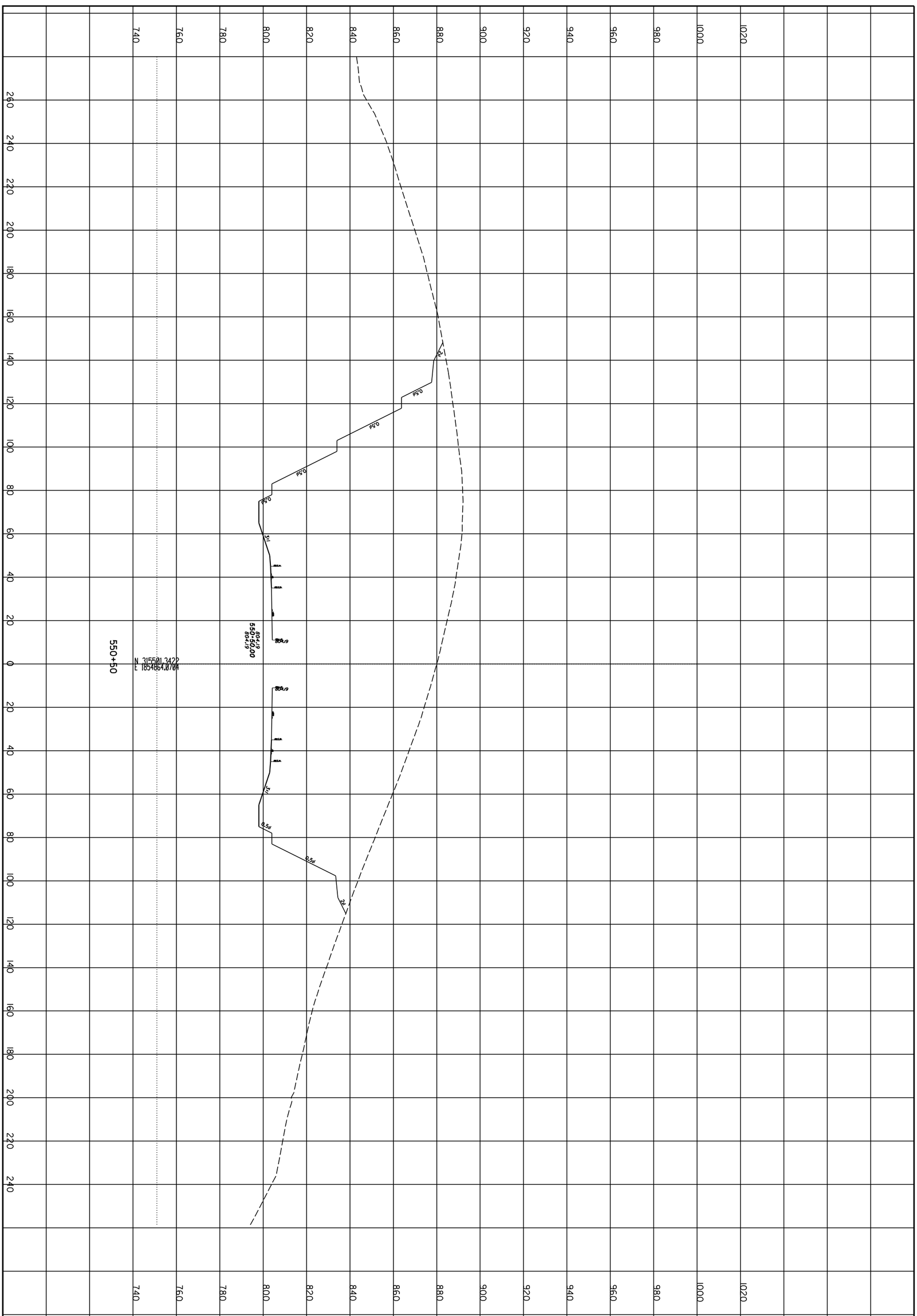

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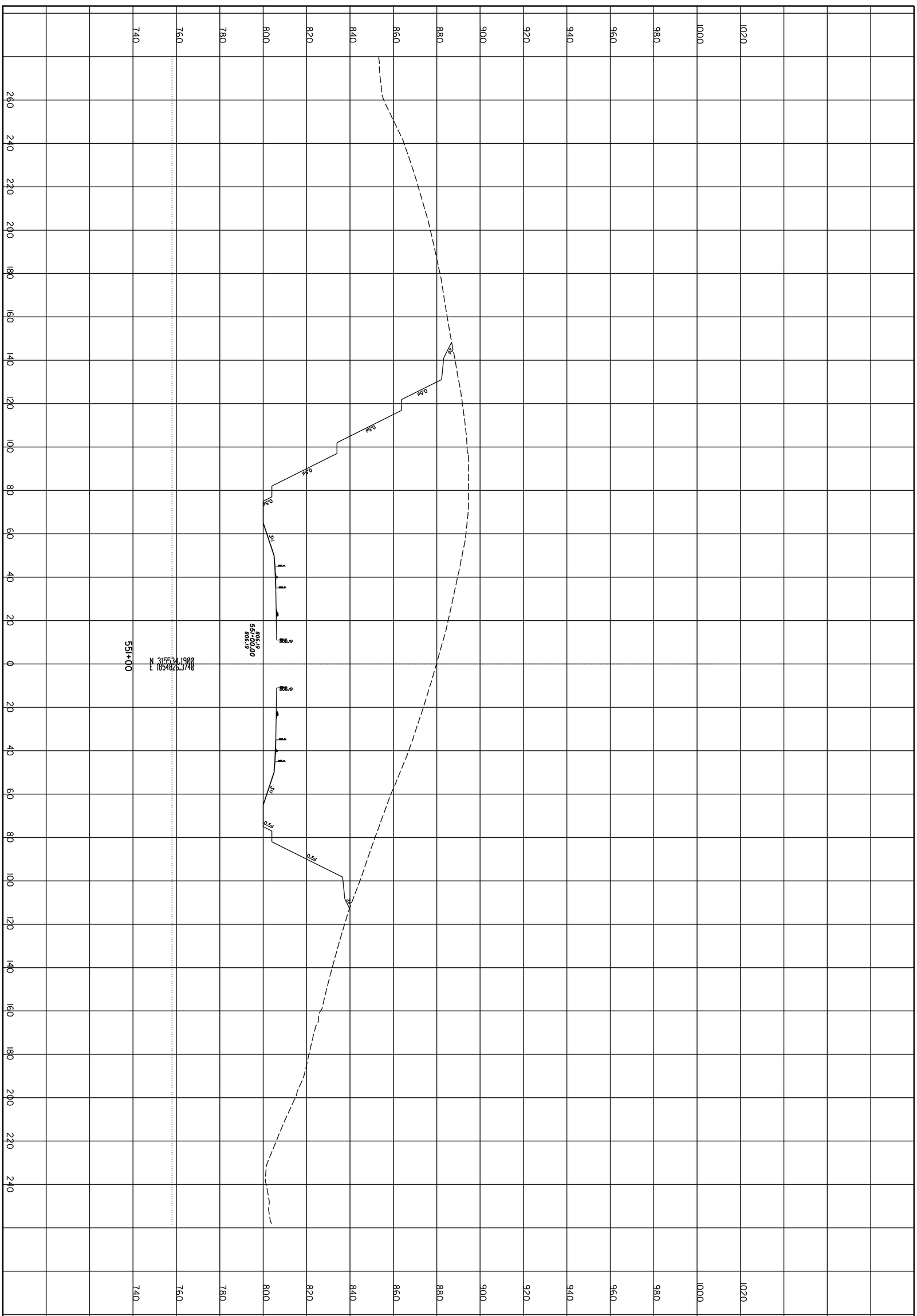

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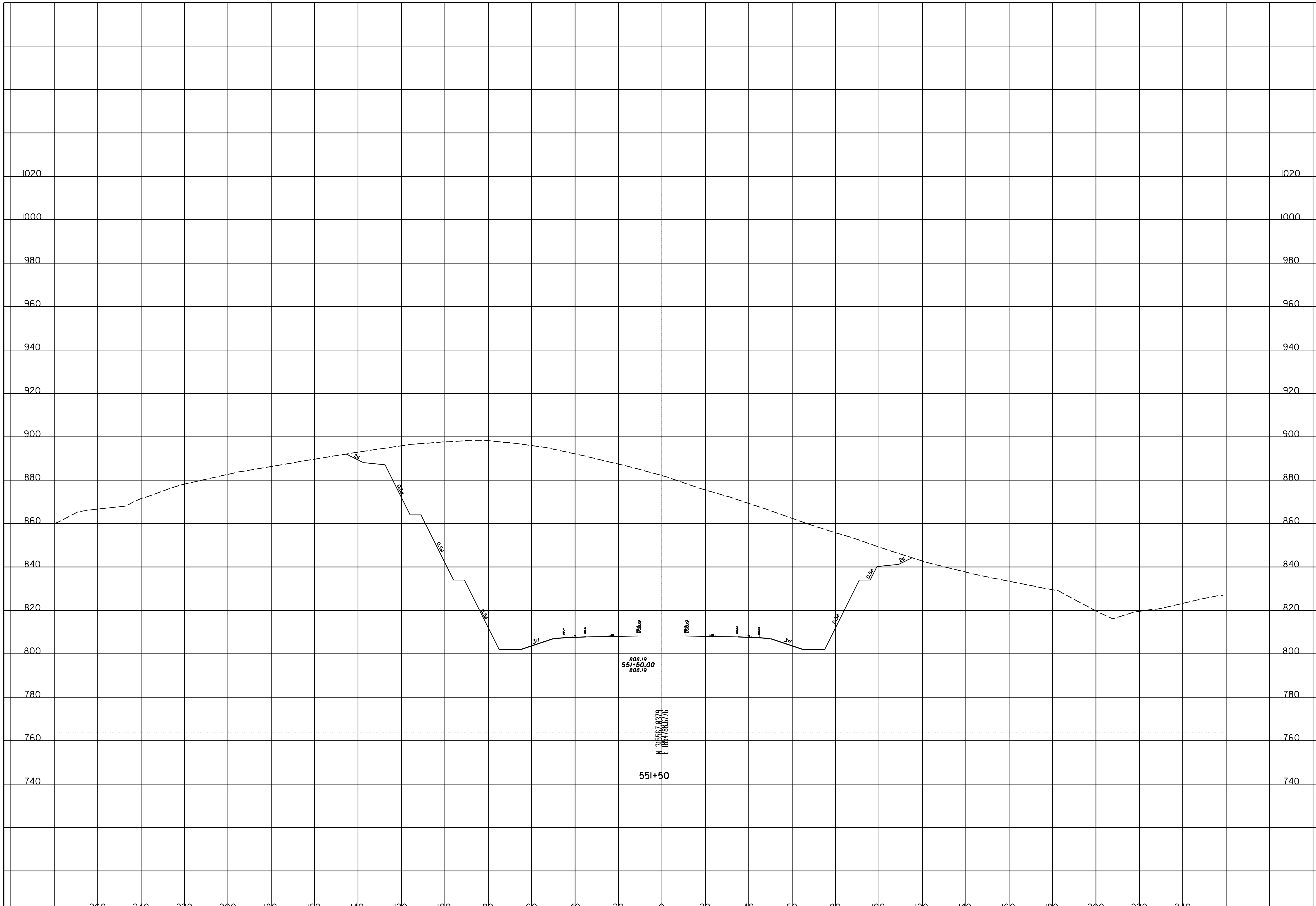

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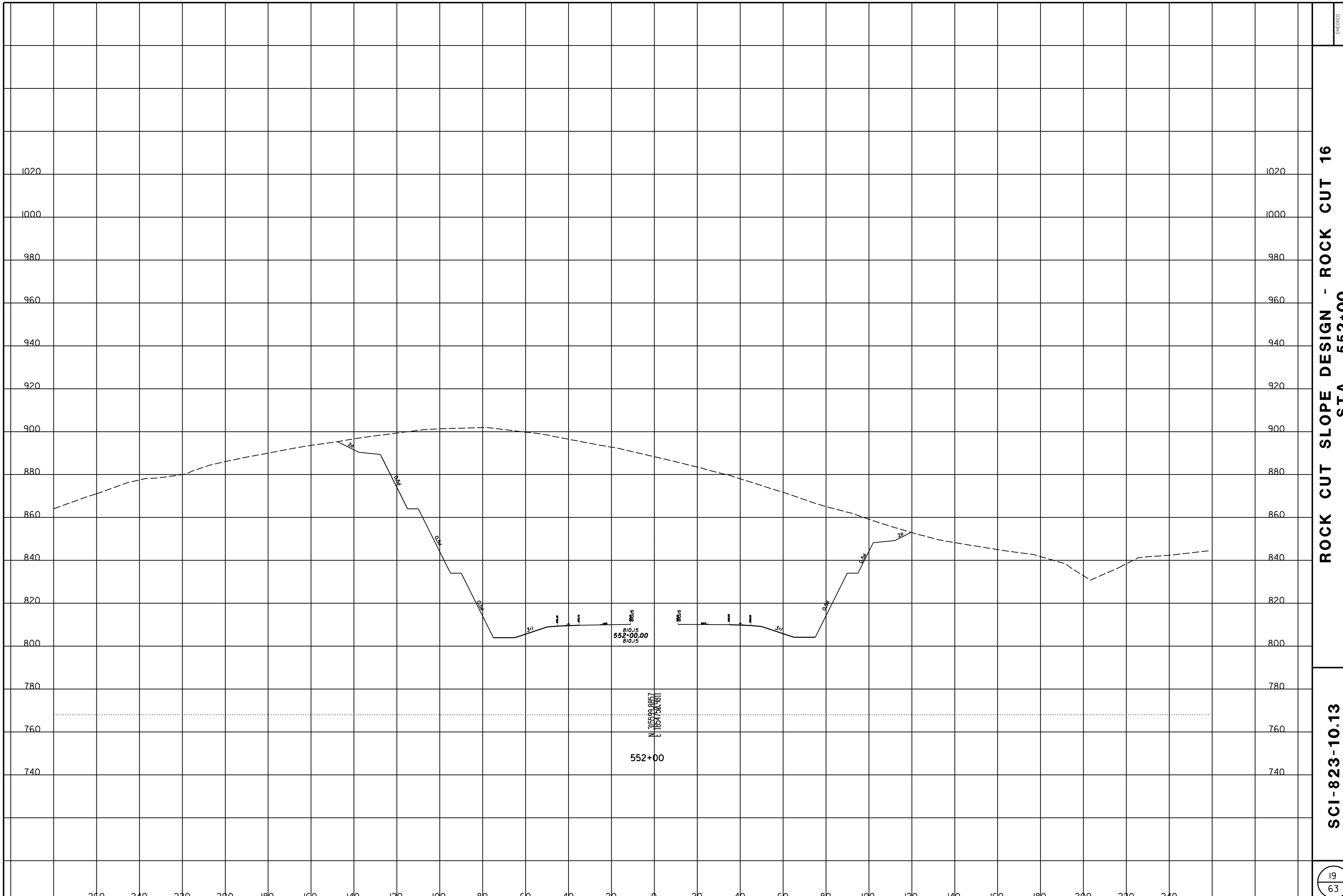
SCI-823-10.13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SCI-823-10.13
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63
CHECKED
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552+00
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E 1854750.9811

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

812.00
552+50.00
812.00

N 315632.7334
E 185473.2846

552+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 552+50

SCI-823-10.13

20
63

CHECKED

SLOPE DESIGN - ROCK CUT 16
STA 553+00

ROCK CUT SLOPE

SCI-823-10.13

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

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0.5H
0.5H
2H
0.5H
0.5H
0.5H
3H
3H
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553+00.00
813.76
N 315665.5569
E 1854675.5610
553+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 553+50

SCI-823-10.13

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

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1H
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553+50.00
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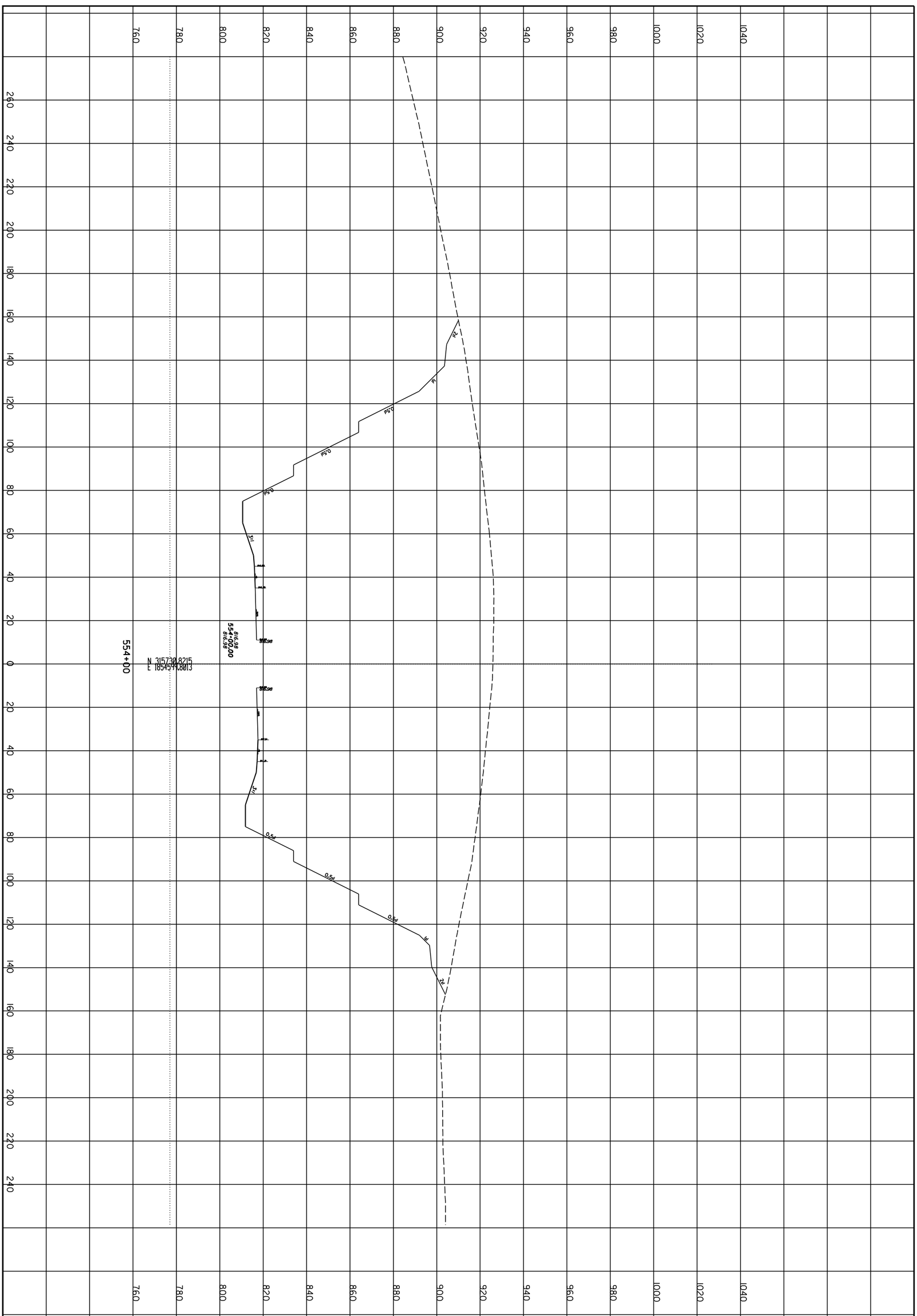

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		CHECKED

CHECKED

CUT SLOPE DESIGN - ROCK CUT 16
STA 554+50

ROCK CUT

SCI-823-10.13

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

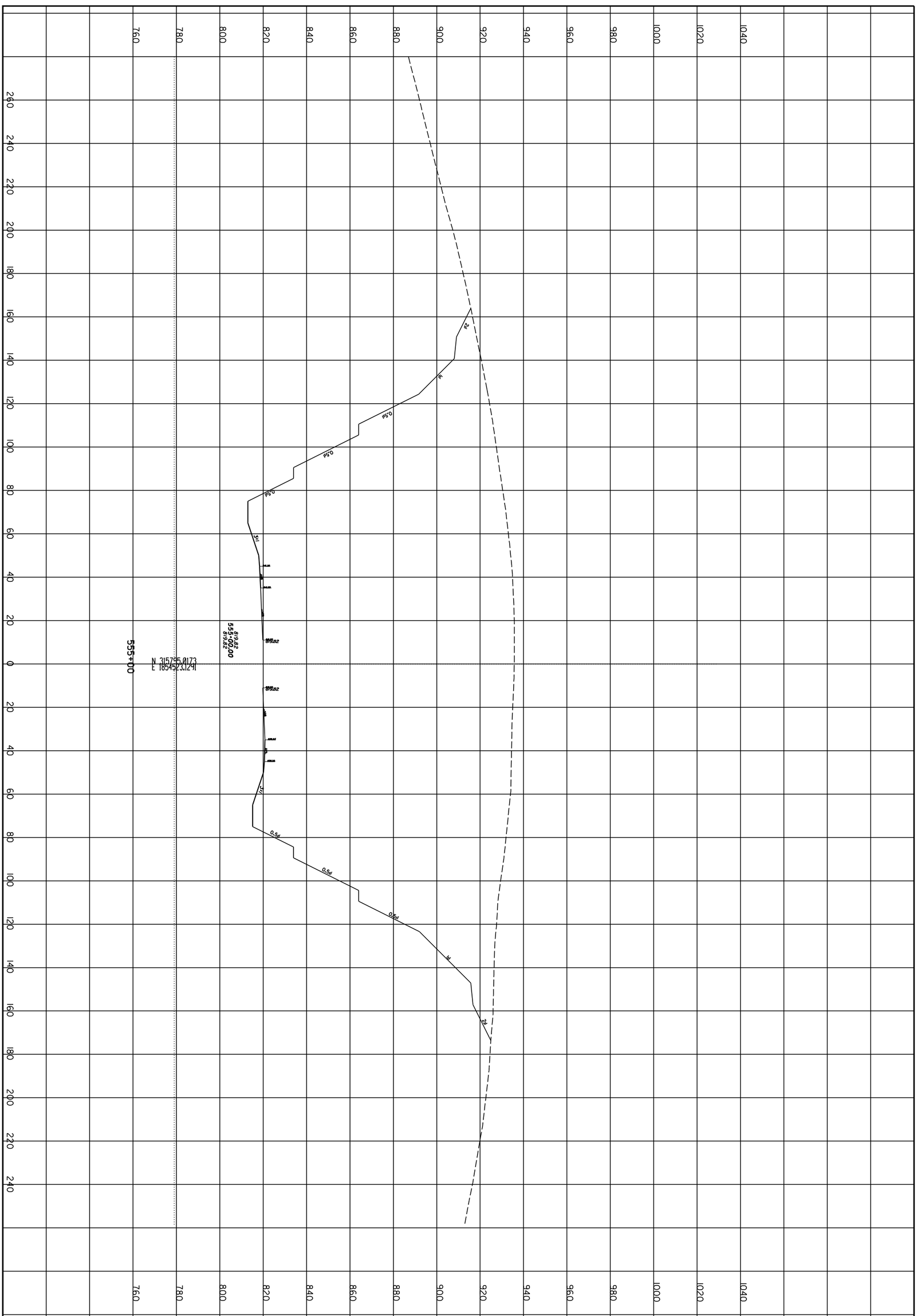
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2H
10H
0.5H
0.5H
0.5H
3:1
3:1
0.5H
0.5H
2H
1H

818.45
554+50.00
818.45

N 3157630.9956
E 1854961.8126

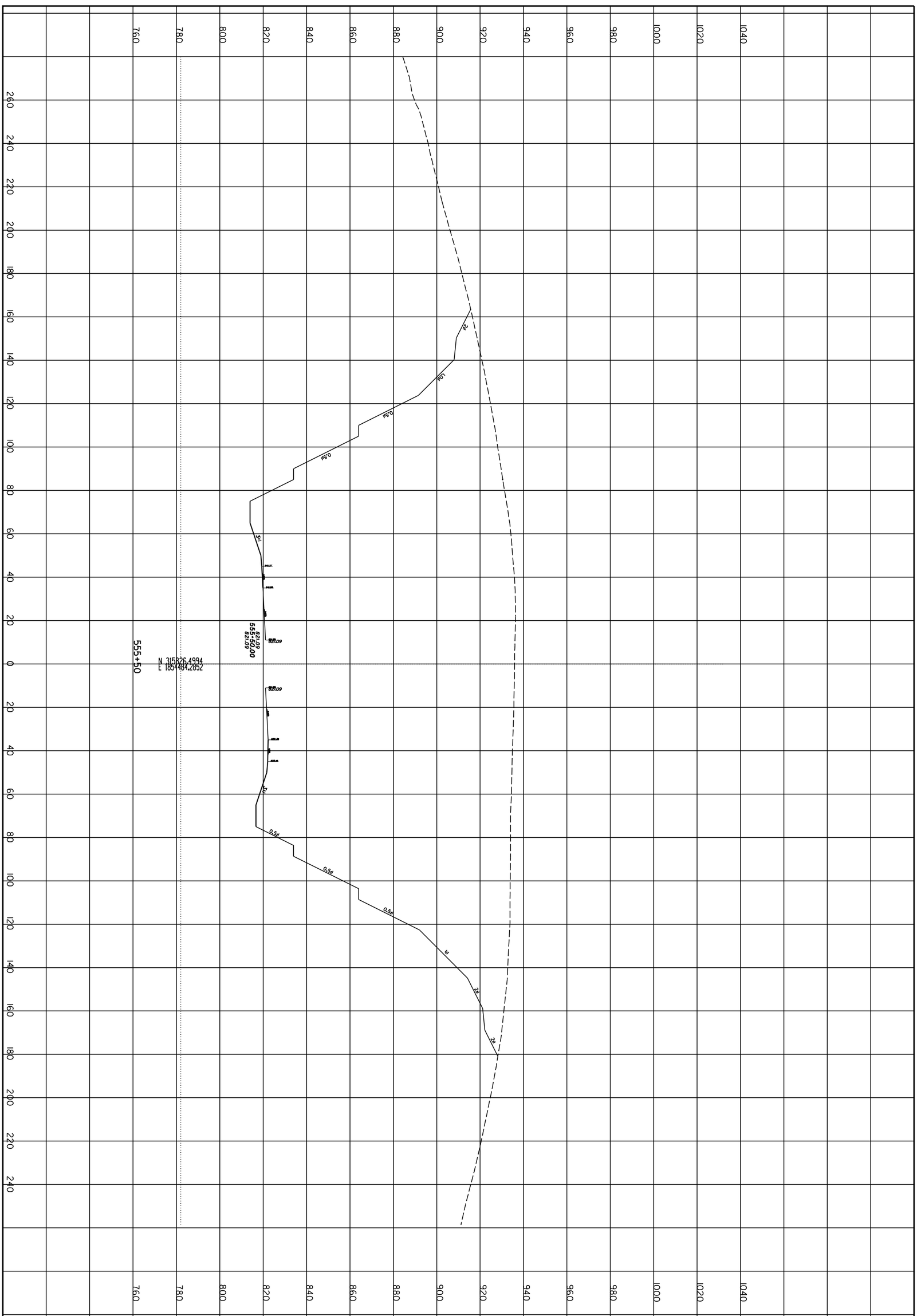
554+50



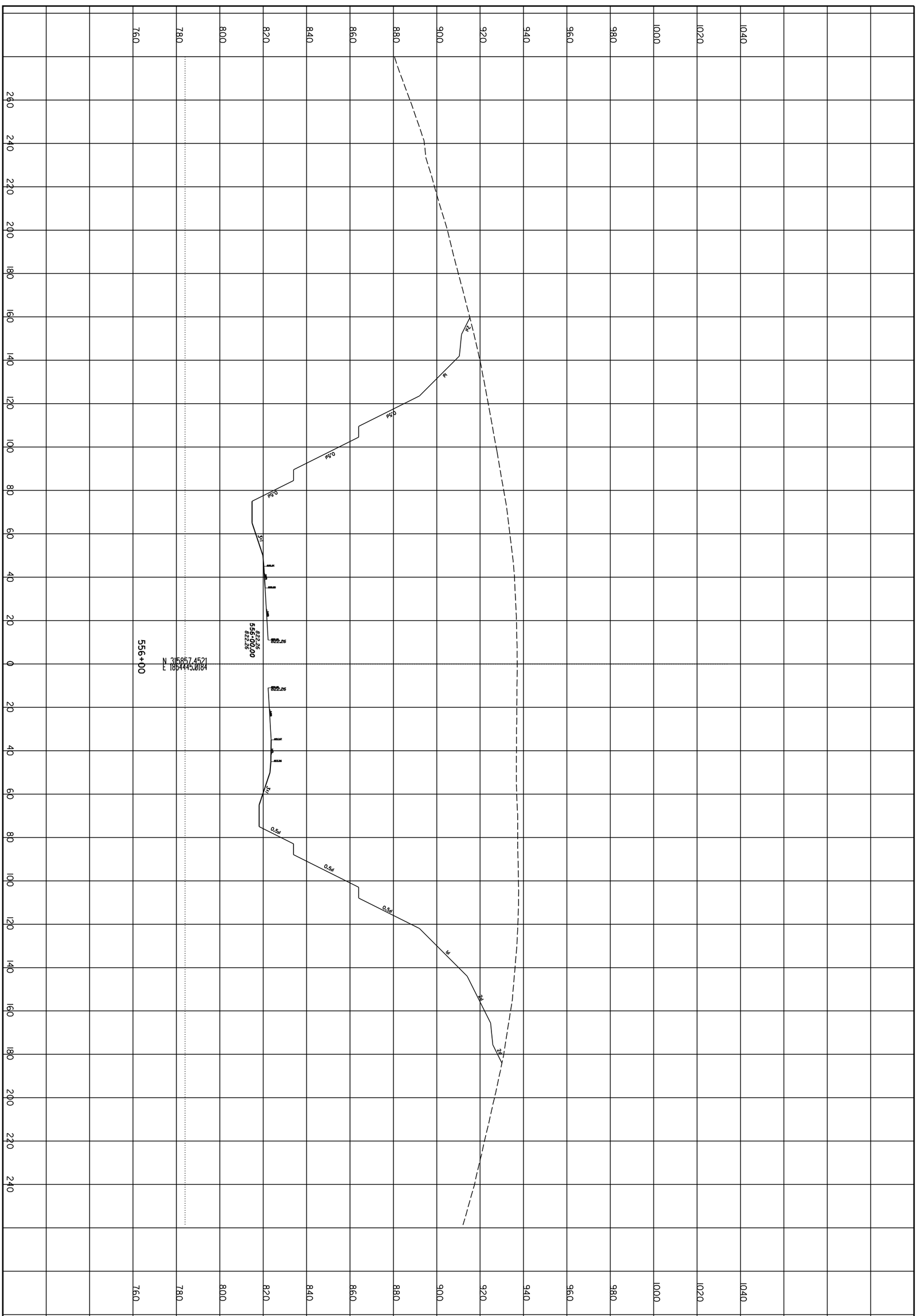
SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 555+00

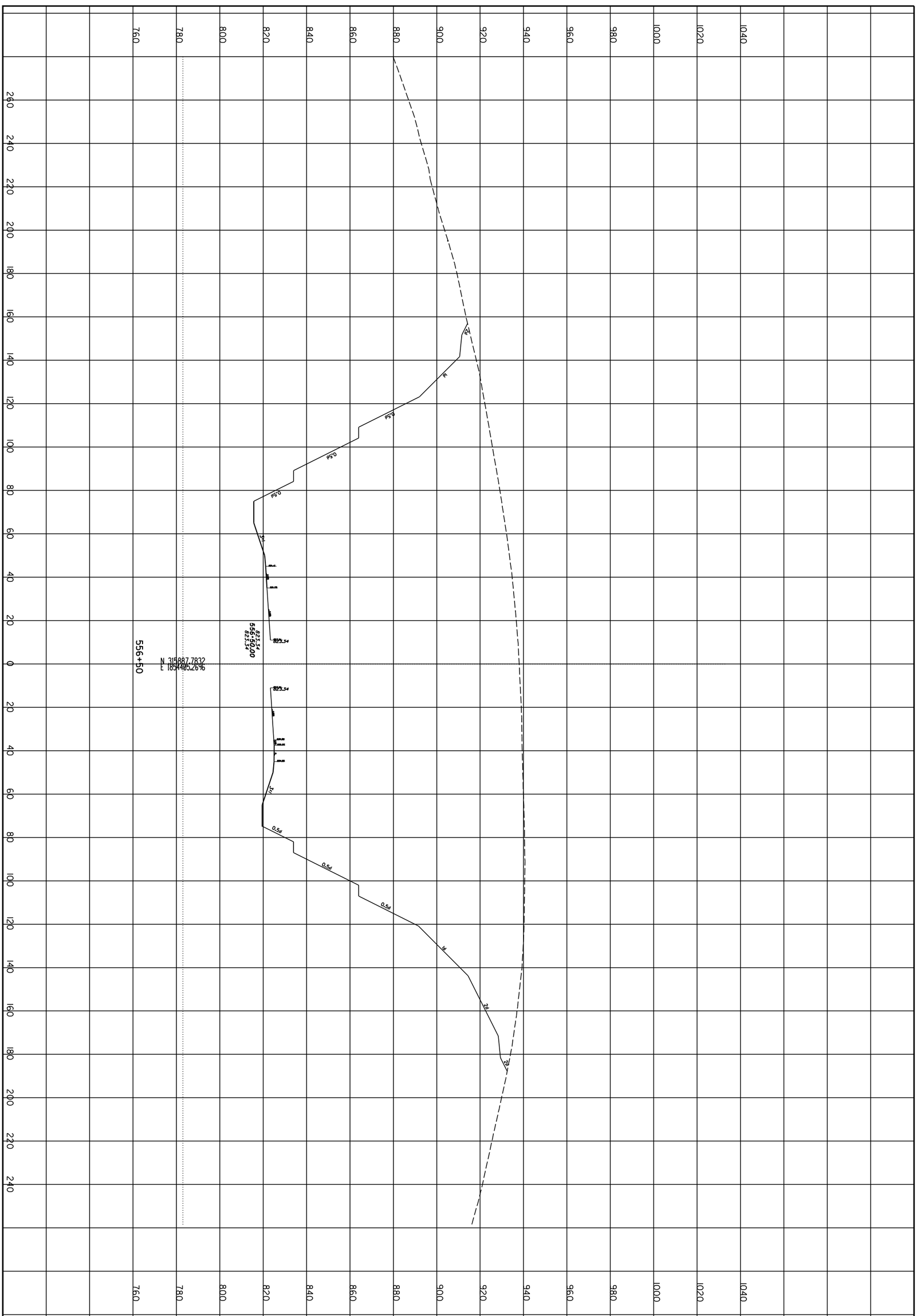
CHECKED



26 / 63	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 555+50
		CHECKED



27 / 63	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 556+00
		CHECKED



28/63	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 556+50	CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 557+00

SCI-823-10.13

824.32
557+00.00
824.32

N 3119317.4231
E 1884365.8024

557+00

CHECKED

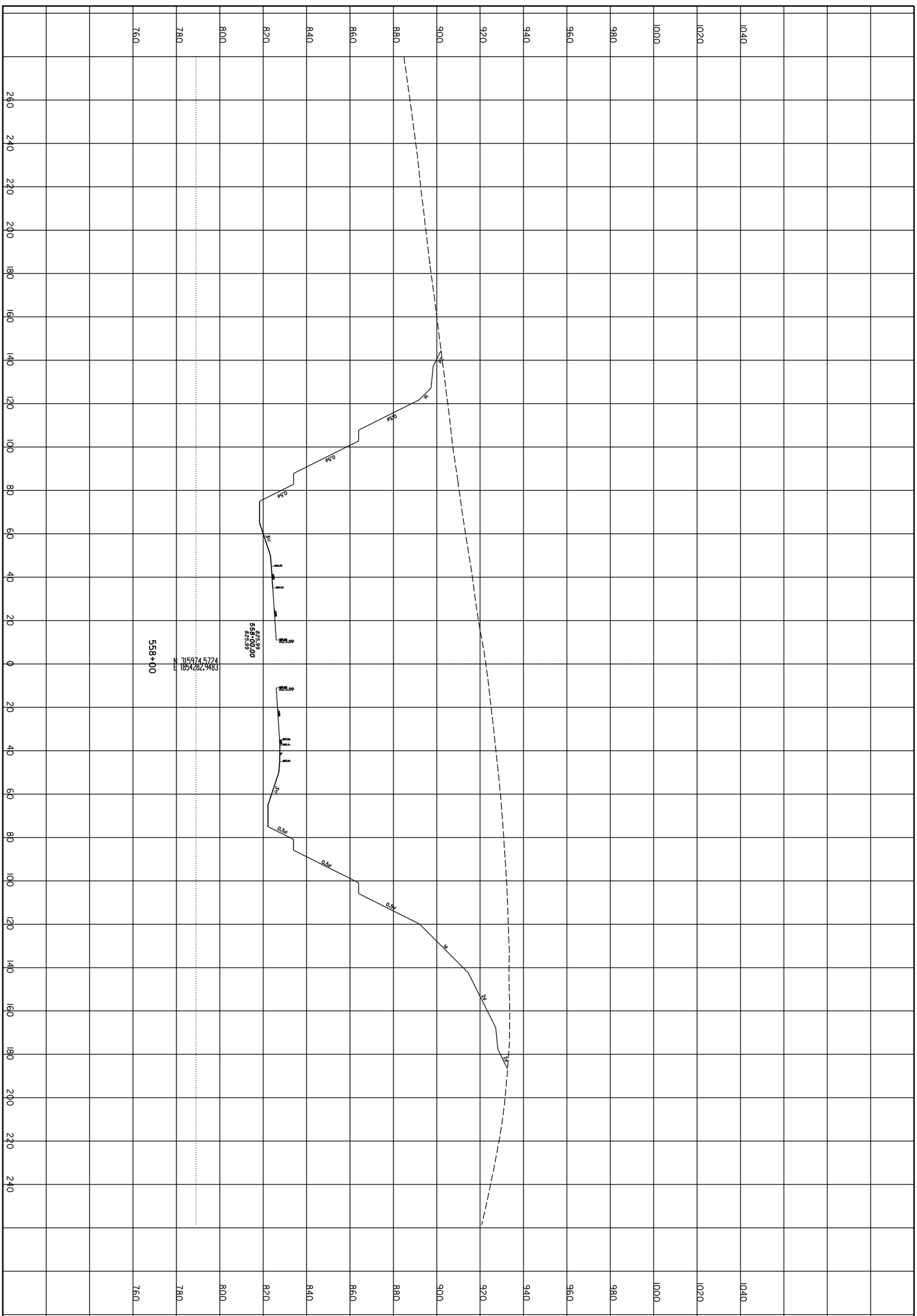
ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 557+50

SCI-823-10.13

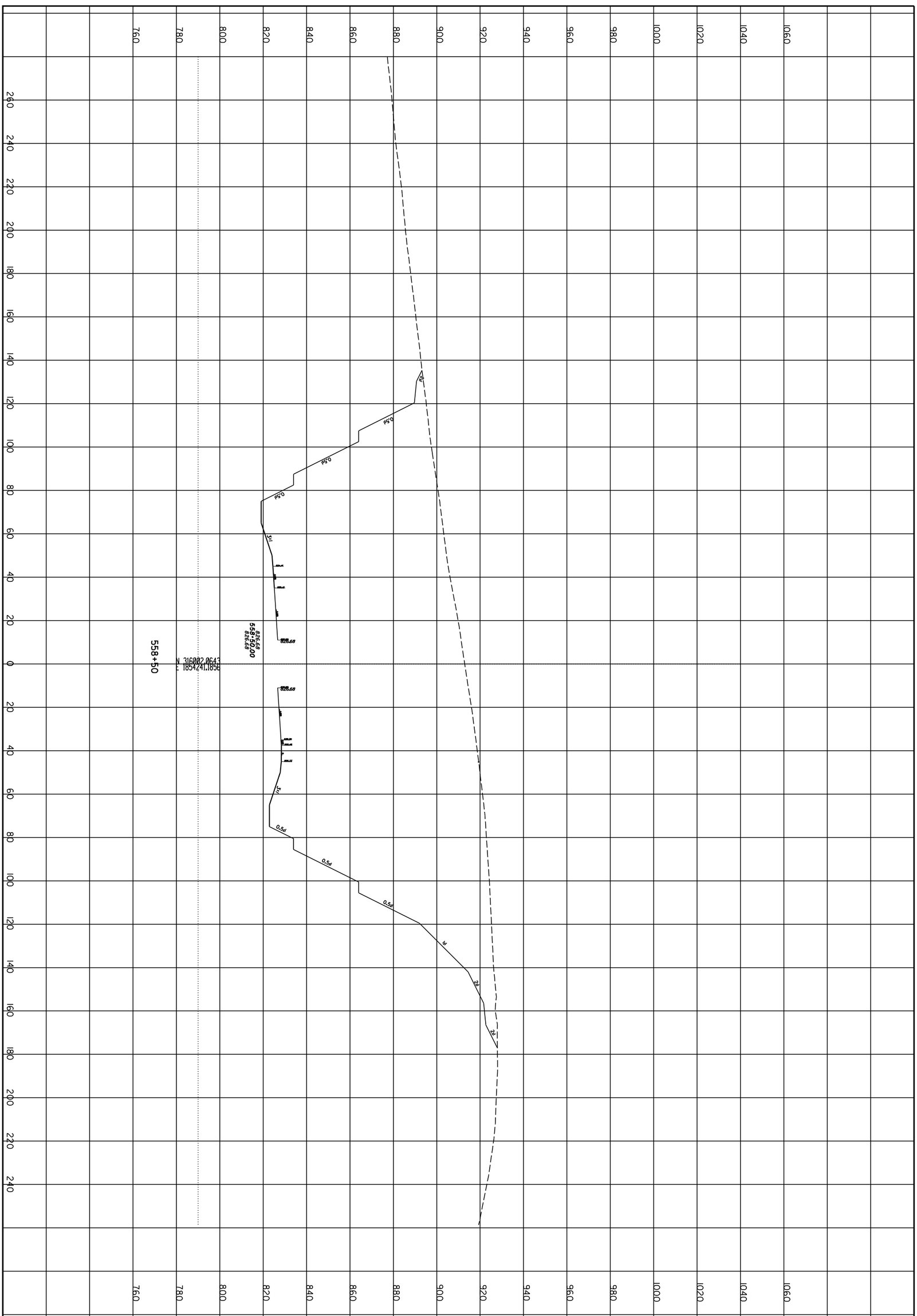
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2H
1H
0.5H
0.5H
0.5H
3:1
825.21
557+50.00
825.21
N 315946.3553
E 1894324.2258
557+50
3:1
0.5H
0.5H
0.5H
1.0H
2H
2H



31 / 63	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 558+00
		CHECKED



SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 558+50

CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 559+00

SCI-823-10.13

1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

0.5H
0.5H
0.5H
3H
827.27
559+00.00
827.27
827.27
827.27
3H
0.5H
0.5H
1.0H
2H

N 3169228.8232
E 1854186.9495

559+00

CHECKED

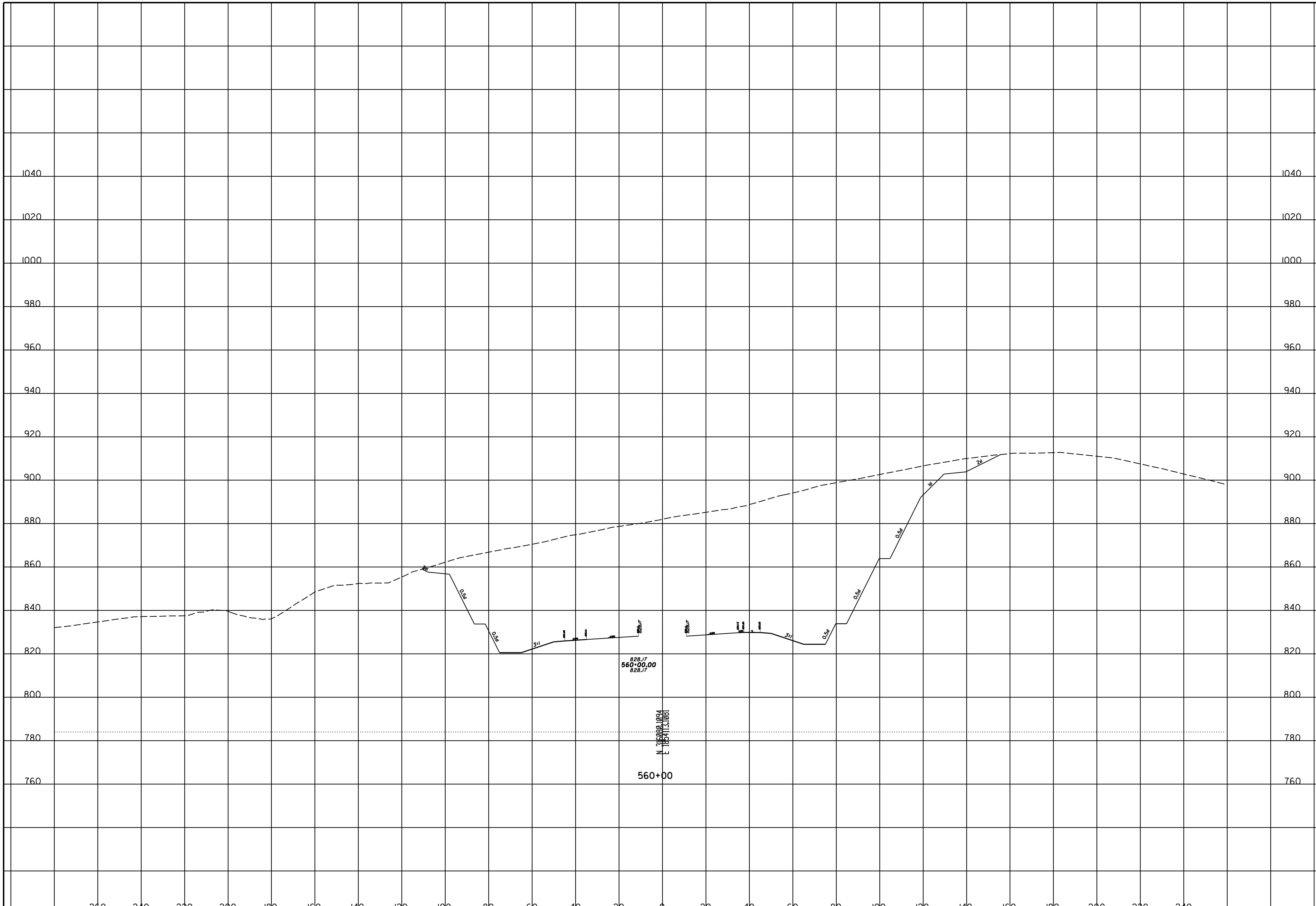
ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 559+50

827.77
559+50.00
827.77

N 3180754.8409
E 1854156.2525

559+50

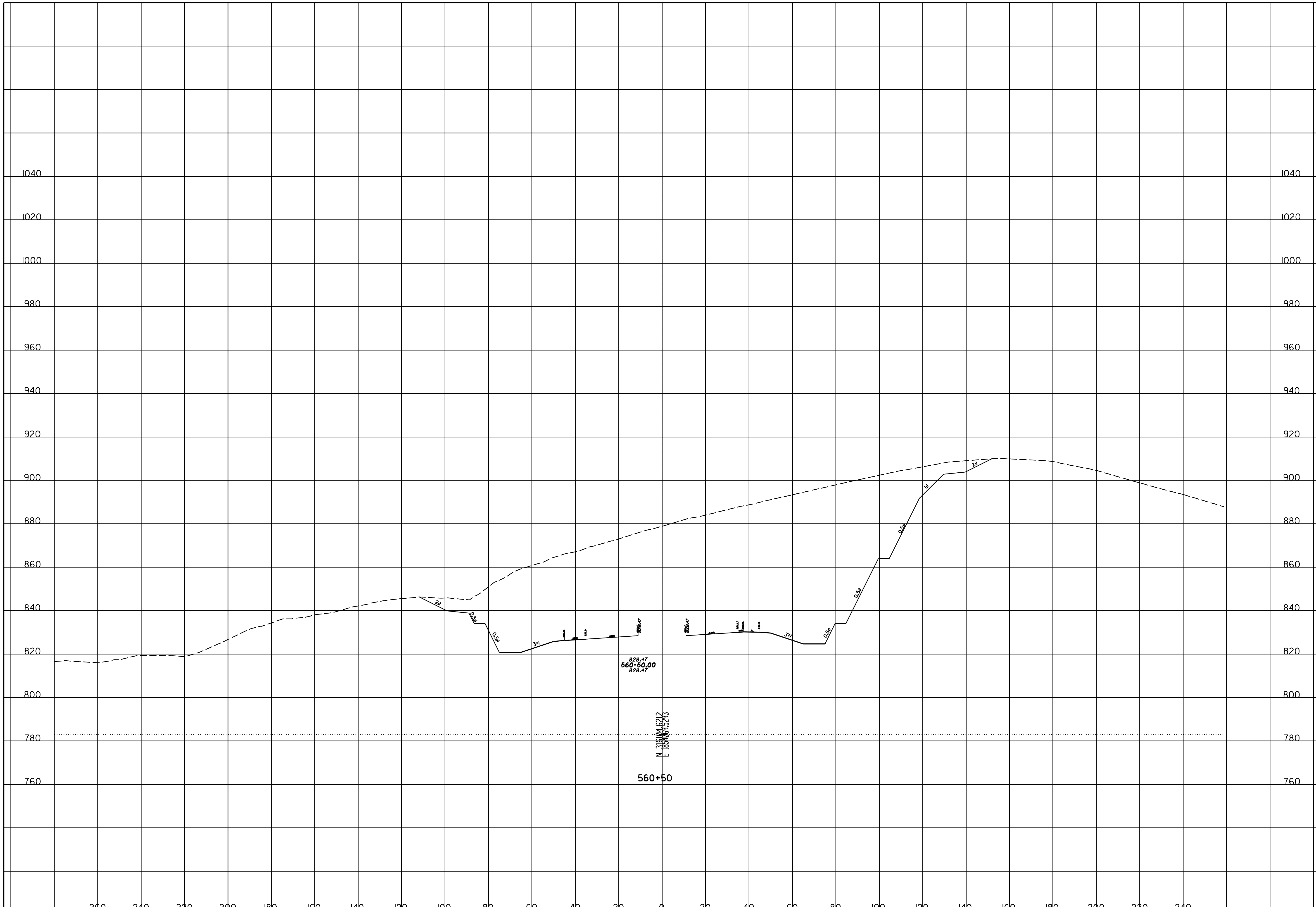
SCI-823-10.13



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 560+00

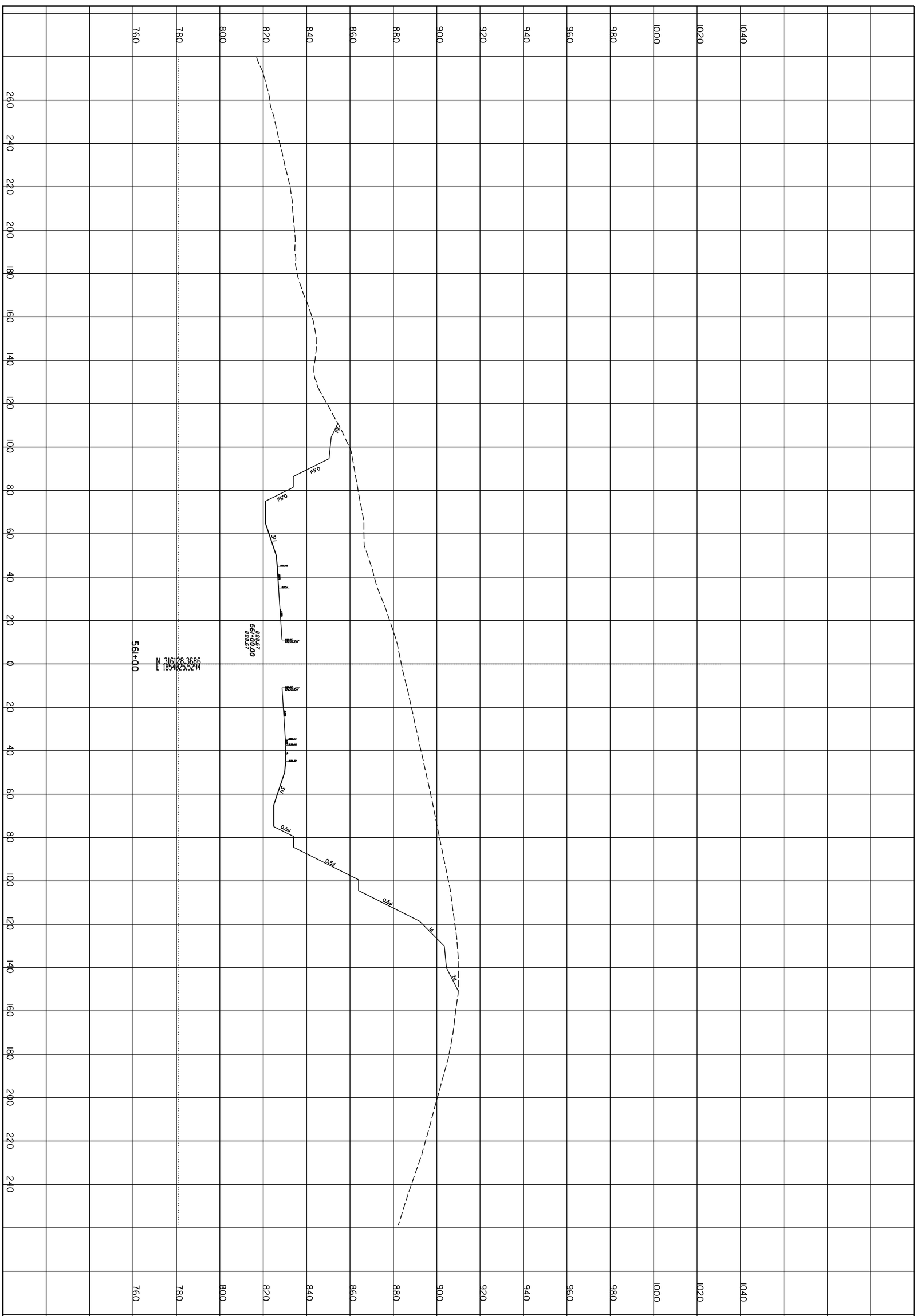
SCI-823-10.13



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 560+50

SCI-823-10.13

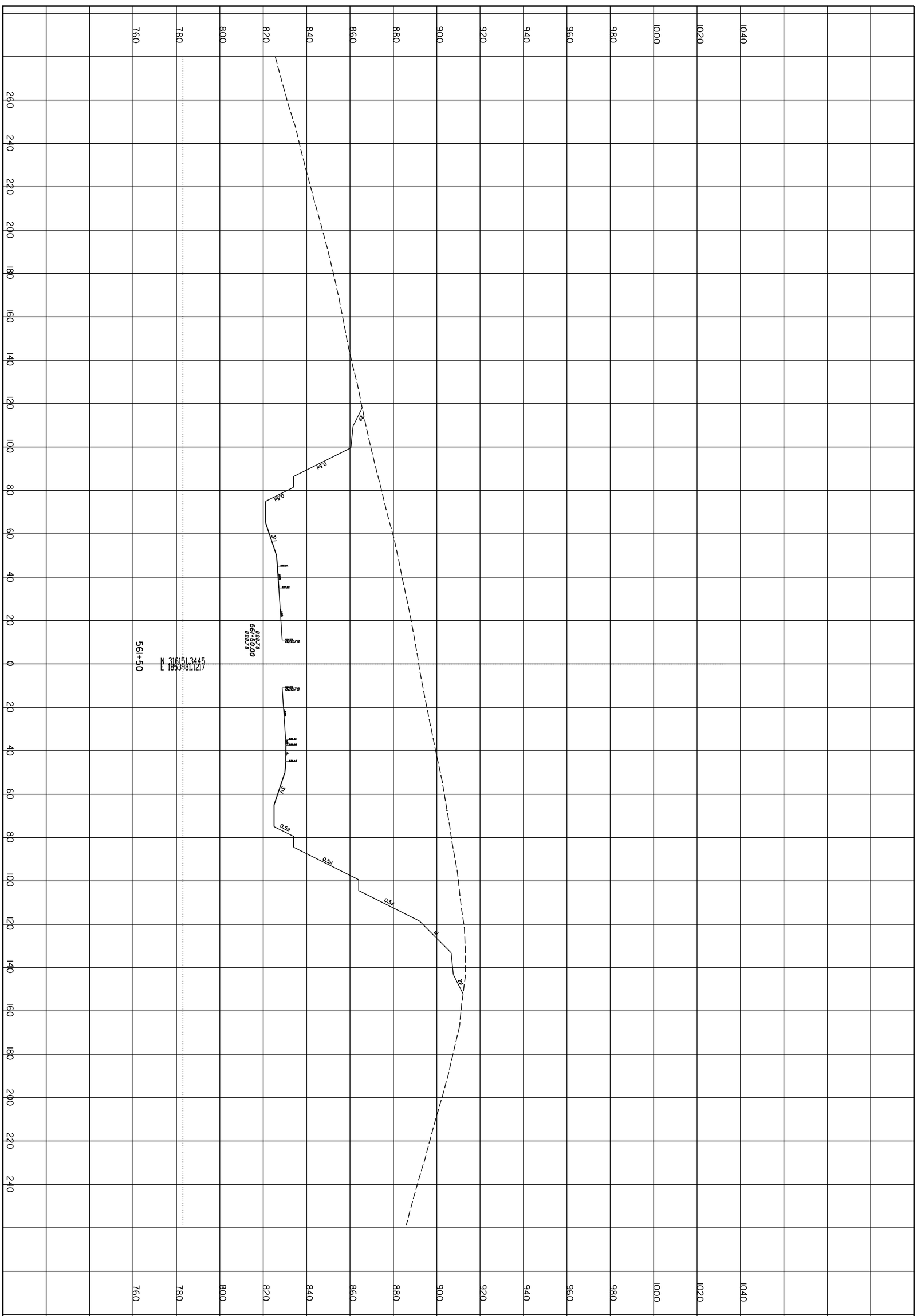


37
63

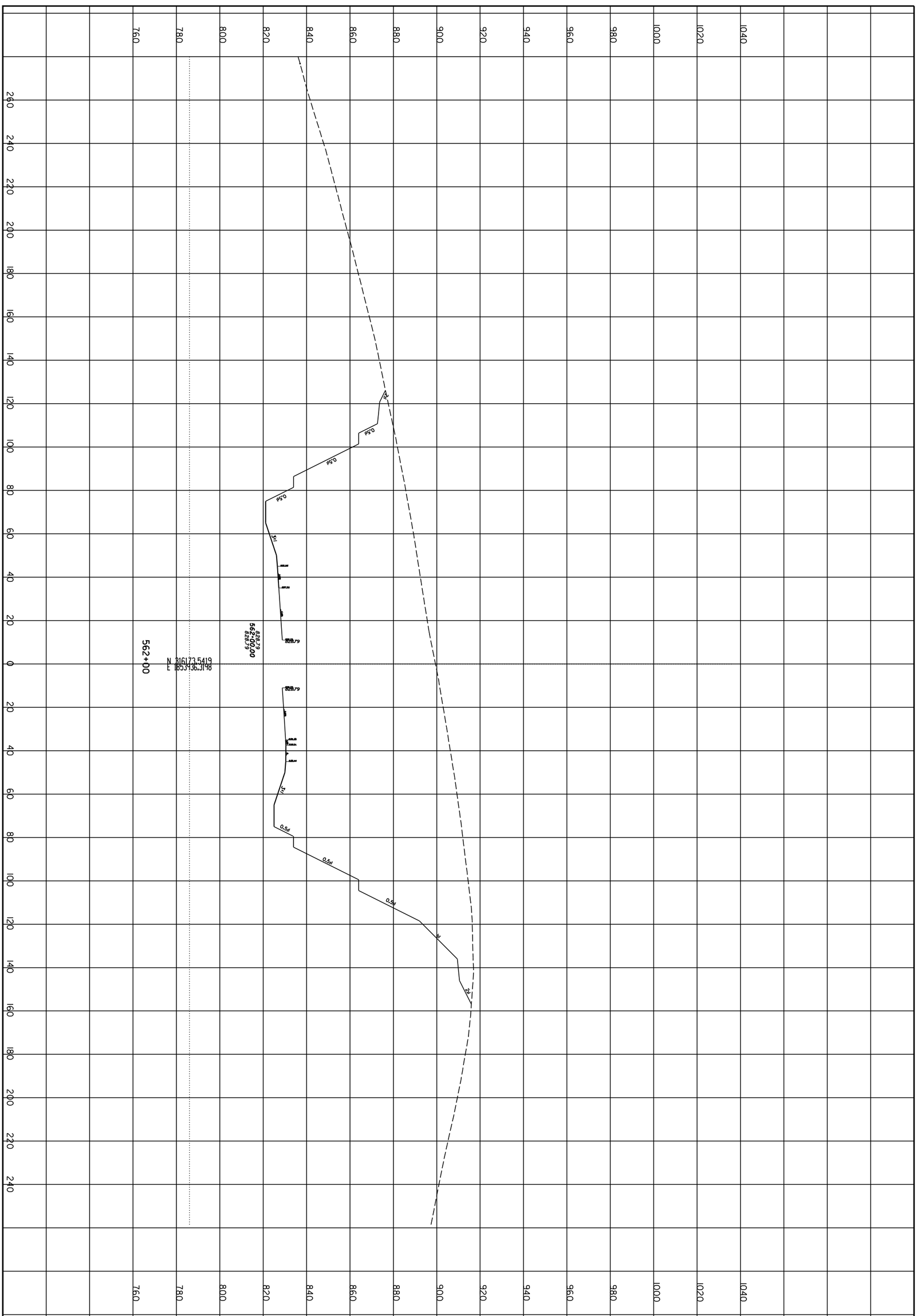
SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 561+00

CHECKED



38 / 63	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 561+50
		CHECKED



39 / 63	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 562+00
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 562+50

SCI-823-10.13

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

0.5H
0.5H
0.5H
3H
828.71
562+50.00
828.71
N 3184194.9540
E 1853891.1373
562+50
3H
0.5H
0.5H
0.5H
1.0H
2H

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 563+00

SCI-823-10.13

1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

0.5H
1H
2H
3H1

828.52
563+00.00
828.52

N 316215.5743
E 1853845.5880

563+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 563+50

SCI-823-10.13

1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2d
0.5d
0.5d
0.5d
3:1
828.24
563+50.00
828.24
N 316235.3866
E 1853741.6867
563+50
3:1
0.5d
0.5d
0.5d
1d
2d

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 564+00

SCI-823-10.13

1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

2H
0.5H
0.5H
3H
827.86
564+00.00
827.86
N 316754.4147
E 1853753.4445
564+00
3H
0.5H
0.5H
2H

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 564+50

SCI-823-10.13

1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2H
0.5H
0.5H
1H
827.39
564+50.00
827.39
N 316272.6729
E 1853786.8765
564+50
1H
0.5H
0.5H
0.5H
2H

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 565+00

SCI-823-10.13

826.82
565+00.00
826.82

N 316230.0156
E 185368.0007

565+00

CHECKED

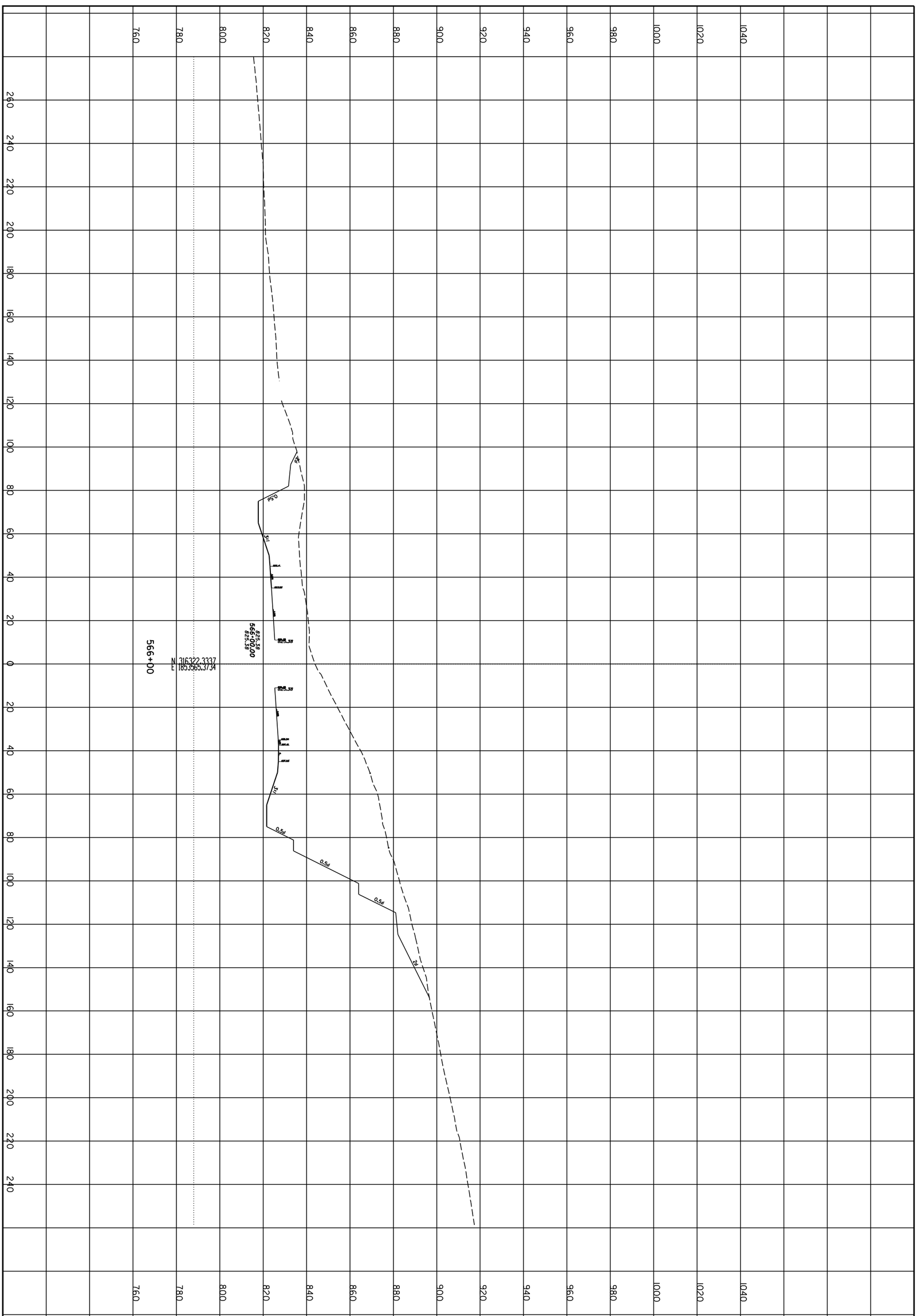
ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 565+50

826.15
565+50.00
826.15

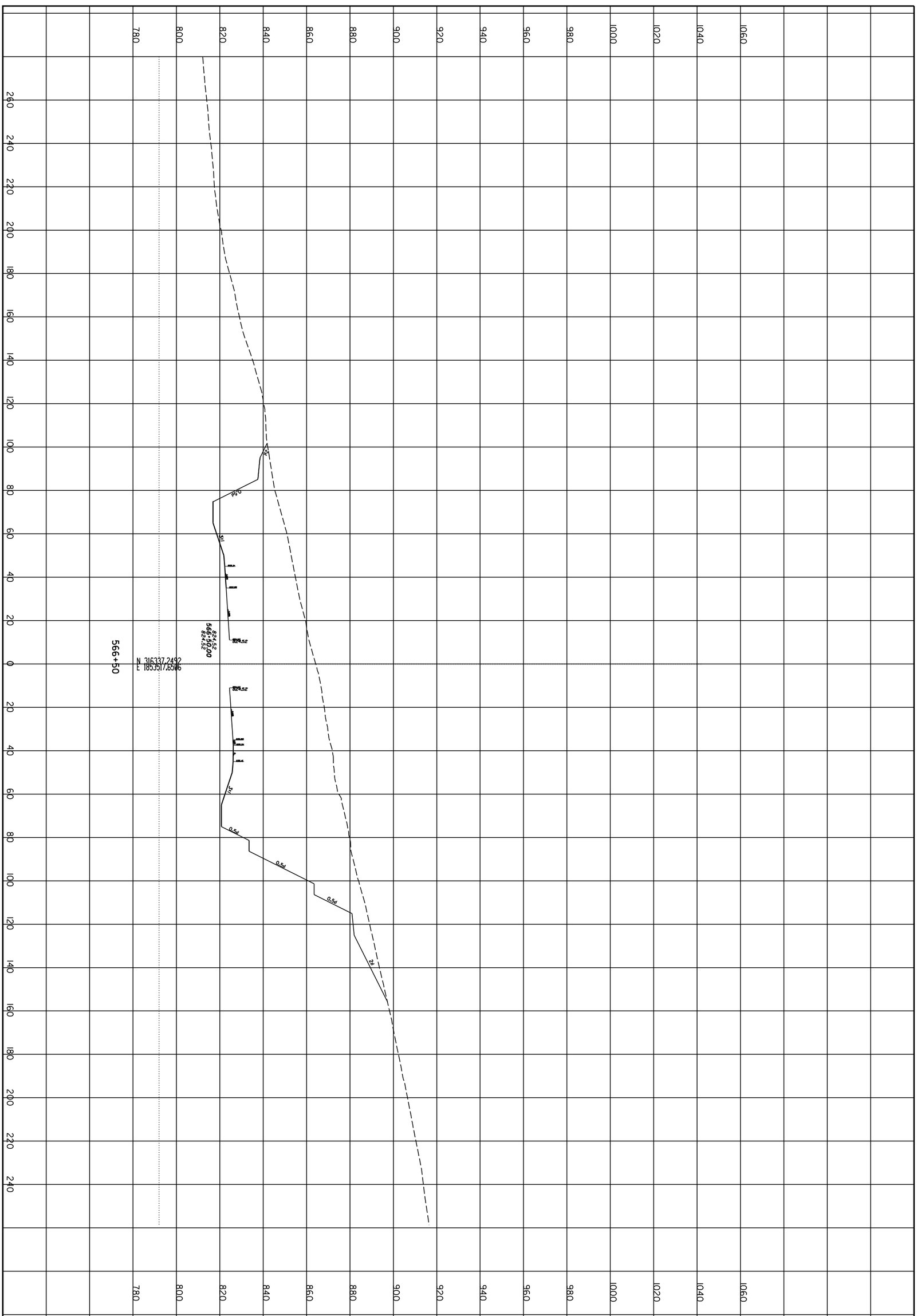
N 316366.5875
E 185361.2286

565+50

SCI-823-10.13



47 / 63	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 16 STA 566+00
		CHECKED



48
63

SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 566+50

CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 567+00

SCI-823-10.13

1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

0.5H
0.5H
0.5H
3H
0.5H
0.5H
0.5H
2H
823.56
823.56
567+00.00
823.56
N 316351.3236
E 185346.5748
567+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 567+50

ROCK CUT

SCI-823-10.13

1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

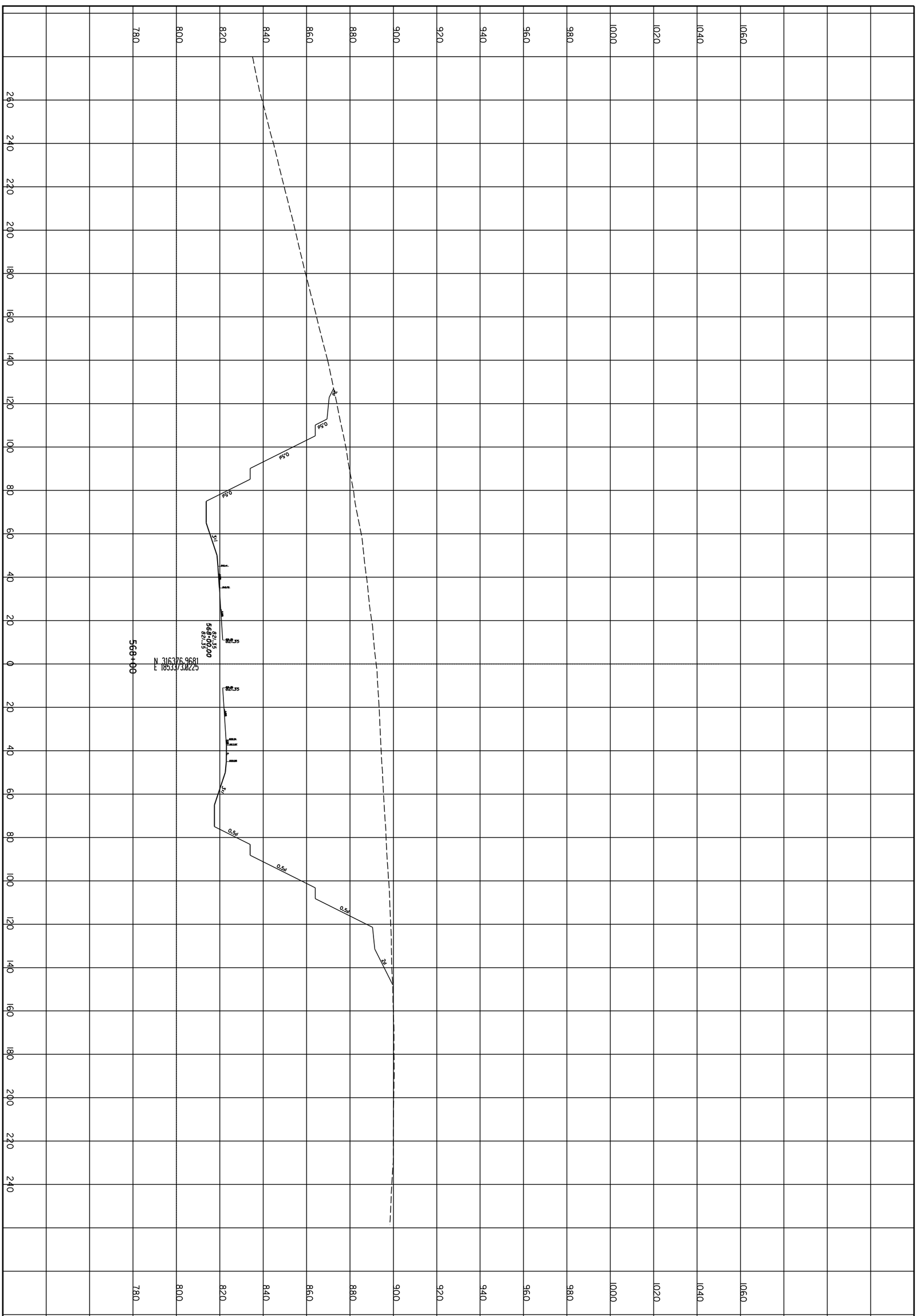
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

0.5H
0.5H
1V
0.5H
0.5H
2H

822.50
567+50.00
822.50

N 316364.5706
E 185342.4606

567+50



51
63

SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 568+00

CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 568+50

820.09
568+50.00
820.09

N 316388.5183
E 185332.1796

568+50

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 569+00

ROCK CUT

SCI-823-10.13

1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2%
0.5H
0.5H
0.5H
3H
818.79
569+00.00
818.79
N 316389.2178
E 1865327.5344
3H
0.5H
0.5H
0.5H
2%

569+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 569+50

SCI-823-10.13

1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

0.5H
0.5H
3:1
817.49
569+50.00
817.49
N 3164893.0632
E 1853226.5940
569+50
0.5H
0.5H
3:1

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 570+00

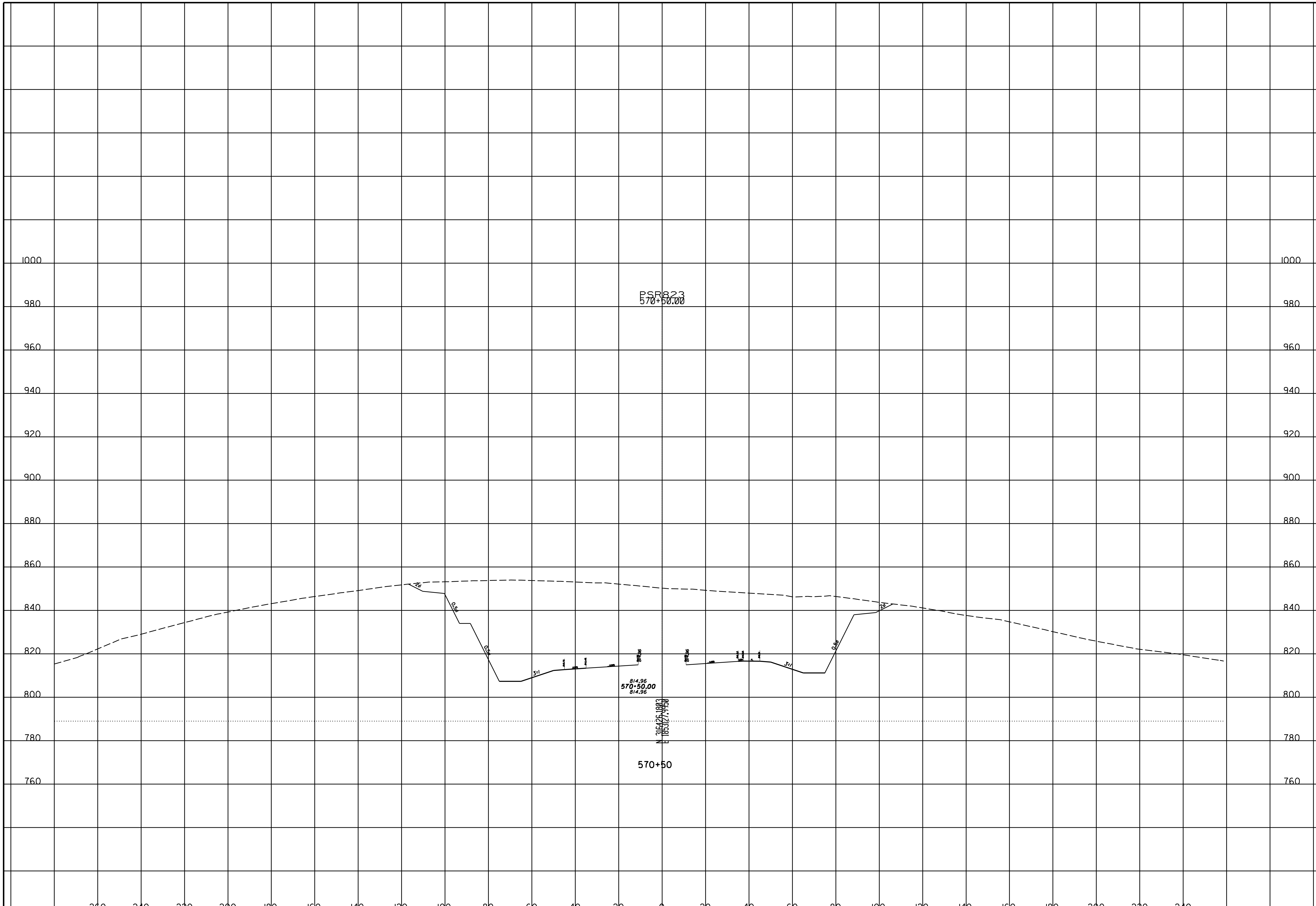
PSR823
570+00.00

816.19
570.00.00
816.19

N 316418.0517
E 185317.4262

570+00

SCI-823-10.13



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 570+50

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 571+00

PSR823
571+00.00

813.87
571+00.00
813.87

N 1116433.4468
E 1855307.8265

571+00

980
960
940
920
900
880
860
840
820
800
780
760

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

SCI-823-10.13

57
63

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 571+50

ROCK CUT

SCI-823-10.13

PSR823
571+50.00

812.91
571+50.00
812.91

N 3164394.8487
E 1853026.1386

571+50

1000
980
960
940
920
900
880
860
840
820
800
780
760

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 572+00

PSR823
572+00.00

812.09
572+00.00
812.09

N 3164445.3843
E 1852474.2467

572+00

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 16
STA 572+50

SCI-823-10.13

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

811.41
572+50.00
811.41

N 316590.9518
E 1852274.4656

572+50

CHECKED

CUT SLOPE DESIGN - ROCK CUT 16
STA 573+00

ROCK CUT

SCI-823-10.13

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

573+00.00

3:1
810.87
573+00.00
810.87
3:1
2:1

N 316451.8498
E 1052874.5617

573+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

CUT SLOPE DESIGN - ROCK CUT 16
STA 573+50

ROCK CUT

SCI-823-10.13

PSR823
573+50.00

1000
980
960
940
920
900
880
860
840
820
800
780
760

3:1
810.46
573+50.00
810.46
2:1

N 3164567.3908
E 1852827.6974

573+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

960
940
920
900
880
860
840
820
800
780
760

PSR823
574+00.00

810.19
574+00.00
810.19

3:1
3:1
2:1

N 316458.9597
E 1852719.7454

574+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

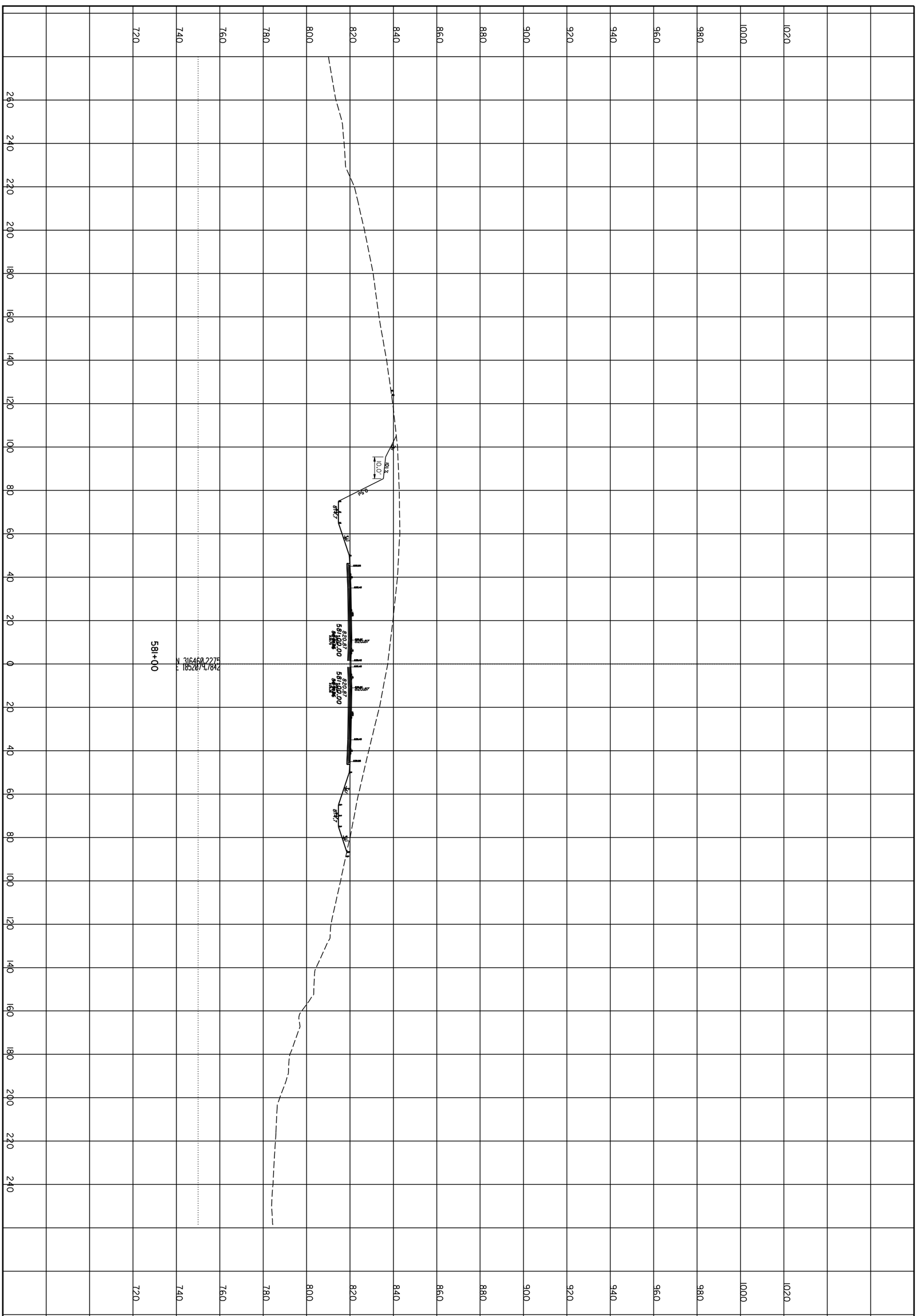
CHECKED

CUT SLOPE DESIGN - ROCK CUT 16
STA 574+00

ROCK CUT

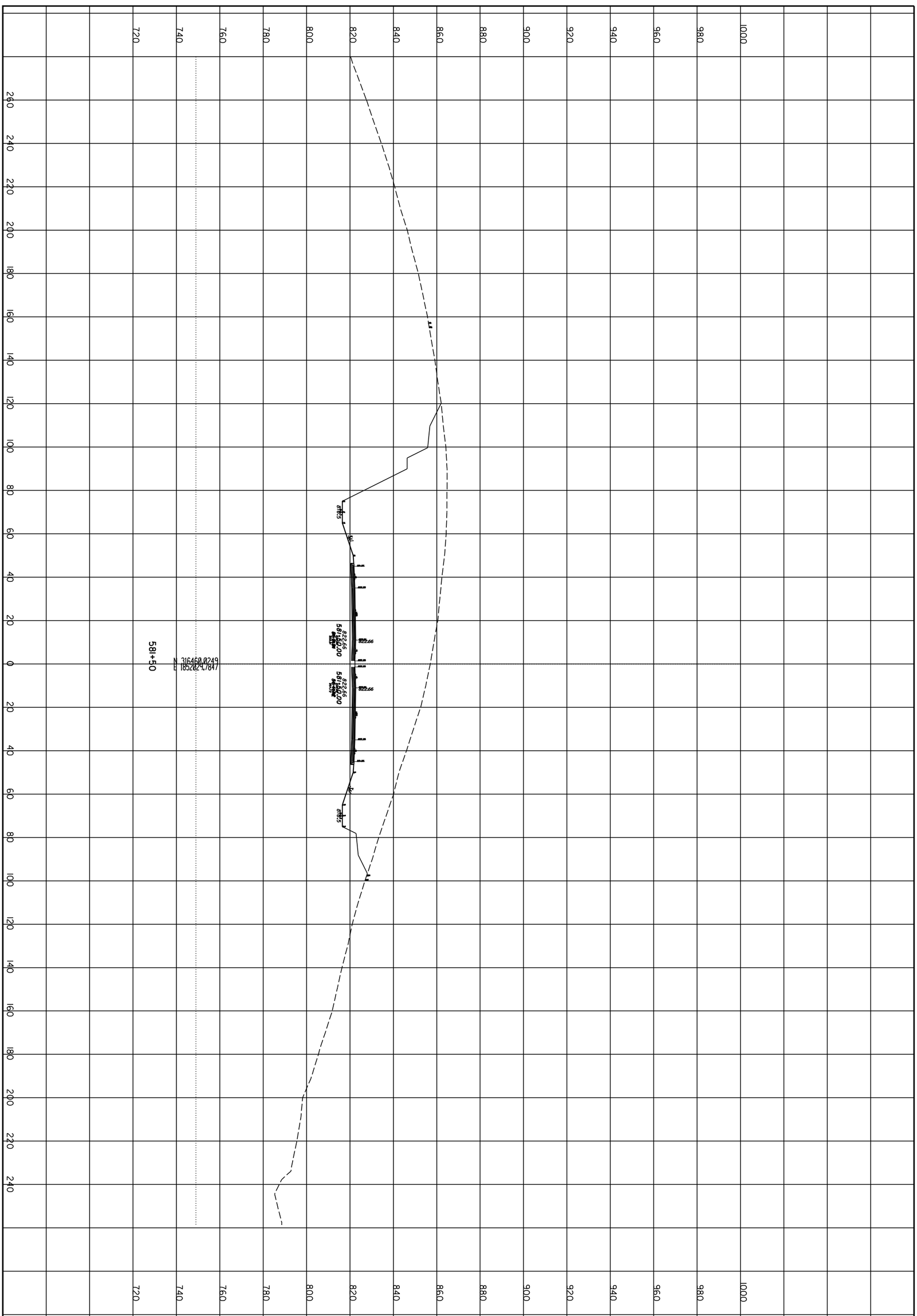
SCI-823-10.13

63
63



33	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 17 STA 581+00

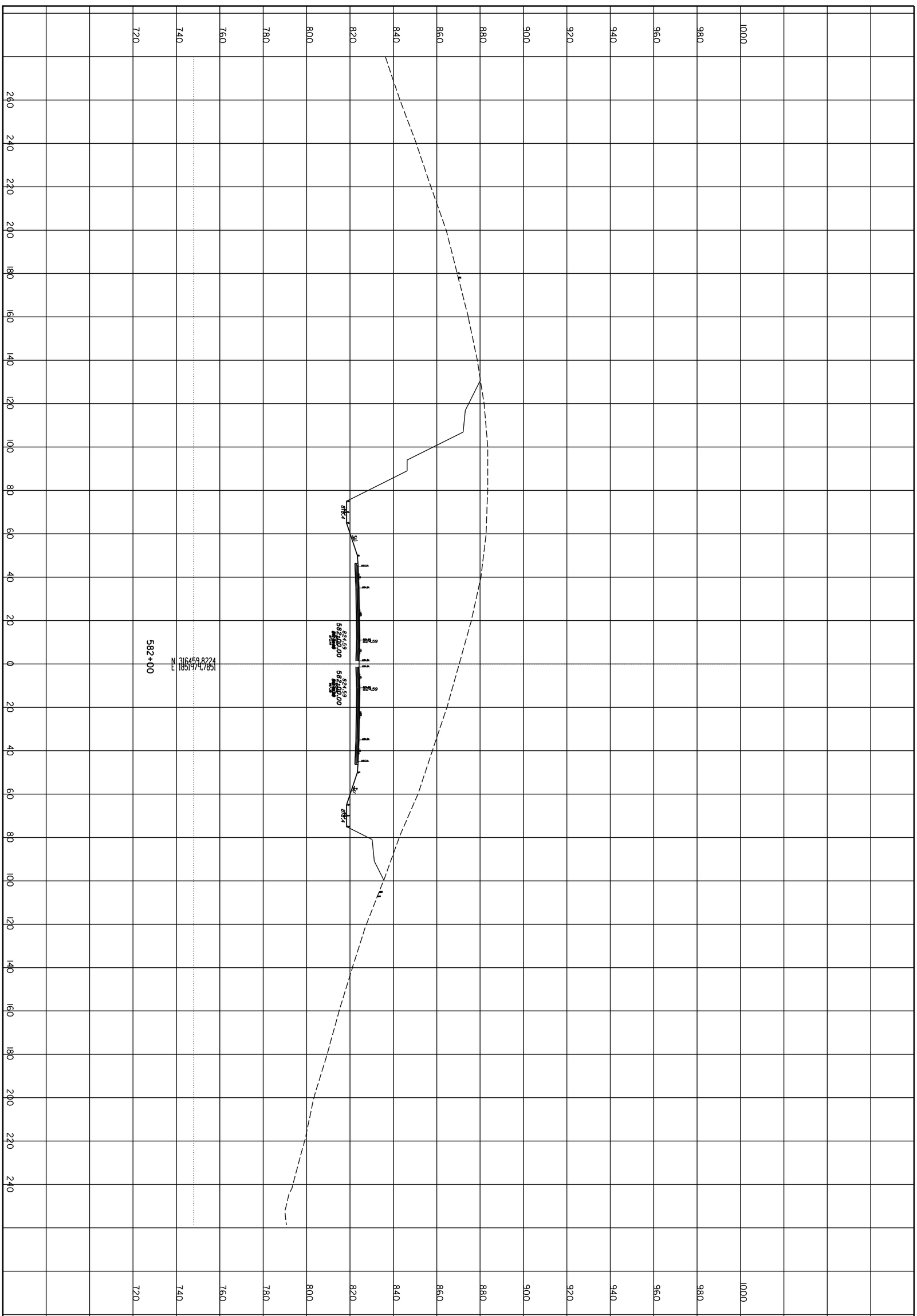
CHECKED



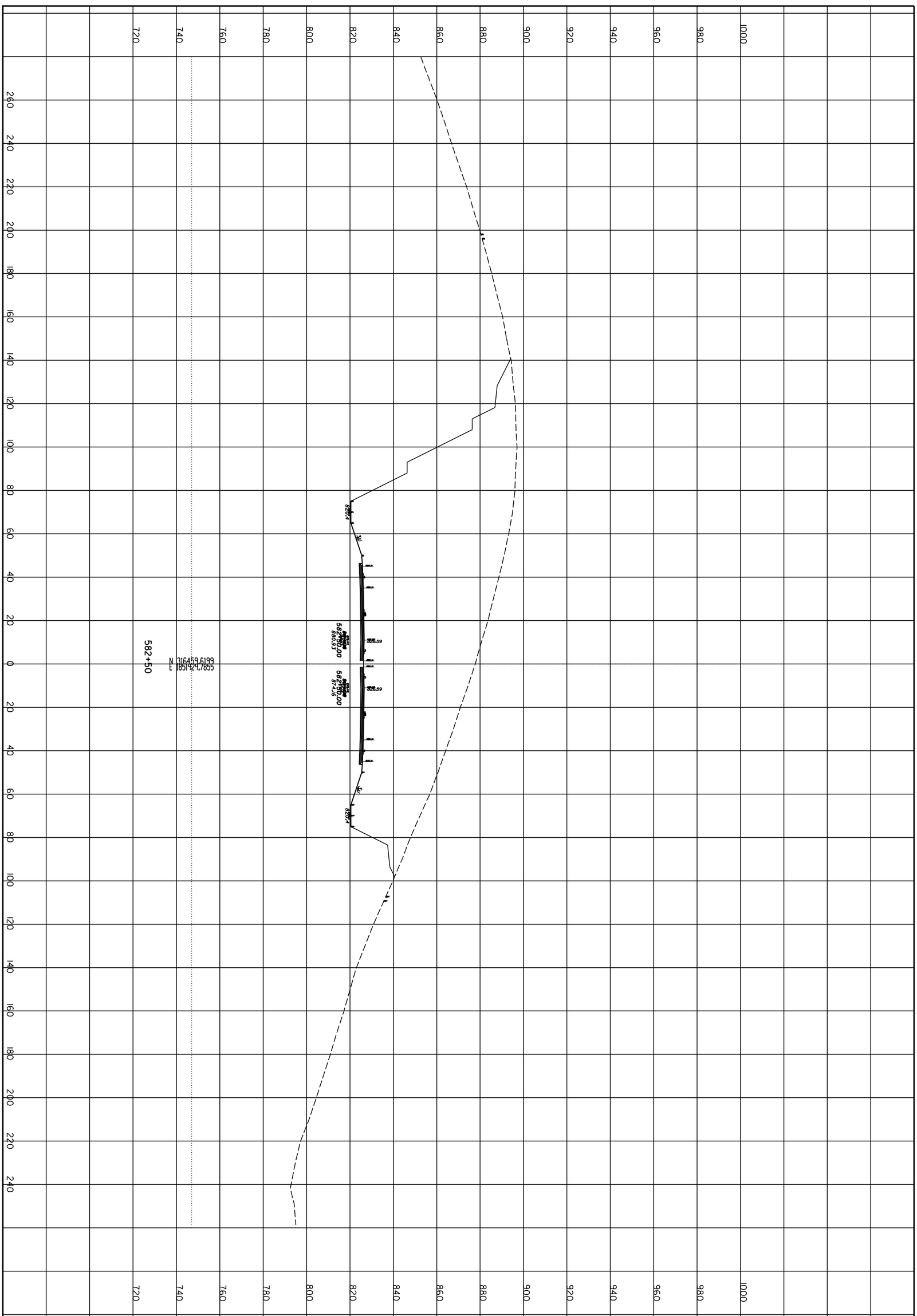
SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 17
STA 581+50

CHECKED



3 / 33	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 17 STA 582+00
		CHECKED



4 / 33	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 17 STA 582+50
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 17
STA 583+00

SCI-823-10.13

583+00

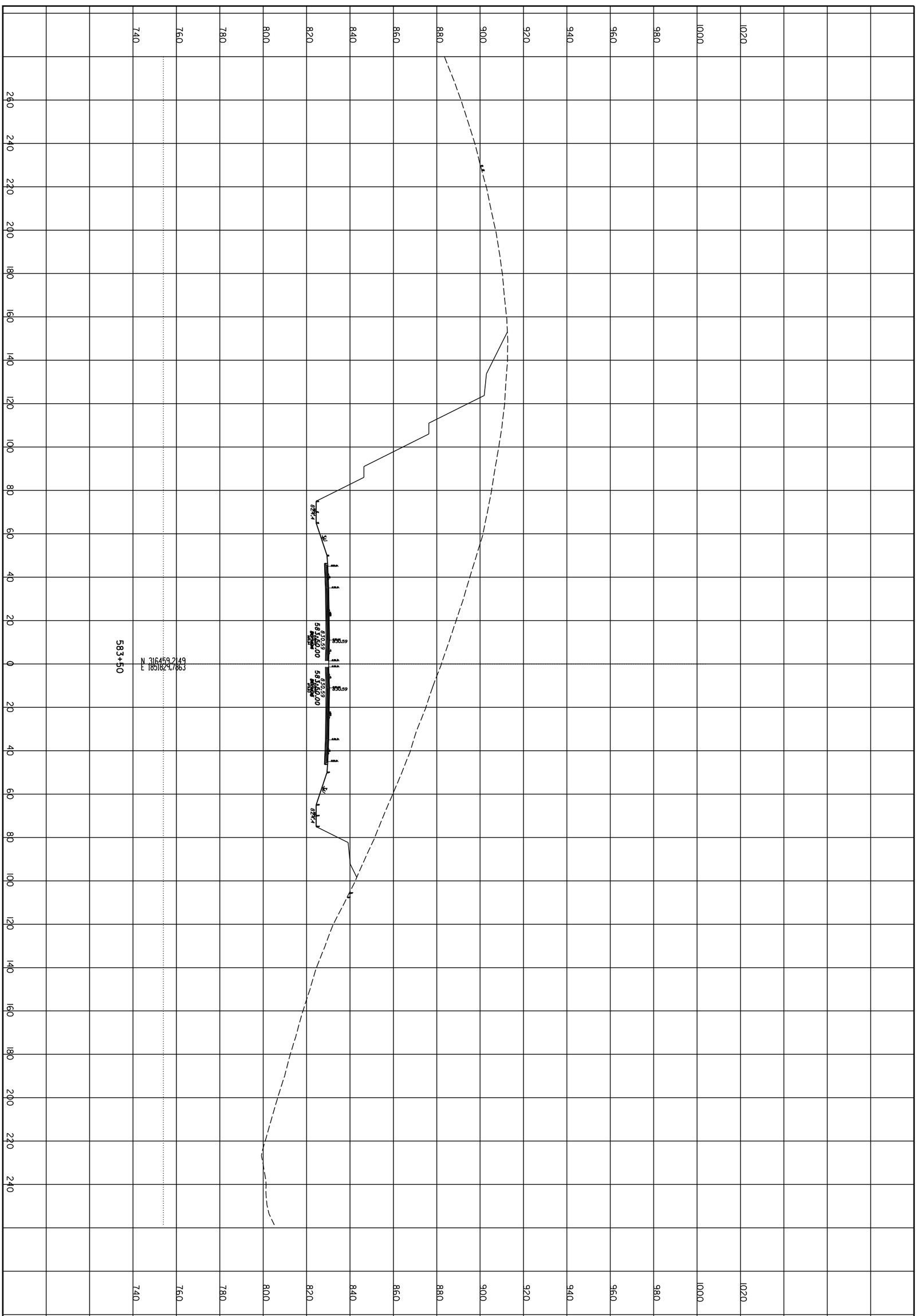
583+00.00
884.72

583+00.00
877.49

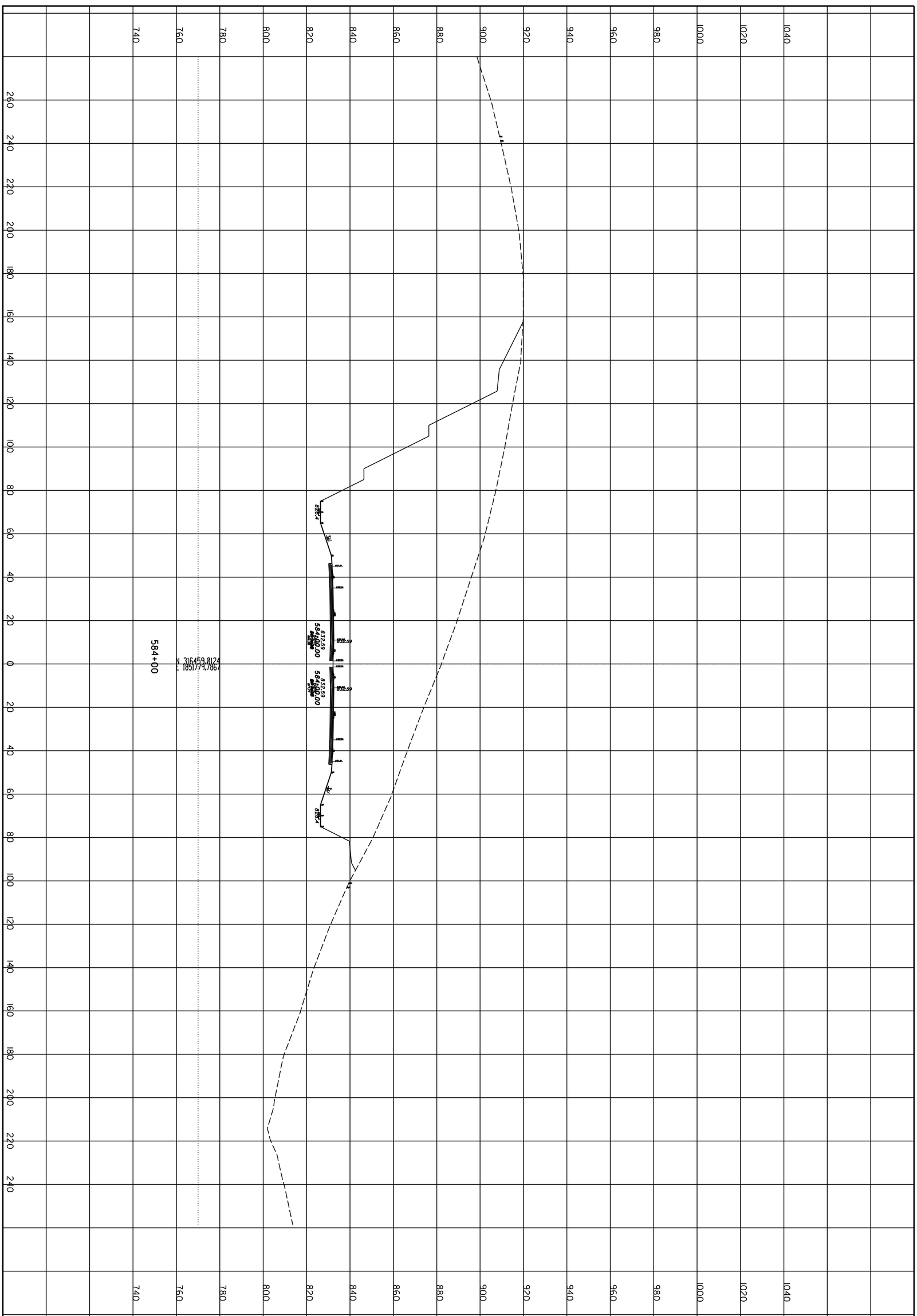
N 316453.4174
E 185187.7865

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740
720

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240



6 / 33	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 17 STA 583+50
		CHECKED



7 / 33	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 17 STA 584+00
		CHECKED

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

828.4
834.59
584+50.00
834.59
584+50.00
828.4

N 316458.8999
E 1851724.7871

584+50

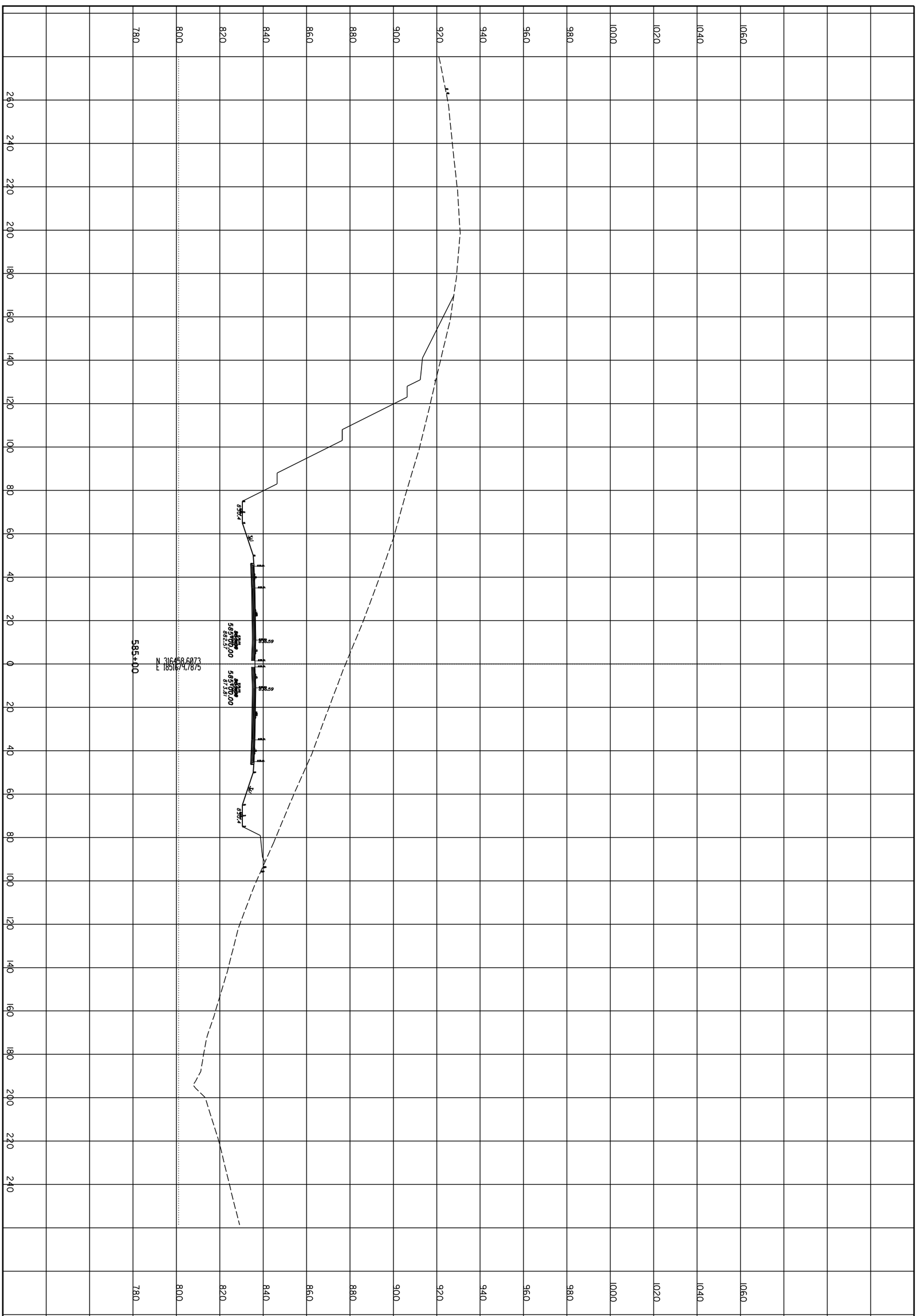
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

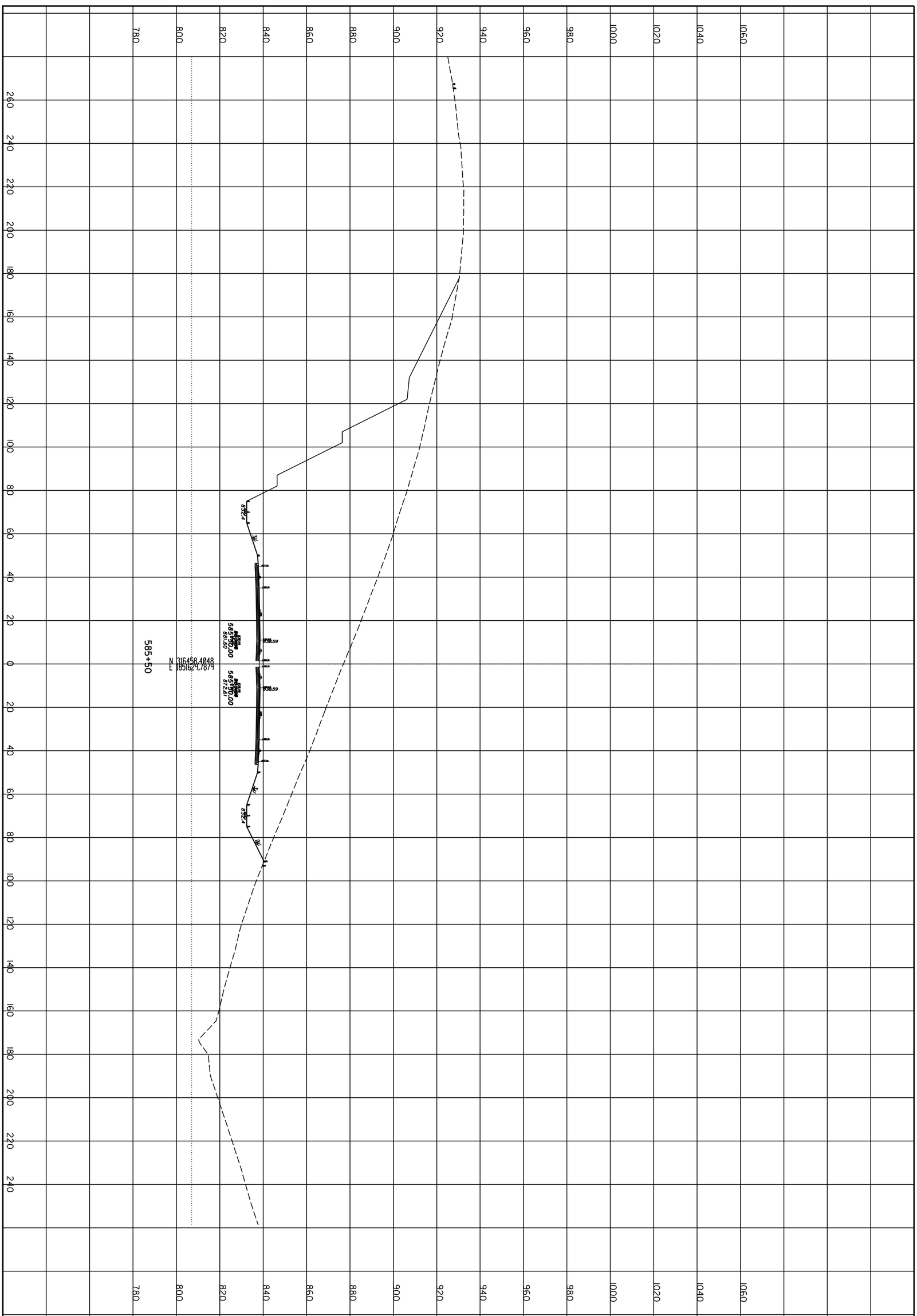
T SLOPE DESIGN - ROCK CUT 17
STA 584+50

ROCK CUT

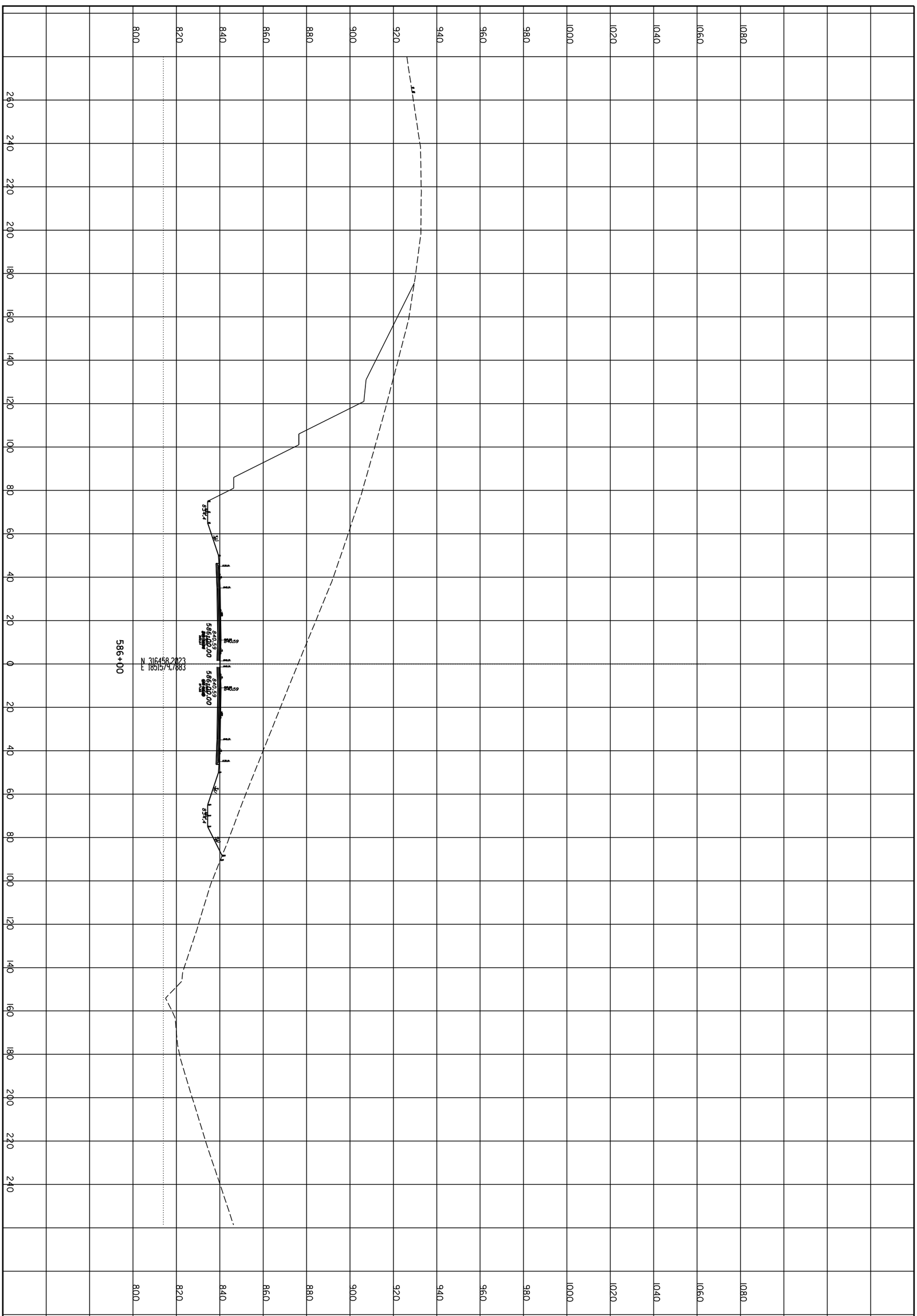
SCI-823-10.13



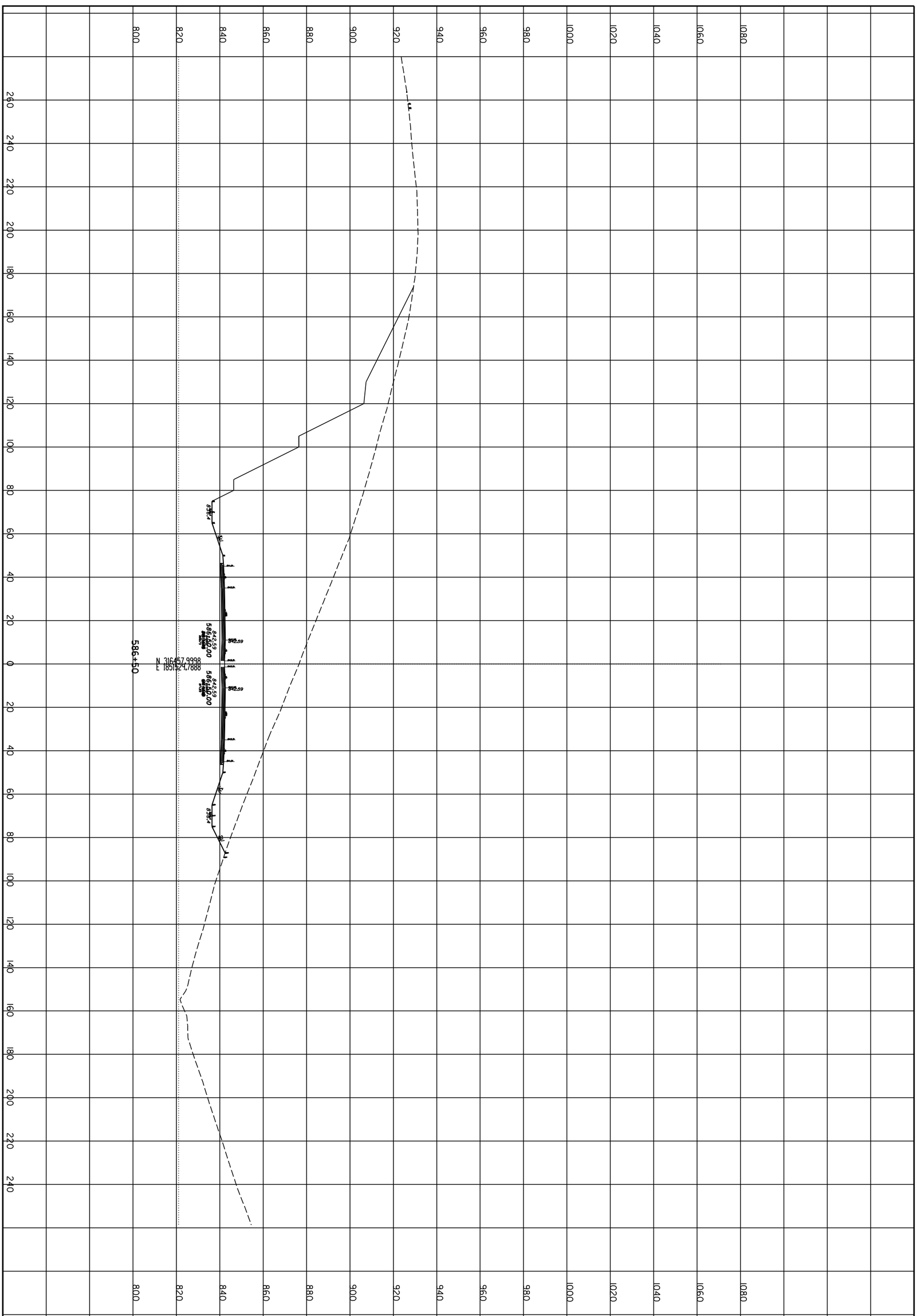
9 / 33	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 17 STA 585+00
		CHECKED



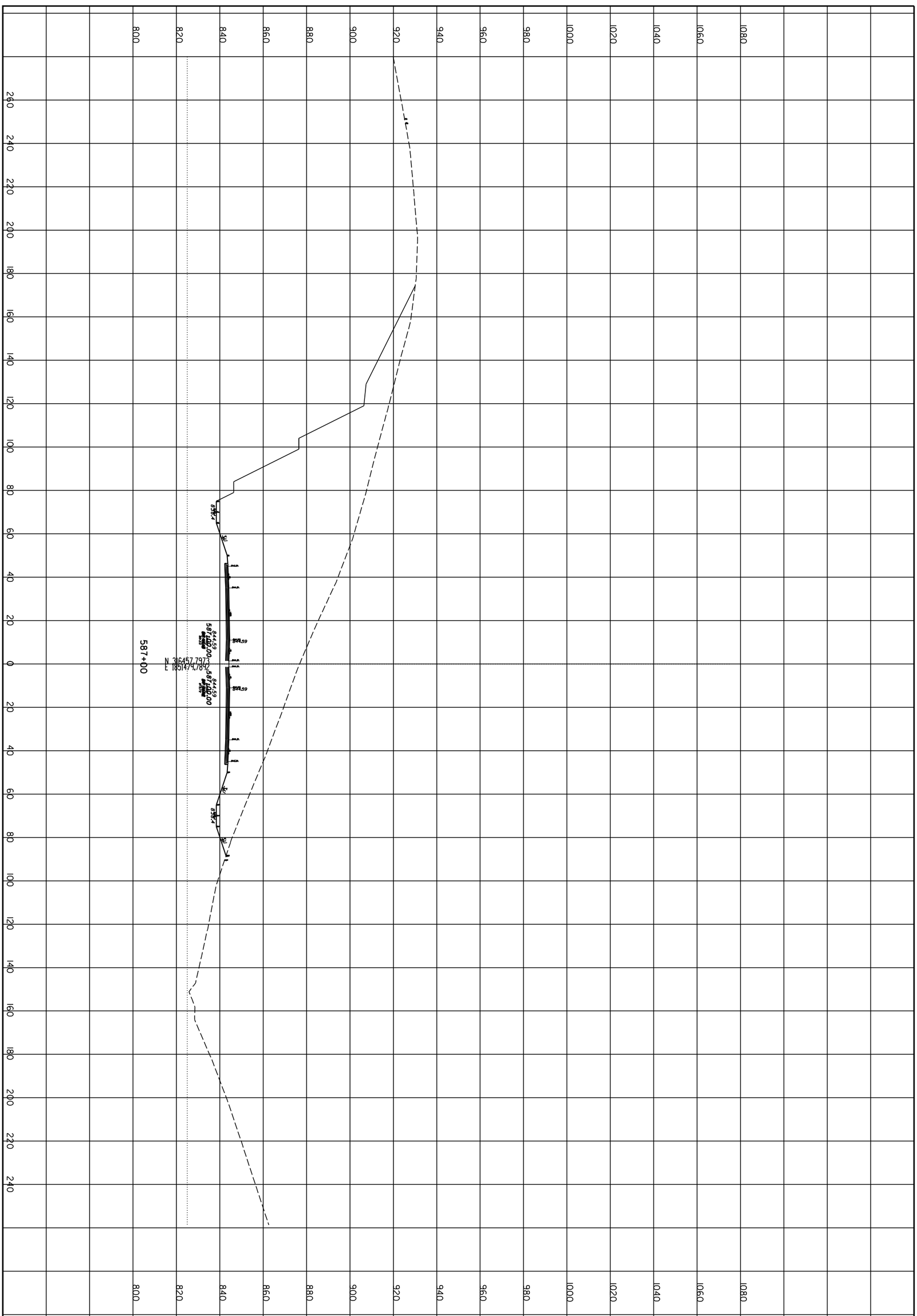
10 / 33	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 17 STA 585+50
		CHECKED



33	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 17 STA 586+00
		CHECKED



12 / 33	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 17 STA 586+50
		CHECKED

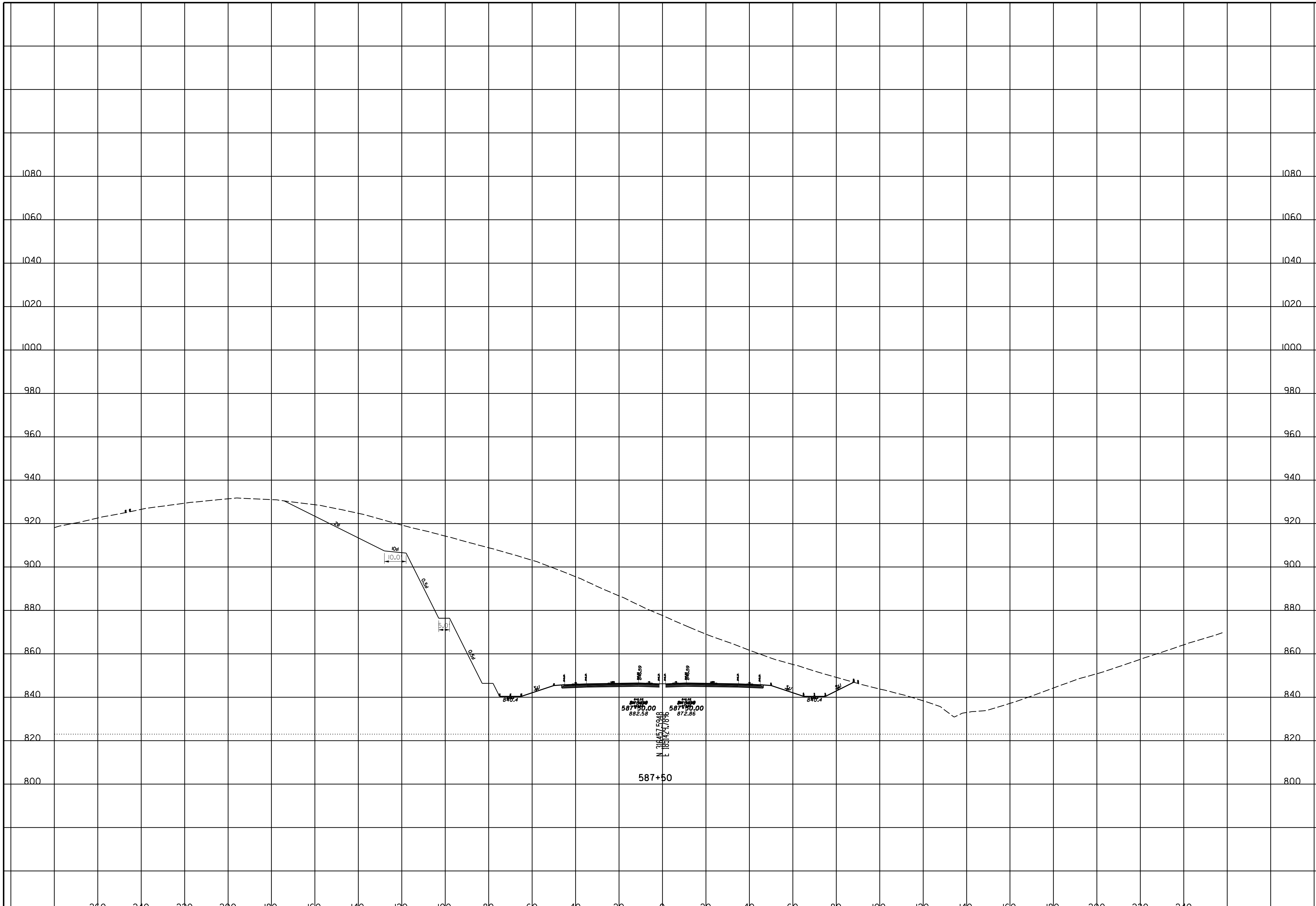


13
33

SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 17
STA 587+00

CHECKED

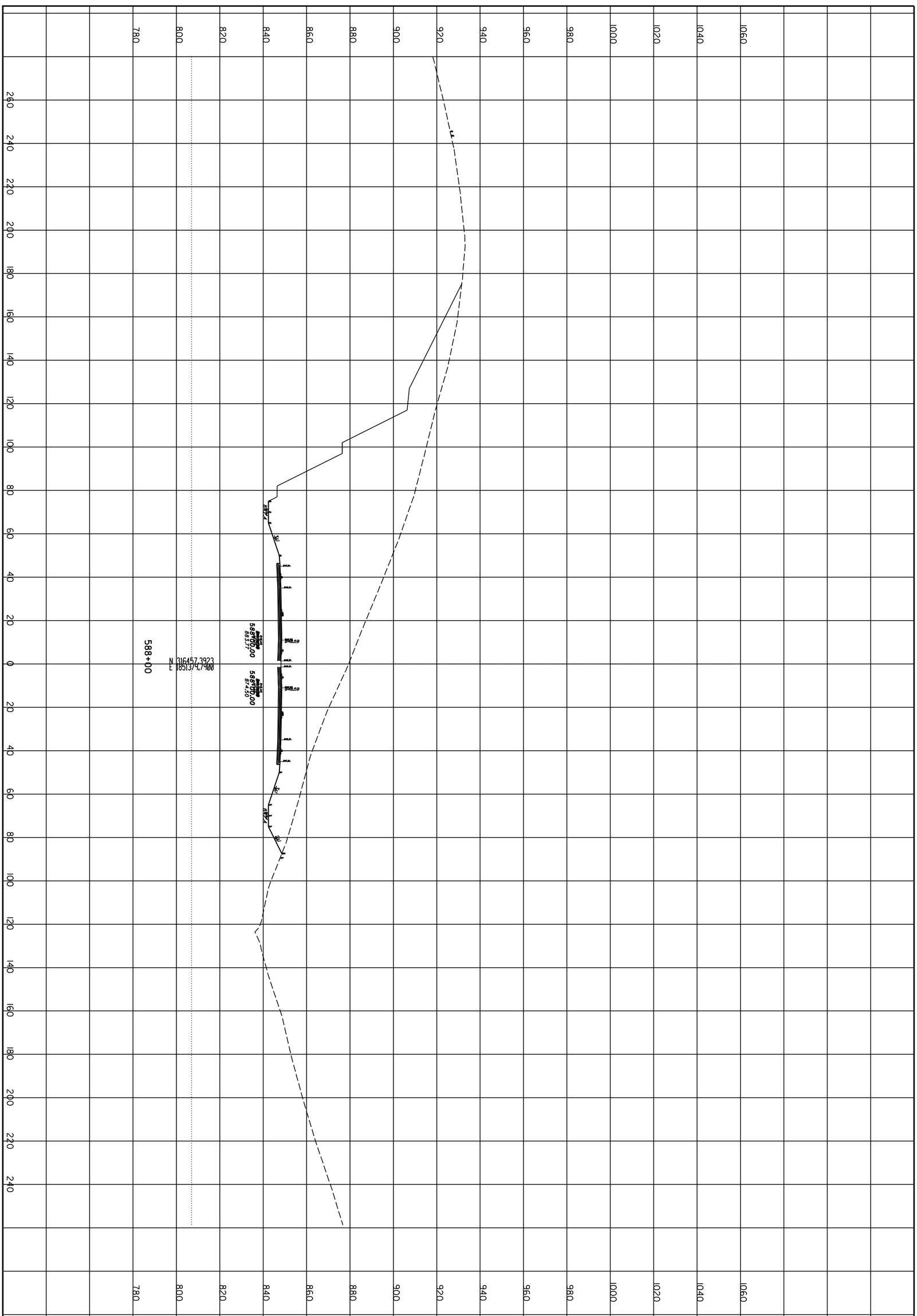


ROCK CUT SLOPE DESIGN - ROCK CUT 17
STA 587+50

SCI-823-10.13

14
33

CHECKED



15 / 33	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 17 STA 588+00
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 17
STA 588+50

SCI-823-10.13

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

850.59
588+50.00
8447.4

N 316457.897
E 185124.704

588+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 17
STA 589+00

SCI-823-10.13

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

852.59
589+00.00
852.59
589+00.00

589+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 17
STA 589+50

ROCK CUT

SCI-823-10.13

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

85±5.9
589±50.00
85±5.9
589±50.00
589+50

CHECKED

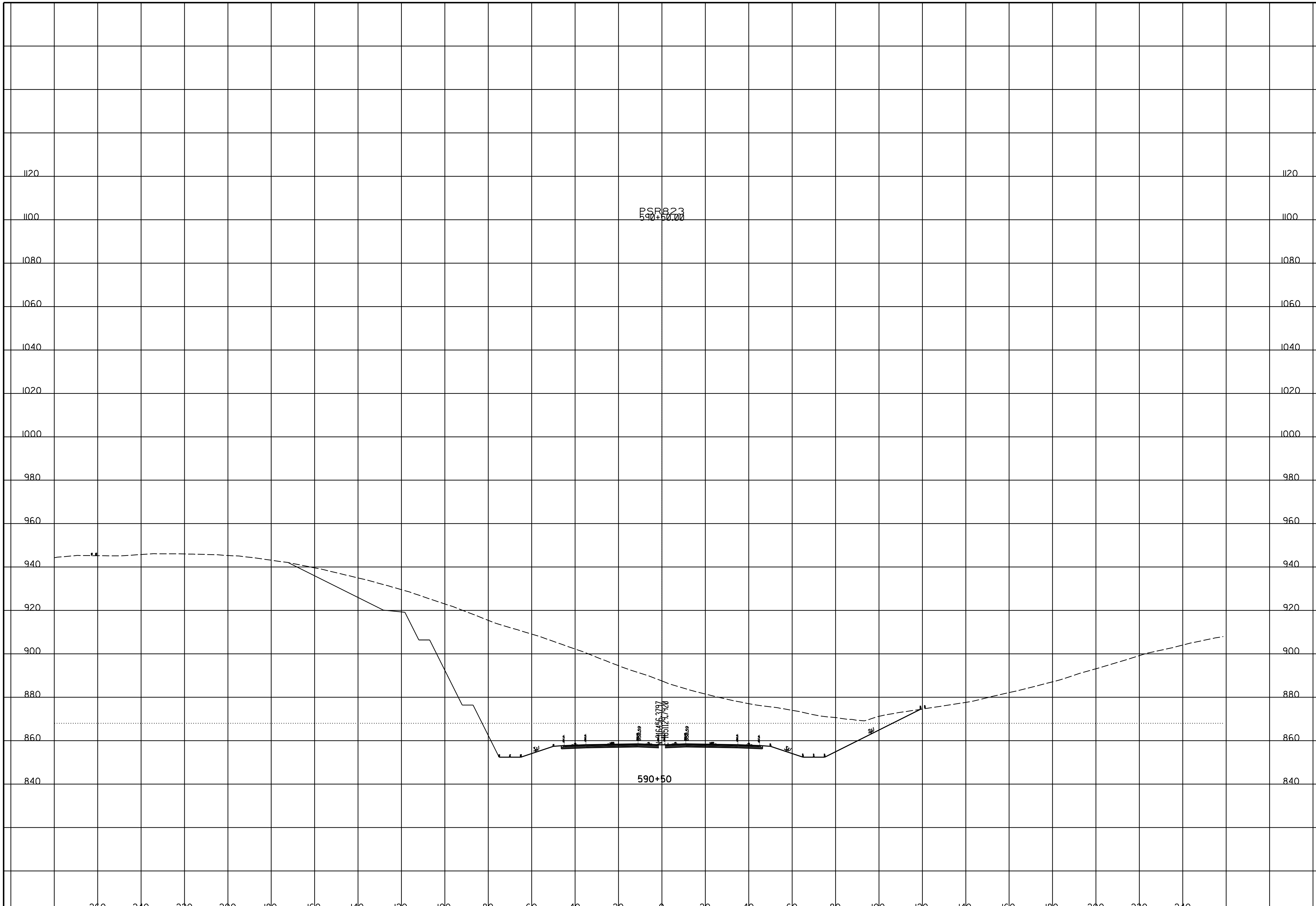
ROCK CUT SLOPE DESIGN - ROCK CUT 17
STA 590+00

SCI-823-10.13

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

590+00



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 17
STA 590+50

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 17
STA 591+00

PSR823
591+00.00

N 3164561.772
E 1851041.425

860.59
591+00.00

591+00

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 17
STA 591+50

ROCK CUT

SCI-823-10.13

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

RSR823
591+50.00

N 38°45'55.9747
E 105°02'54.1424

862.59

591+50

CHECKED

CUT SLOPE DESIGN - ROCK CUT 17
STA 592+00

ROCK CUT

SCI-823-10.13

PSR823
592+00.00

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

N 316455.7721
E 1850479.1933

592+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

CUT SLOPE DESIGN - ROCK CUT 17
STA 592+50

ROCK CUT

SCI-823-10.13

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

866.59
592+50.00
866.59

N 30455696
E 1859427.737

592+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 17
STA 593+00

ROCK CUT

SCI-823-10.13

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

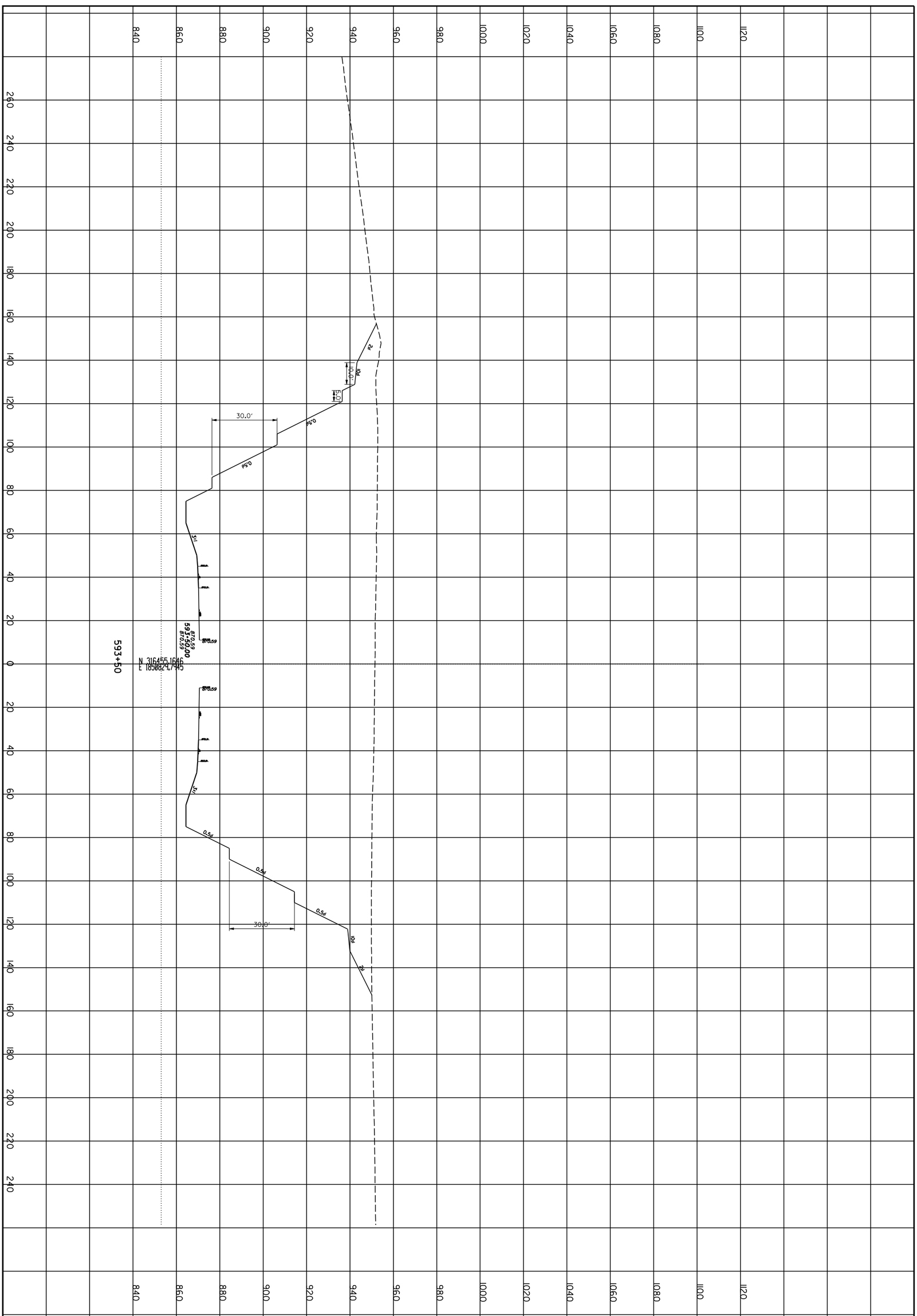
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

3:1

868.59
593+00.00
868.59

N 3164553.6671
E 1858694.7941

593+00



26/33	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 17 STA 593+50	CHECKED

960
940
920
900
880
860

872.59
594+00.00

594+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

CUT SLOPE DESIGN - ROCK CUT 17
STA 594+00

ROCK CUT

SCI-823-10.13

CHECKED

CUT SLOPE DESIGN - ROCK CUT 17
STA 594+50

ROCK CUT

SCI-823-10.13

PSR823
594+50.00

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860

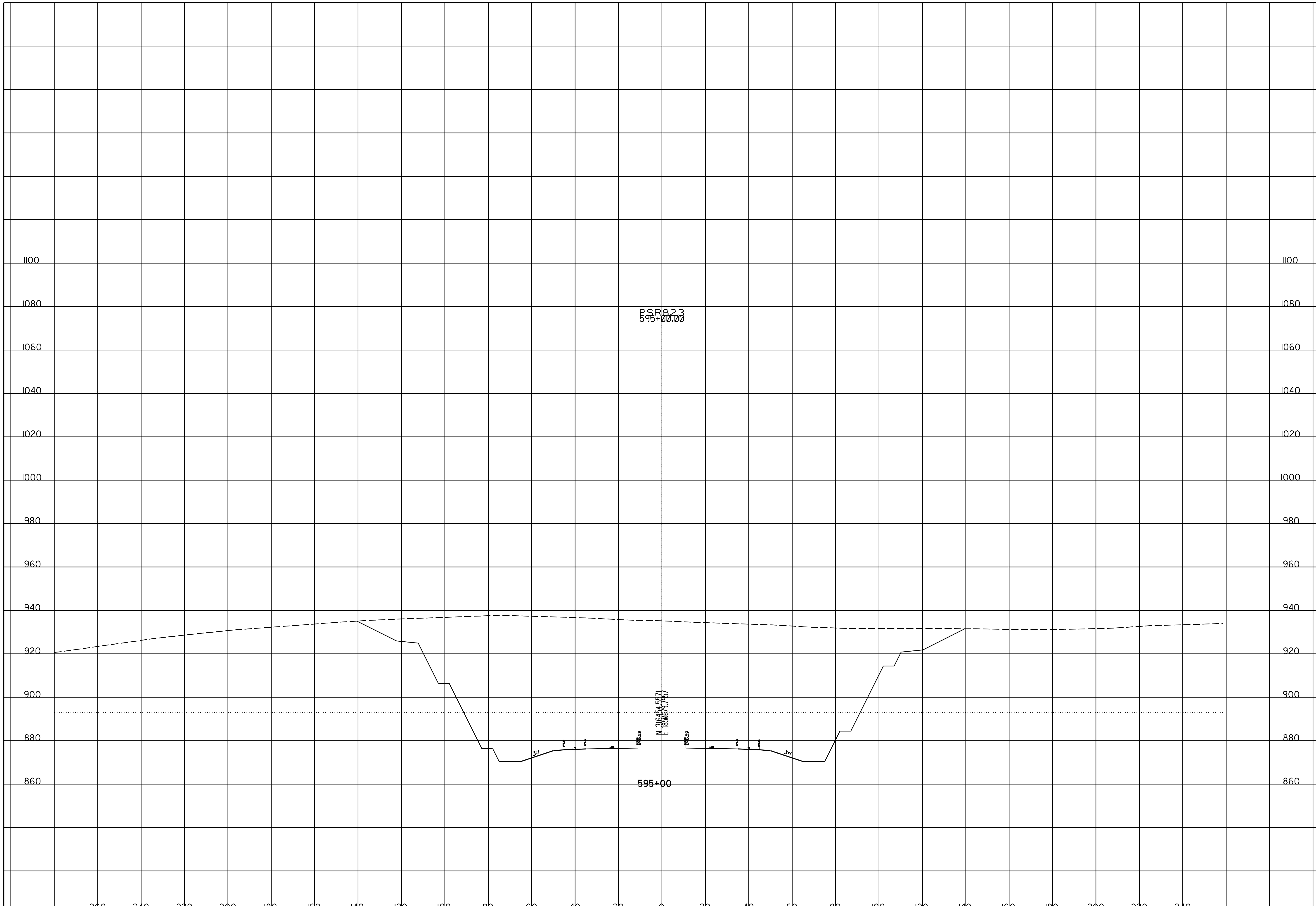
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

3:1

3:1

N 316454.7596
E 1850724.7963

594+50



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 17
STA 595+00

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 17
STA 595+50

PSR823
595+50.00

N 3164543.6545
E 1850624.7461

595+50

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 17
STA 596+00

PSR823
596+00.00

880.59
596+00.00
880.59

N 316454.1520
E 180067.9766

596+00

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 17 STA 596+50

ROCK CUT

SCI-823-10.13

PSR823
596+50.00

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

882.59
596+50.00
882.59

N 3164539495
E 185062.7470

596+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

PSR823
597+00.00

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

884.59
597+00.00
884.59

3:1
3:1

N 366613.7470
E 1850473.7974

597+00

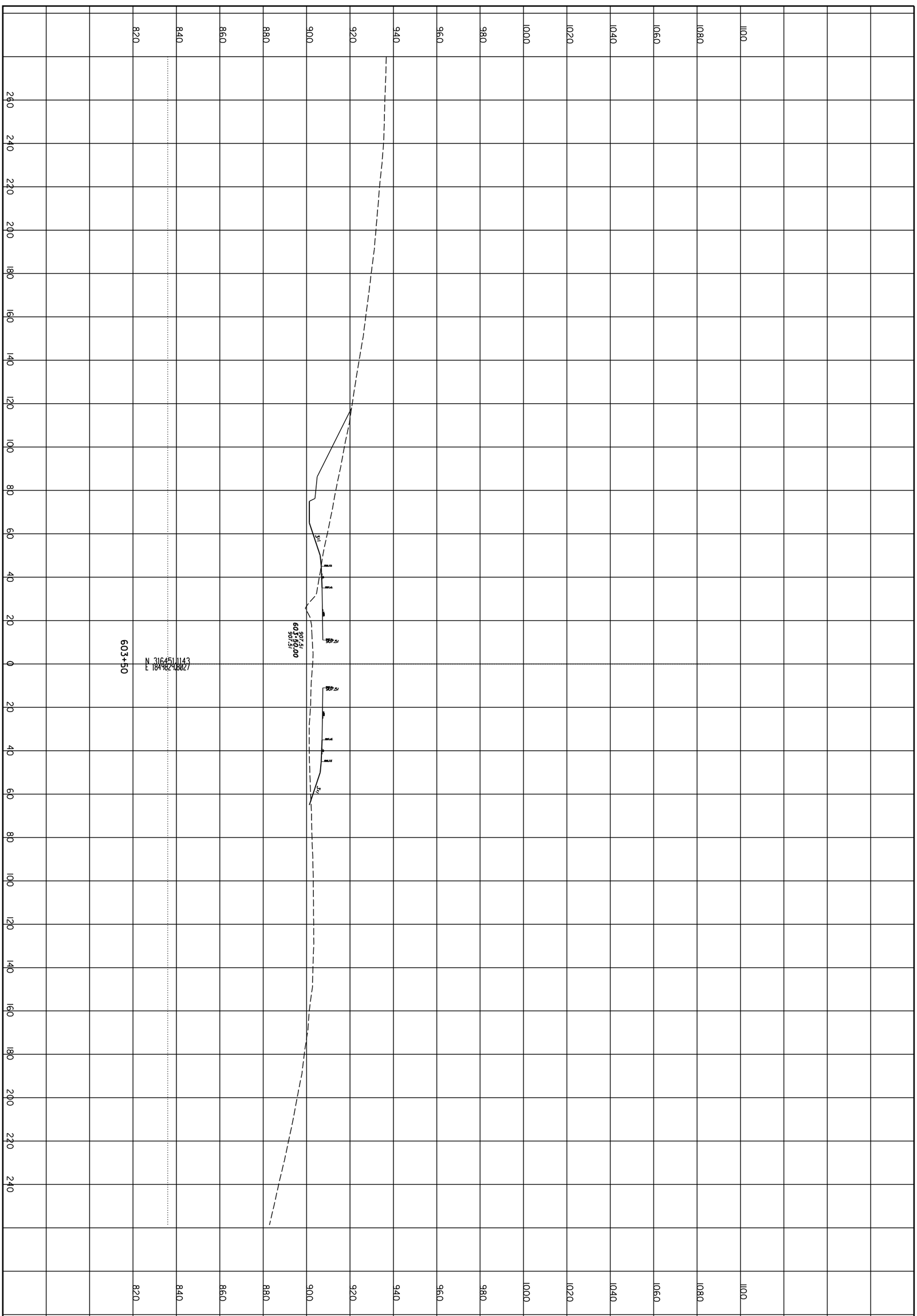
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CUT SLOPE DESIGN - ROCK CUT 17
STA 597+00

ROCK CUT

SCI-823-10.13

33
33



10	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 18 STA 603+50
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 18
STA 604+50

SCI-823-10.13

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

3:1
909.78
604+50.00
909.78
3:1

N 316450.7093
E 1849721.8035

604+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 18
STA 605+00

SCI-823-10.13

3
10

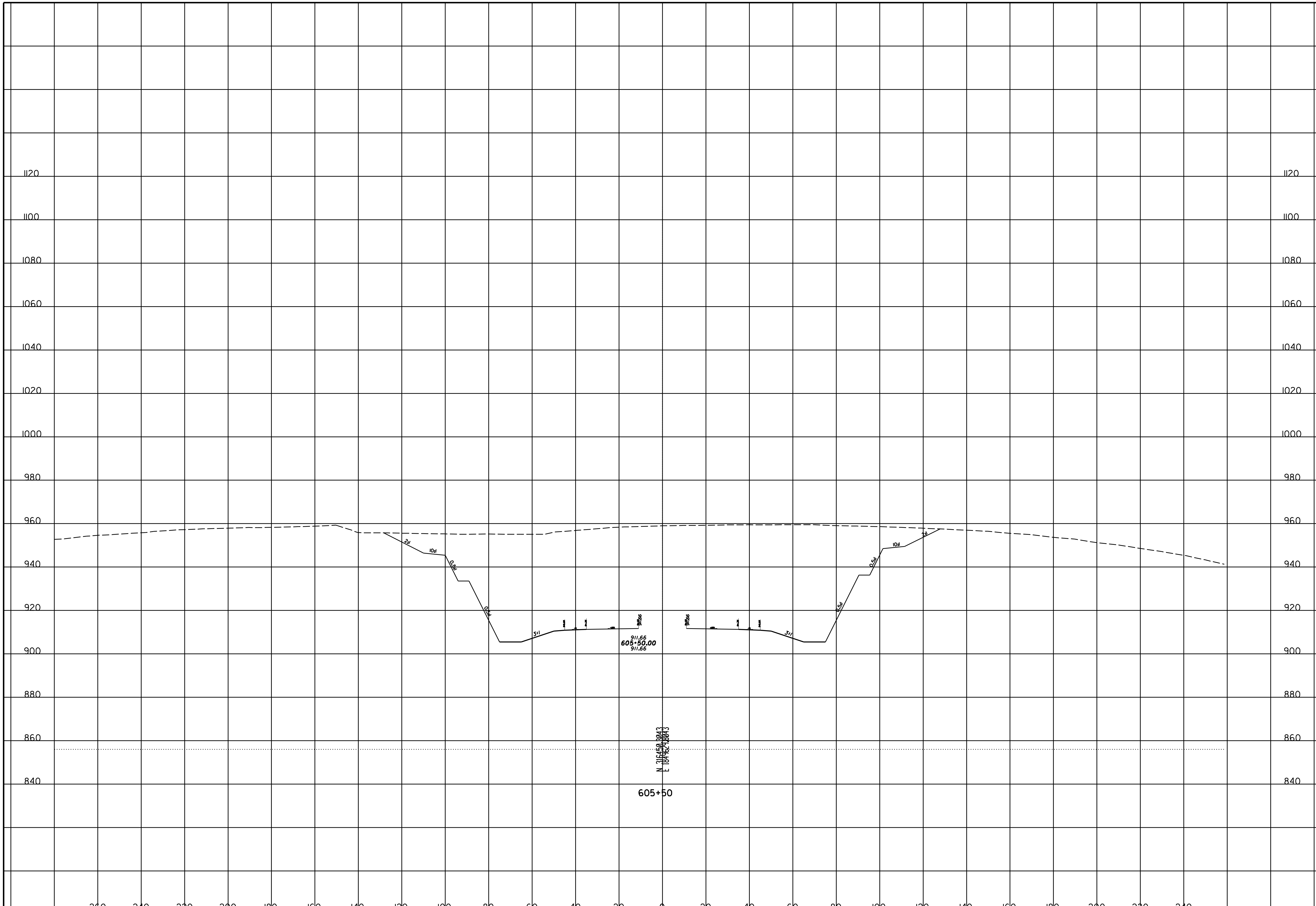
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

910.77
605+00.00
910.77

N 316450.2068
E 184967.8809

605+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 18
STA 605+50

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 18
STA 606+00

SCI-823-10.13

5
10

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

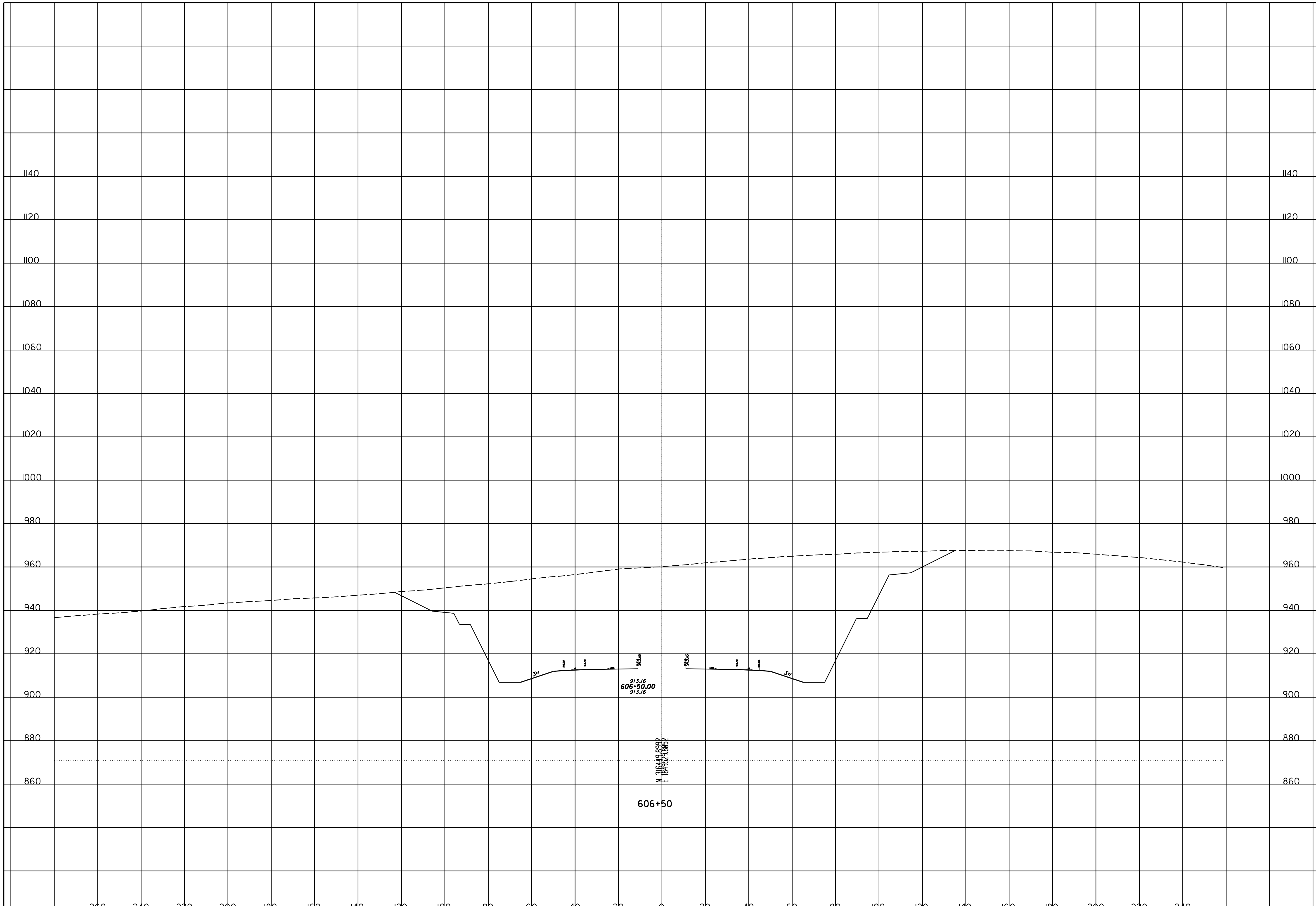
912.46
606+00.00
912.46

3:1

N 316450.1017
E 184557.4808

606+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 18
STA 606+50

SCI-823-10.13

6
10

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 18
STA 607+00

ROCK CUT

SCI-823-10.13

7
10

1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

913.77
607+00.00
913.77

N 316449.6367
E 184947.0856

607+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 18
STA 607+50

SCI-823-10.13

8
10

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

914.27
607+50.00
914.27

3:1

N 3167449.4042
E 1819427.8060

607+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 18
STA 608+00

SCI-823-10.13

9
10

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

914.69
608+00.00
914.69

N 316449.2917
E 1849749.8864

608+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 18
STA 608+50

SCI-823-10.13

10
10

915.00
608+50.00
915.00

N 316449.0832
E 1849321.8068

608+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 19
STA 611+50

SCI-823-10.13

9

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

3:1

914.87
611+50.00
914.87

3:1

N 3316447.8741
E 1849024.8093

611+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 19
STA 612+00

SCI-823-10.13

2
9

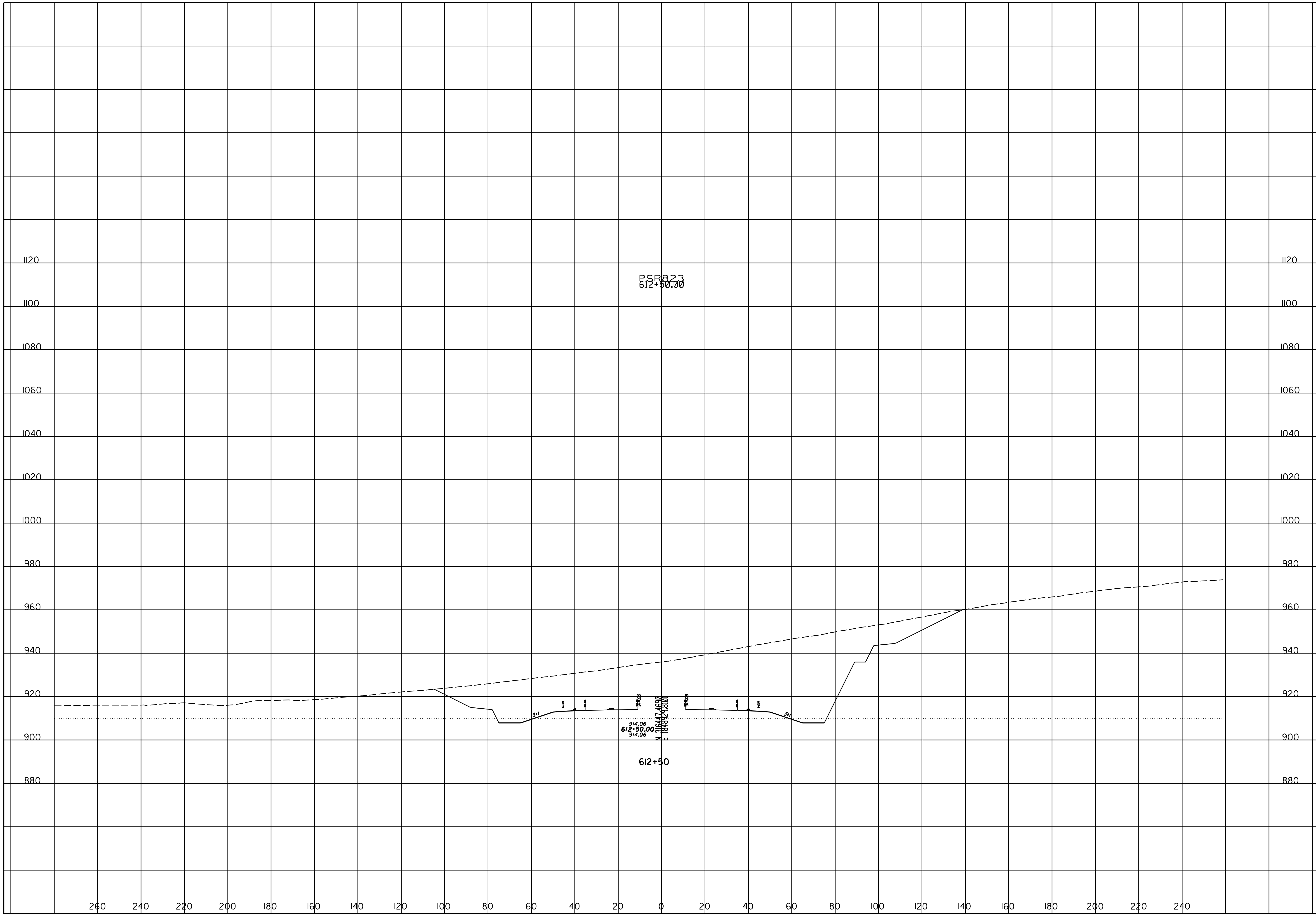
1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

914.52
612+00.00
914.52

N 3164476.716
E 1048914.8847

612+00



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 19
STA 612+50

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 19
STA 613+00

SCI-823-10.13

4
9

PSR823
613+00.00

N 3180447.2665
E 1048874.8185

613+00

1100
1080
1060
1040
1020
1000
980
960
940
920
900

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 19
STA 613+50

SCI-823-10.13

1080
1060
1040
1020
1000
980
960
940
920
900

PSR823
613+50.00

N 316447.0660
E 1048824.3804

3:1

912.86

613+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 19
STA 614+00

PSR823
614+00.00

1080
1060
1040
1020
1000
980
960
940
920
900

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

N 316446.8615
E 184877.8813

3:1
3:1

912.12

614+00

SCI-823-10.13

6
9

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 19
STA 614+50

PSR823
614+50.00

N 316446.6598
E 184872.4817

614+50

SCI-823-10.13

7
9

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 19
STA 615+00

SCI-823-10.13

8
9

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900

PSR823
615+00.00

910.35
615+00.00
N 3164416.4565
E 1948679.8124

3:1
3:1

615+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 19
STA 615+50

SCI-823-10.13

9
9

1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880

909.31
615+50.00
909.31

N 3164462.5140
E 1848629.8125

615+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

CUT SLOPE DESIGN - ROCK CUT 20
STA 619+50

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

3:1

897.59
619+50.00
897.59

N 3166444.7833
E 1048224.8154

619+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

ROCK CUT

SCI-823-10.13

1
4

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 20
STA 620+00

895.74
620+00.00
895.74

N 3184444.9067
E 1848174.8156

620+00

SCI-823-10.13

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

3:1

893.89
620+50.00
893.89

N 3166495.3184
E 1048274.8174

620+50

CHECKED

CUT SLOPE DESIGN - ROCK CUT 20
STA 620+50

ROCK CUT

SCI-823-10.13

3
4

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 20
STA 621+00

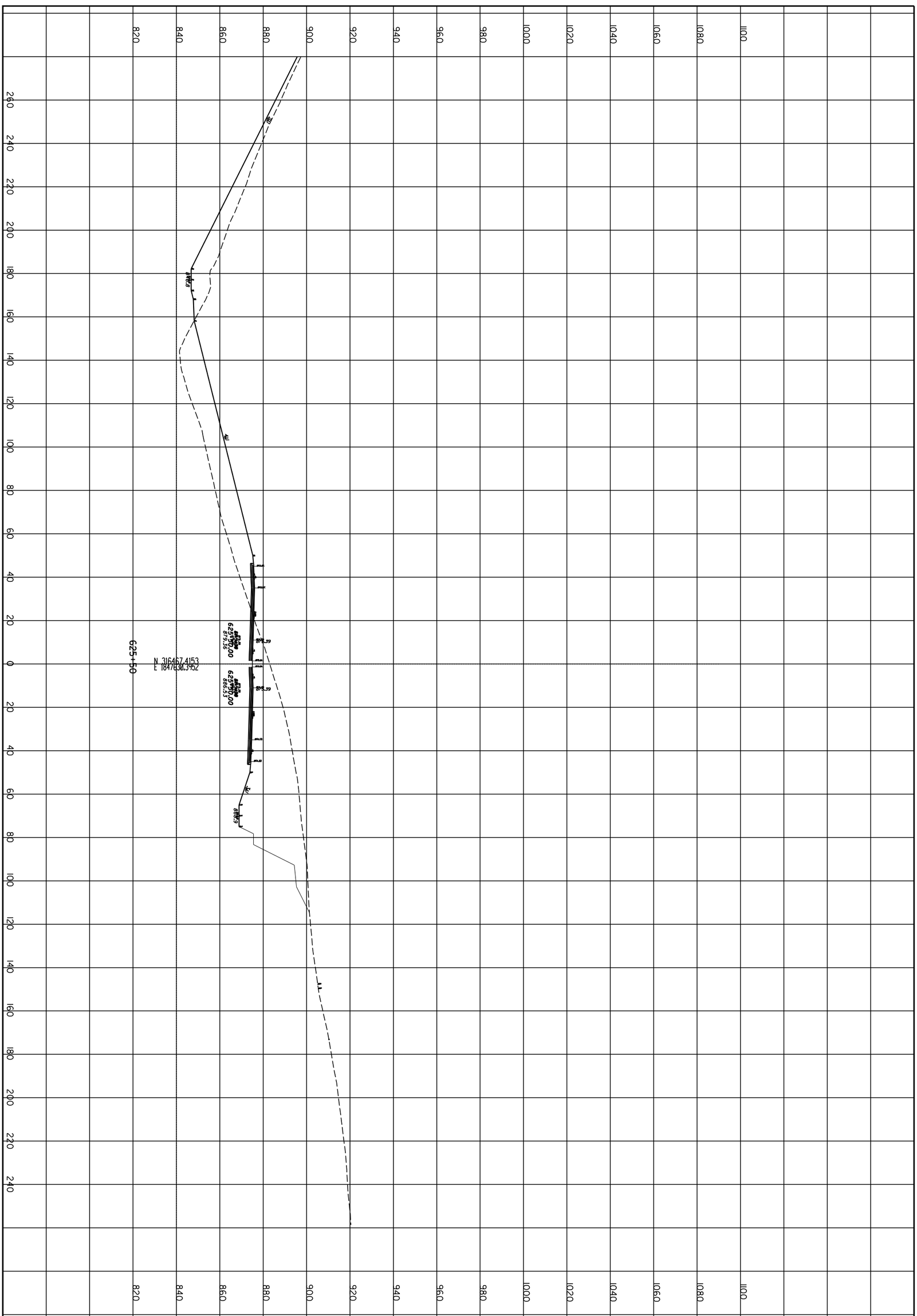
SCI-823-10.13

4
4

892.04
621+00.00
892.04

N 316446.0966
E 1848074.8824

621+00



17 / 1	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 21 STA 625+50
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 21
STA 626+00

SCI-823-10.13

ROCK CUT

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

873.54
626+00.00
889.4

873.54
626+00.00
887.1

N 3164714.4217
E 1847386.3561

626+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 21
STA 626+50

SCI-823-10.13

626+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 21
STA 627+00

ROCK CUT

SCI-823-10.13

1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

N 3184180.4126
E 1847480.9618

627+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 21
STA 627+50

ROCK CUT

SCI-823-10.13

1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

627+50

N 3164852967
E 1847312084

3:1

0.5H

1H

10.00 %

2H

PSR823
628+00.00

N 36490.7463
E 18473814.9437

628+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 21
STA 628+00

SCI-823-10.13

6
17

PSR823
628+50.00

N 3164396.3412
E 1847431.8124

628+50

1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

SLOPE DESIGN - ROCK CUT 21
STA 628+50

ROCK CUT SLOPE

SCI-823-10.13

PSR823
629+00.00

N 316582.3812
E 1847282.1684

862.44

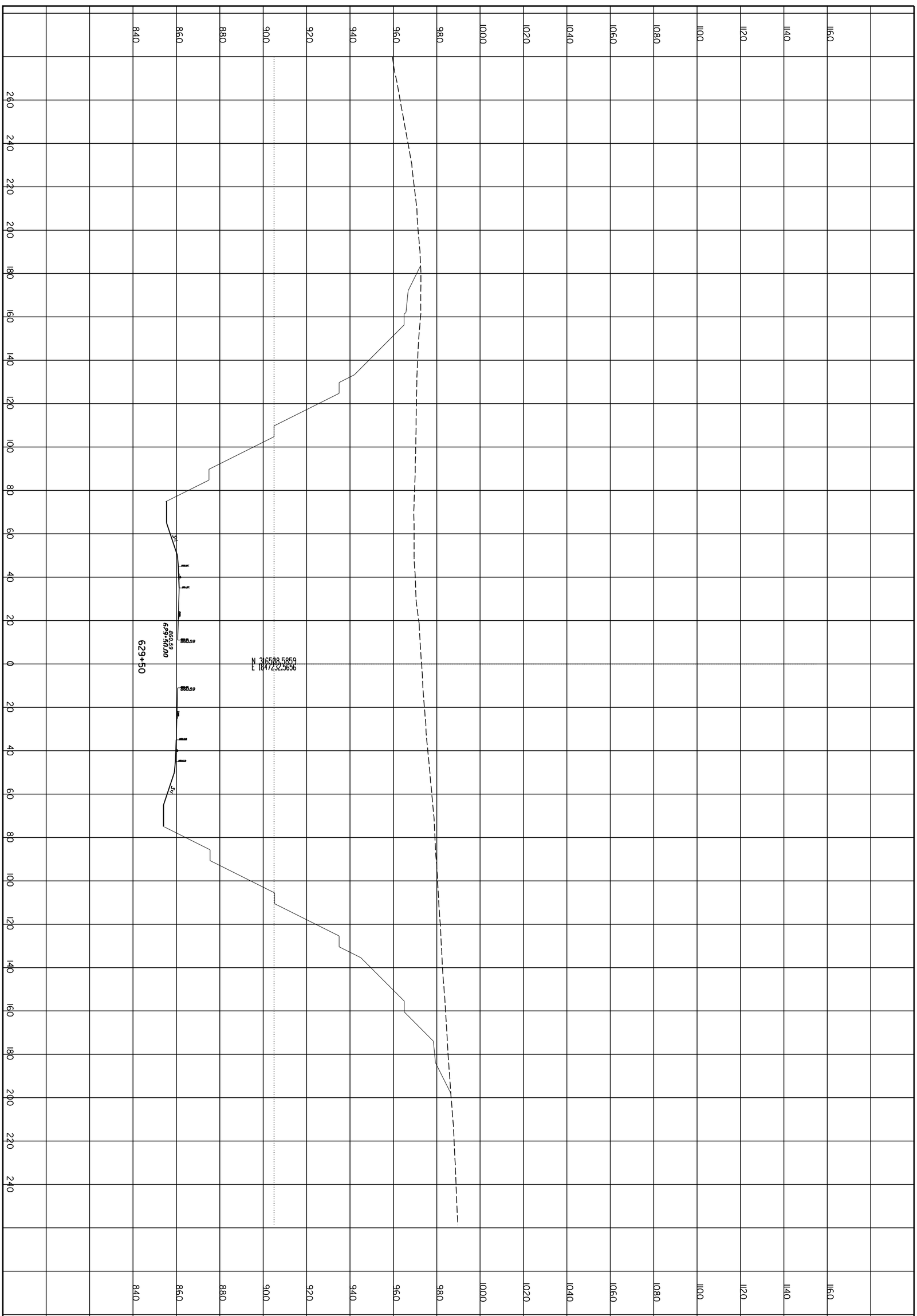
629+00

CHECKED

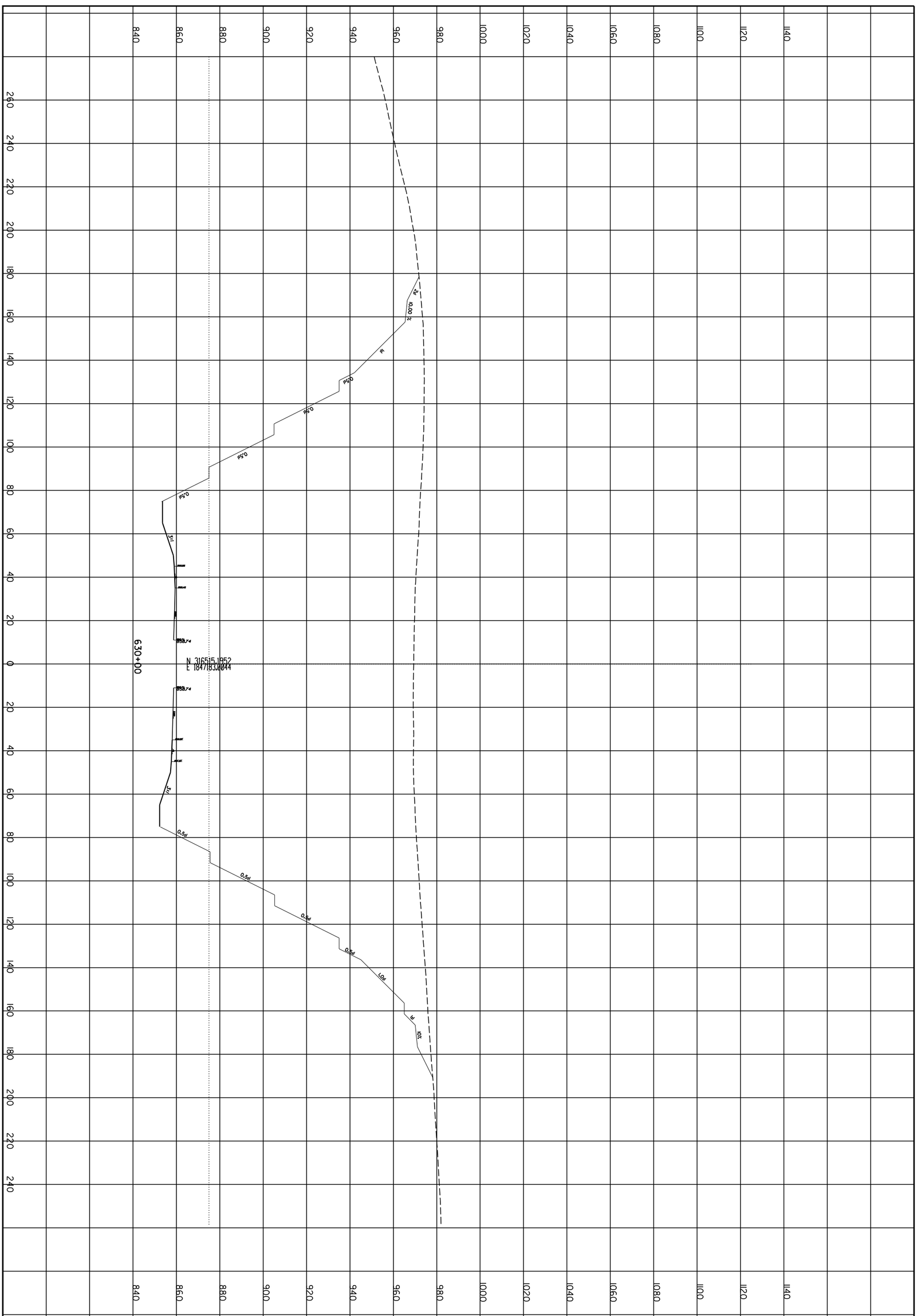
SLOPE DESIGN - ROCK CUT 21
STA 629+00

ROCK CUT SLOPE

SCI-823-10.13



9/17	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 21 STA 629+50	CHECKED



10 / 17	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 21 STA 630+00
		CHECKED

CHECKED

SLOPE DESIGN - ROCK CUT 21
STA 630+50

ROCK CUT SLOPE

SCI-823-10.13

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

3:1
3:1
856.89
630+50.00
856.89
N 16522.1287
E 18473.4878

630+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 21
STA 631+00

SCI-823-10.13

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

3:1

855.11
631+00.00
855.11

N 316529.3861
E 1847084.2872

631+00

1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

853.45
631+50.00
853.45

N 3165536.9672
E 1847034.5953

631+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 21 STA 631+50

SCI-823-10.13

13
17

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

3:1

851.92
632+00.00
851.92

N 316544.8715
E 1046865.2242

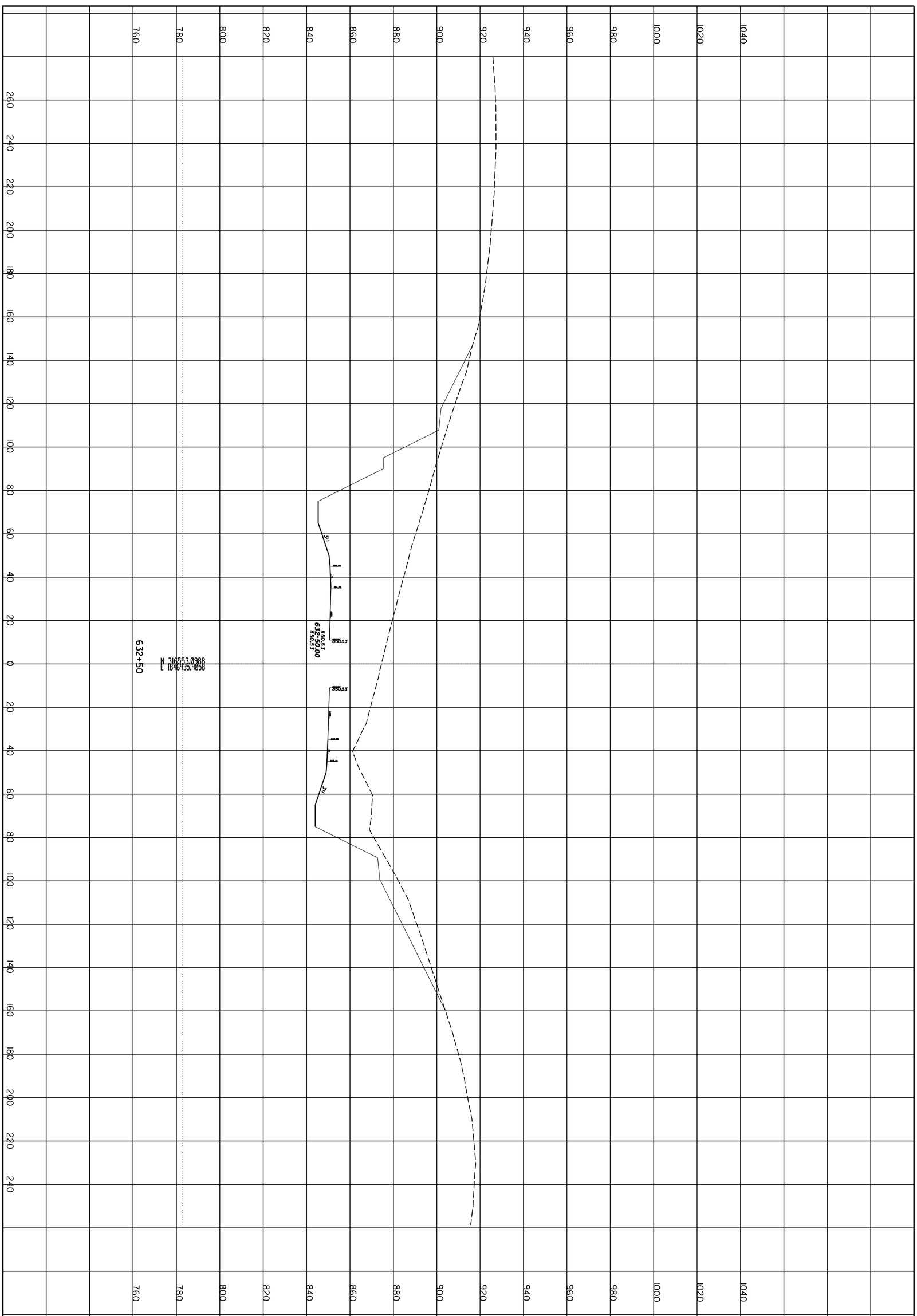
632+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 21 STA 632+00

SCI-823-10.13



15 / 17	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 21 STA 632+50
		CHECKED

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

3:1

849.26
633+00.00
849.26

N 3165161.6487
E 1048886.6423

633+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

SLOPE DESIGN - ROCK CUT 21
STA 633+00

ROCK CUT SLOPE

SCI-823-10.13

16
17

CHECKED

CUT SLOPE DESIGN - ROCK CUT 21
STA 633+50

ROCK CUT

SCI-823-10.13

17
17

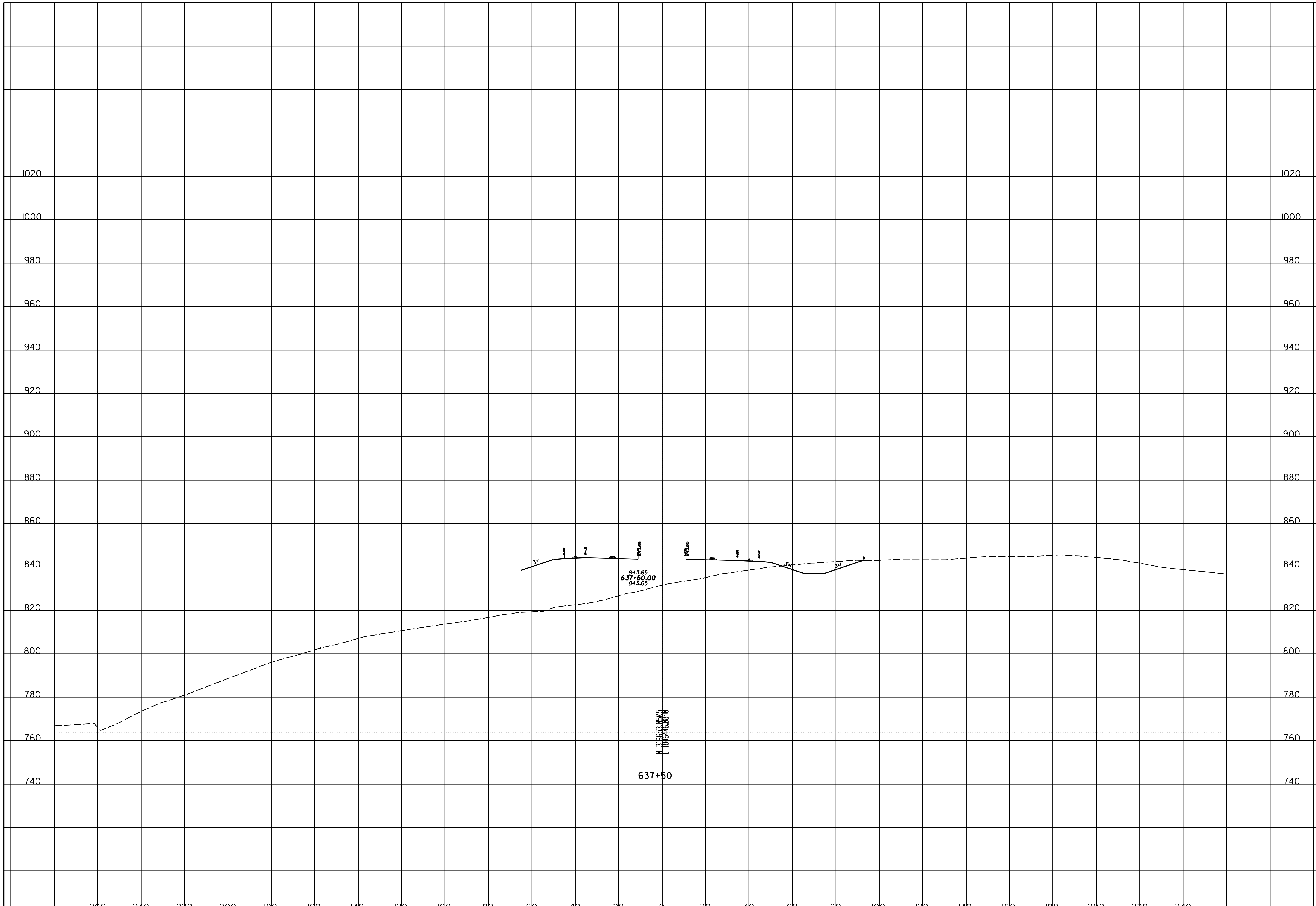
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

3:1
848.78
633+50.00
848.12
3:1

N 316579.5209
E 184683.4658

633+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 637+50

SCI-823-10.13

CHECKED

CUT SLOPE DESIGN - ROCK CUT 22
STA 638+00

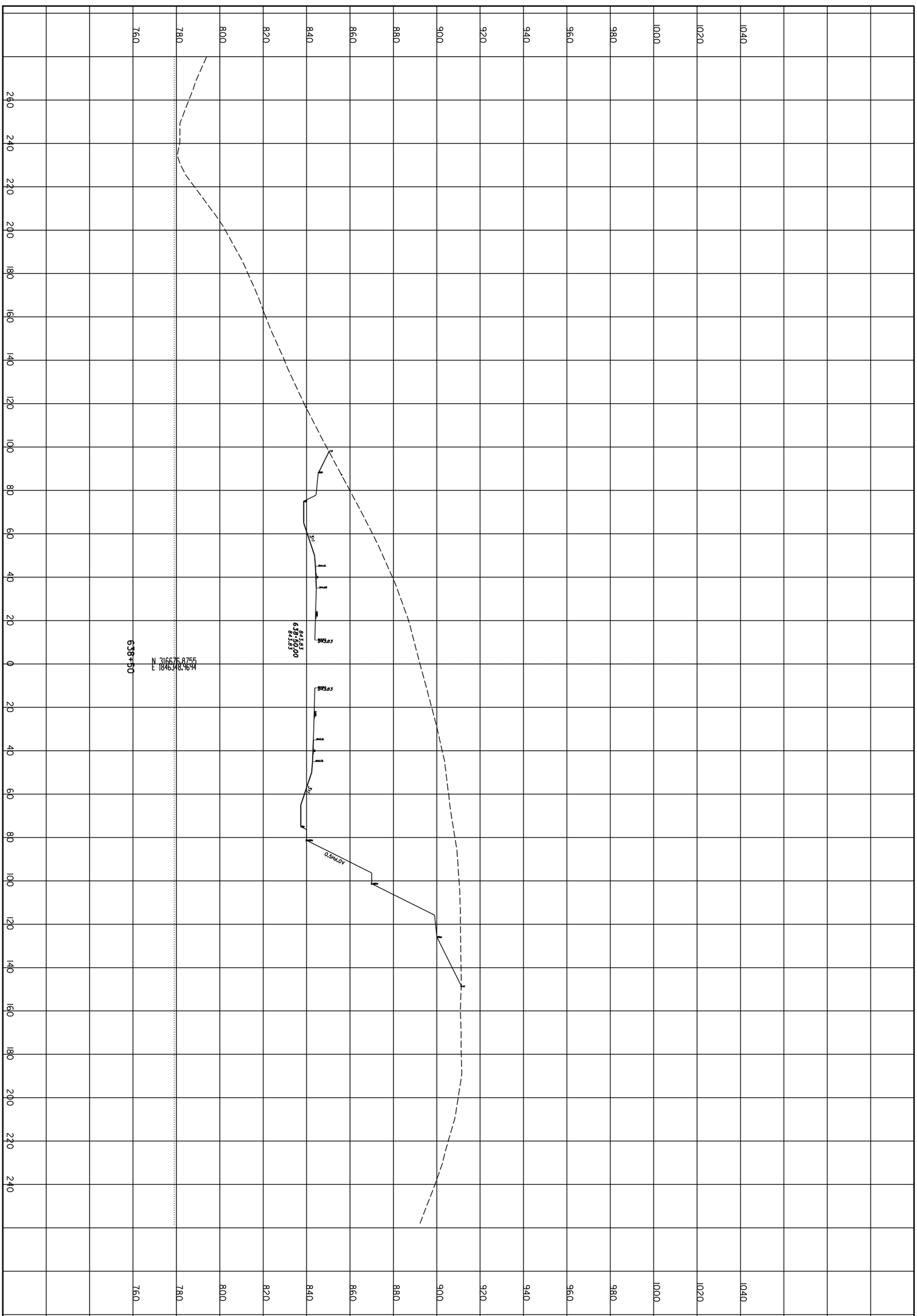
ROCK CUT

SCI-823-10.13

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

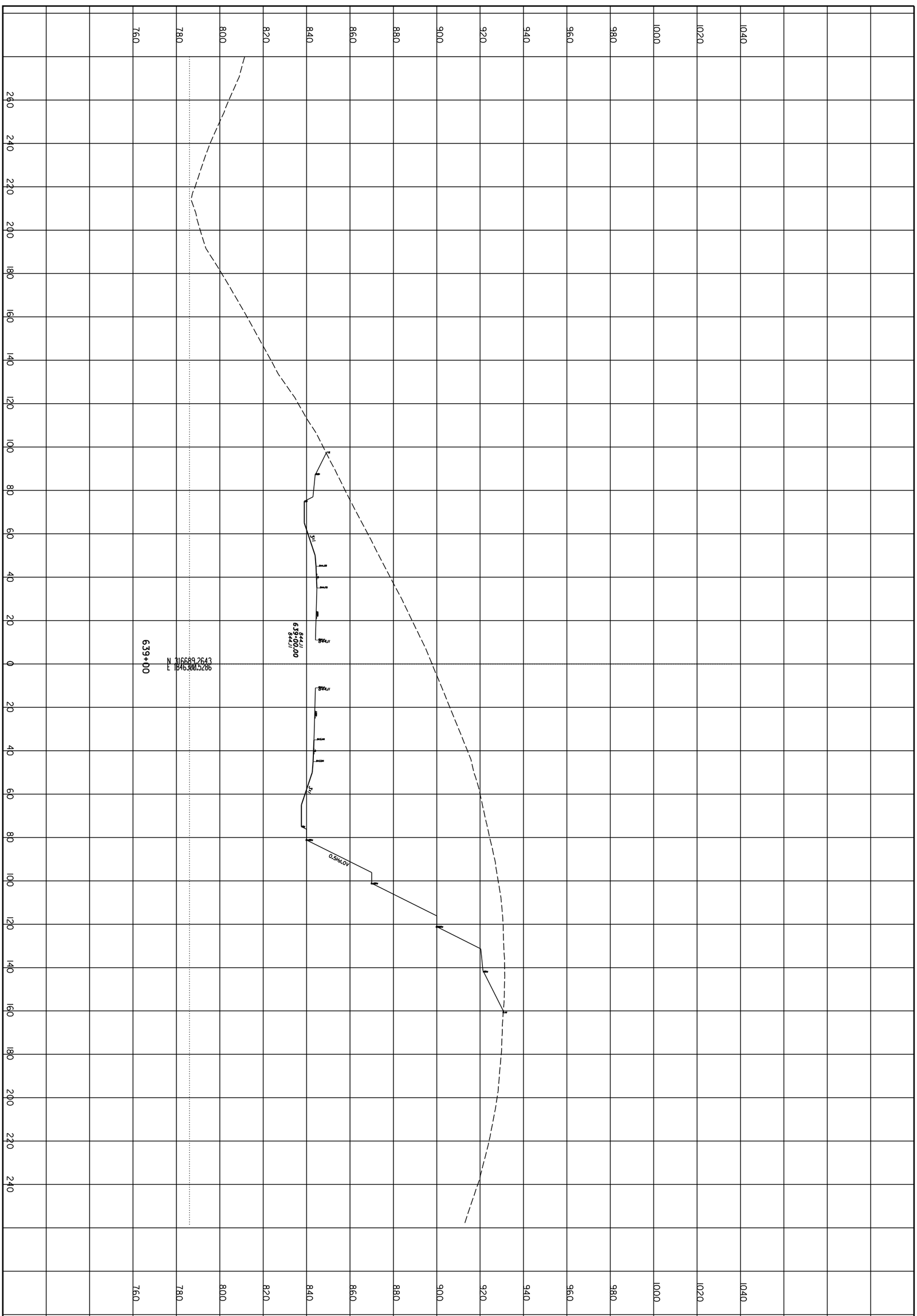
0.5H:1V
3:1
843.67
638+00.00
843.67
3:1
840.0
0.5H:1V
N 3166543.8041
E 1846397.4962
638+00



SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 638+50

CHECKED



4 / 39	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 22 STA 639+00
		CHECKED

CHECKED

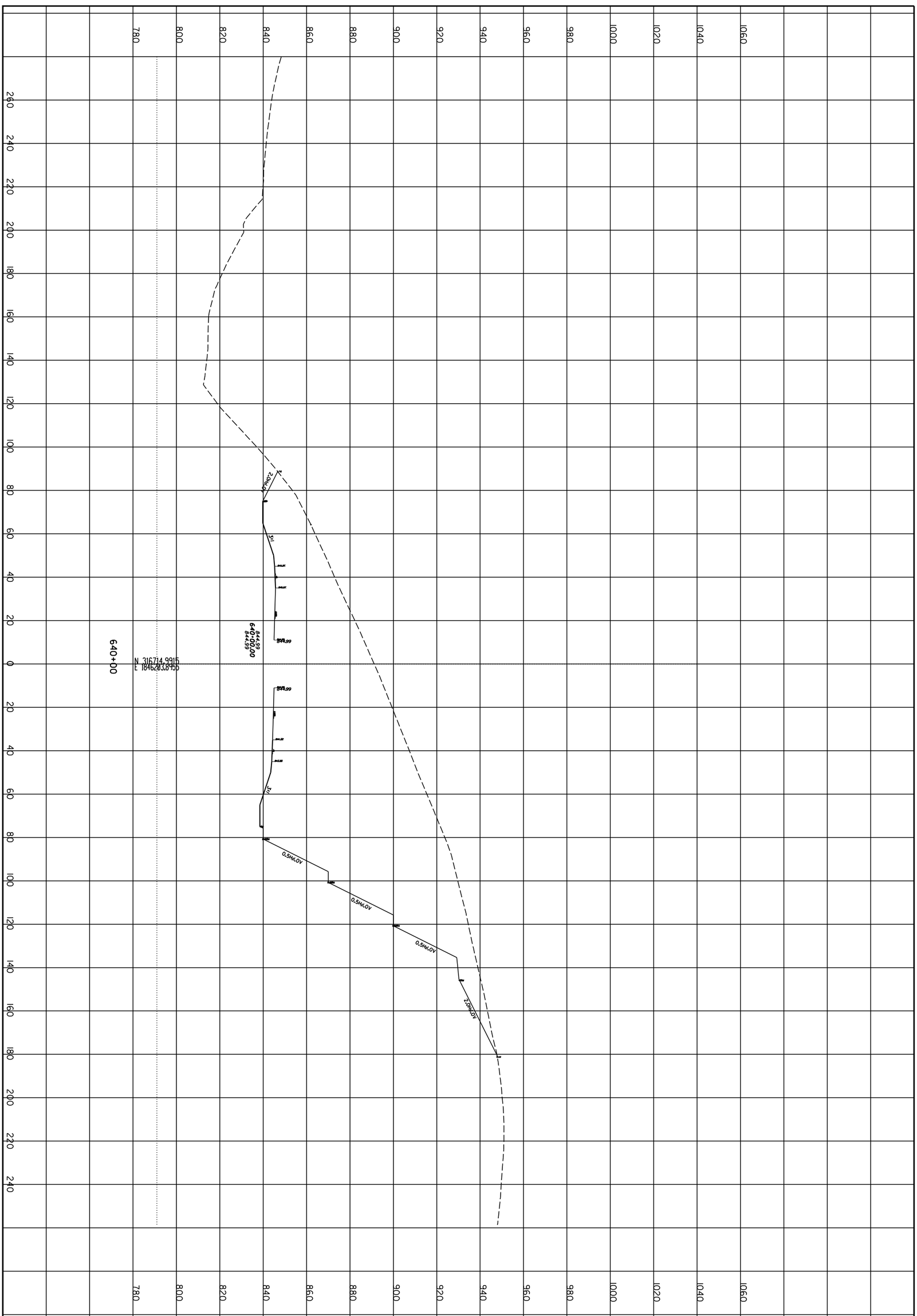
ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 639+50

SCI-823-10.13

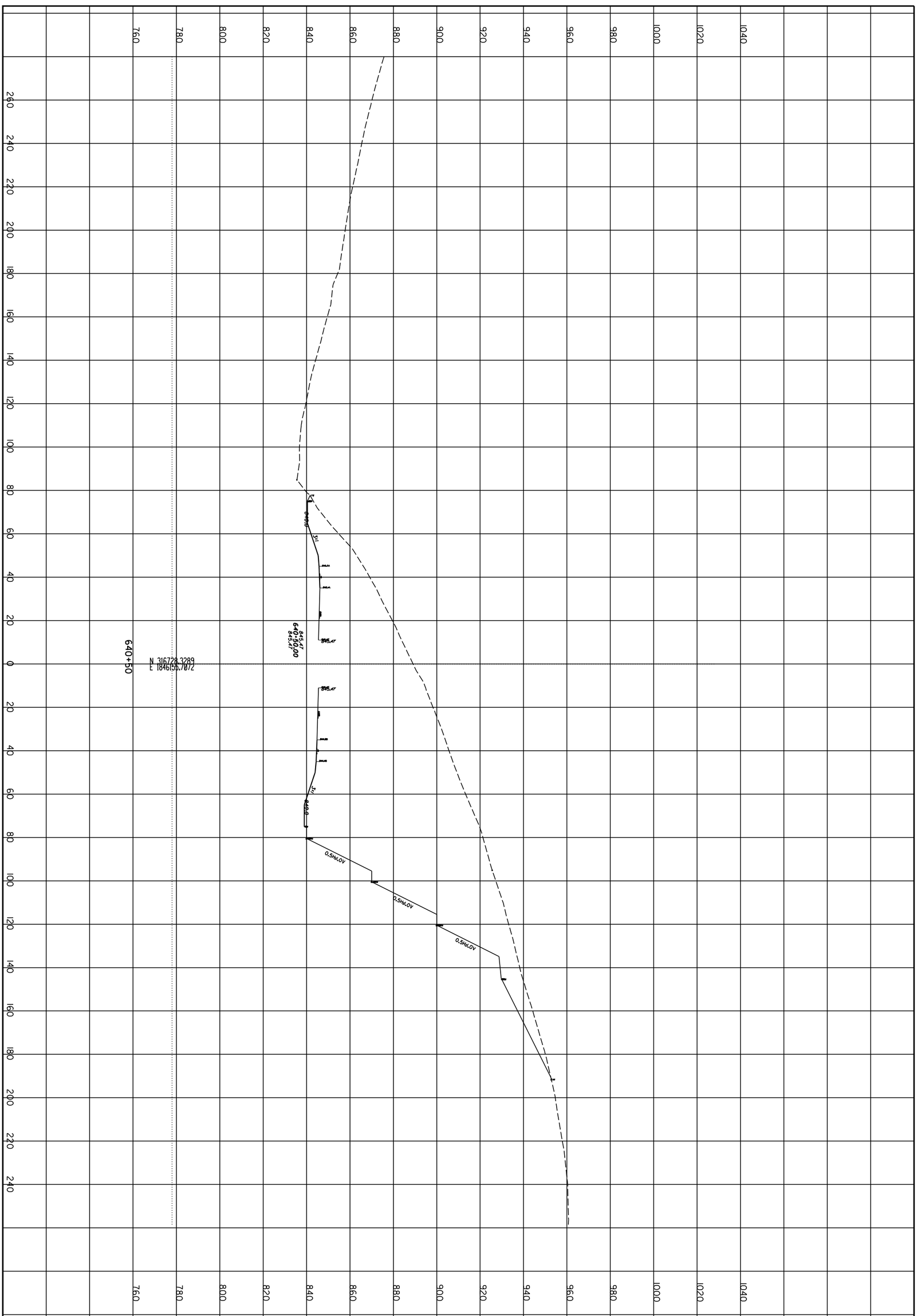
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2.0H:4.0V
3:1
844.52
639+50.00
844.52
N 316701.9638
E 1846252.1699
639+50
0.5H:4.0V
0.5H:4.0V
2.0H:4.0V



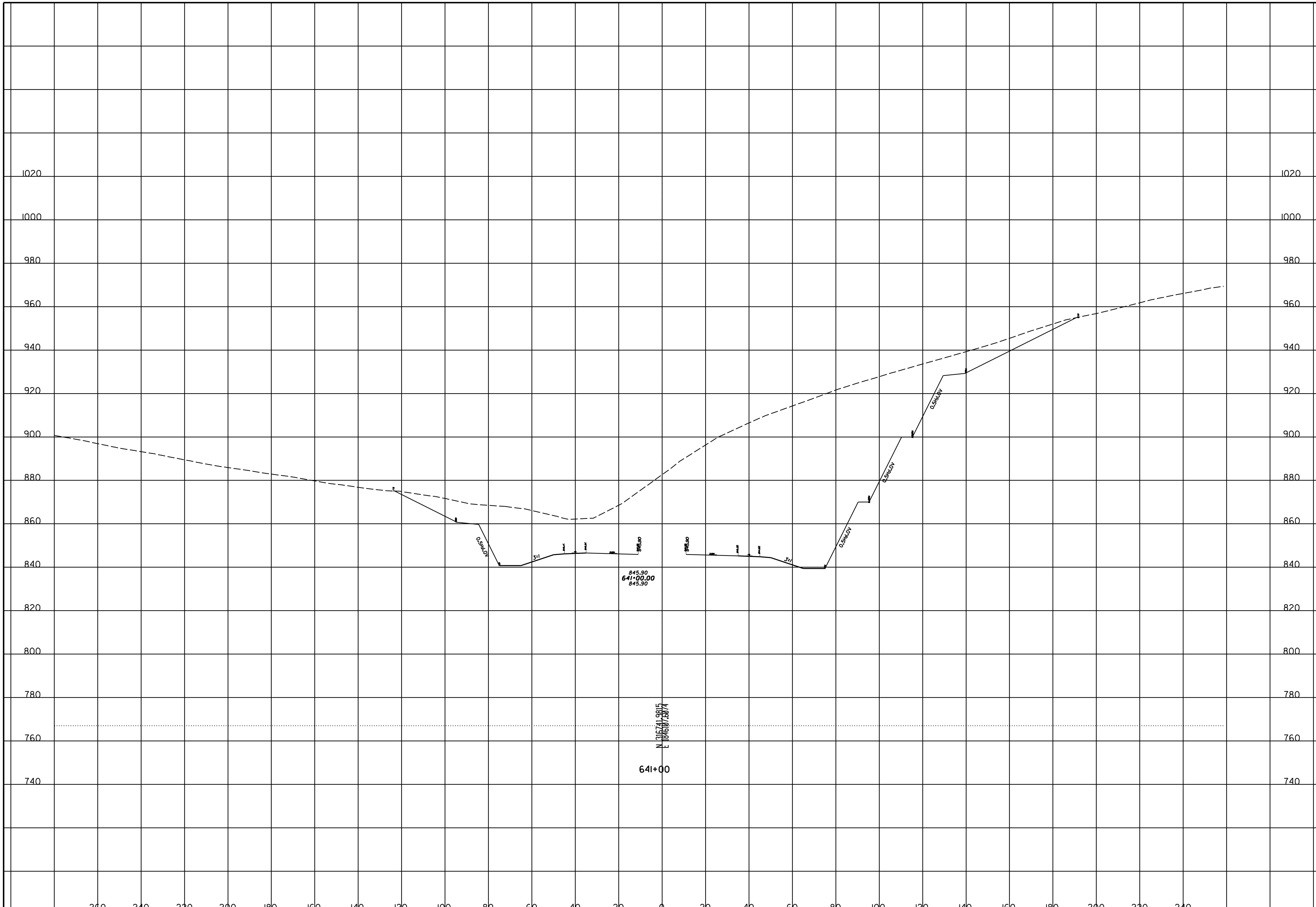
6 / 39	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 22 STA 640+00
		CHECKED



SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 640+50

CHECKED

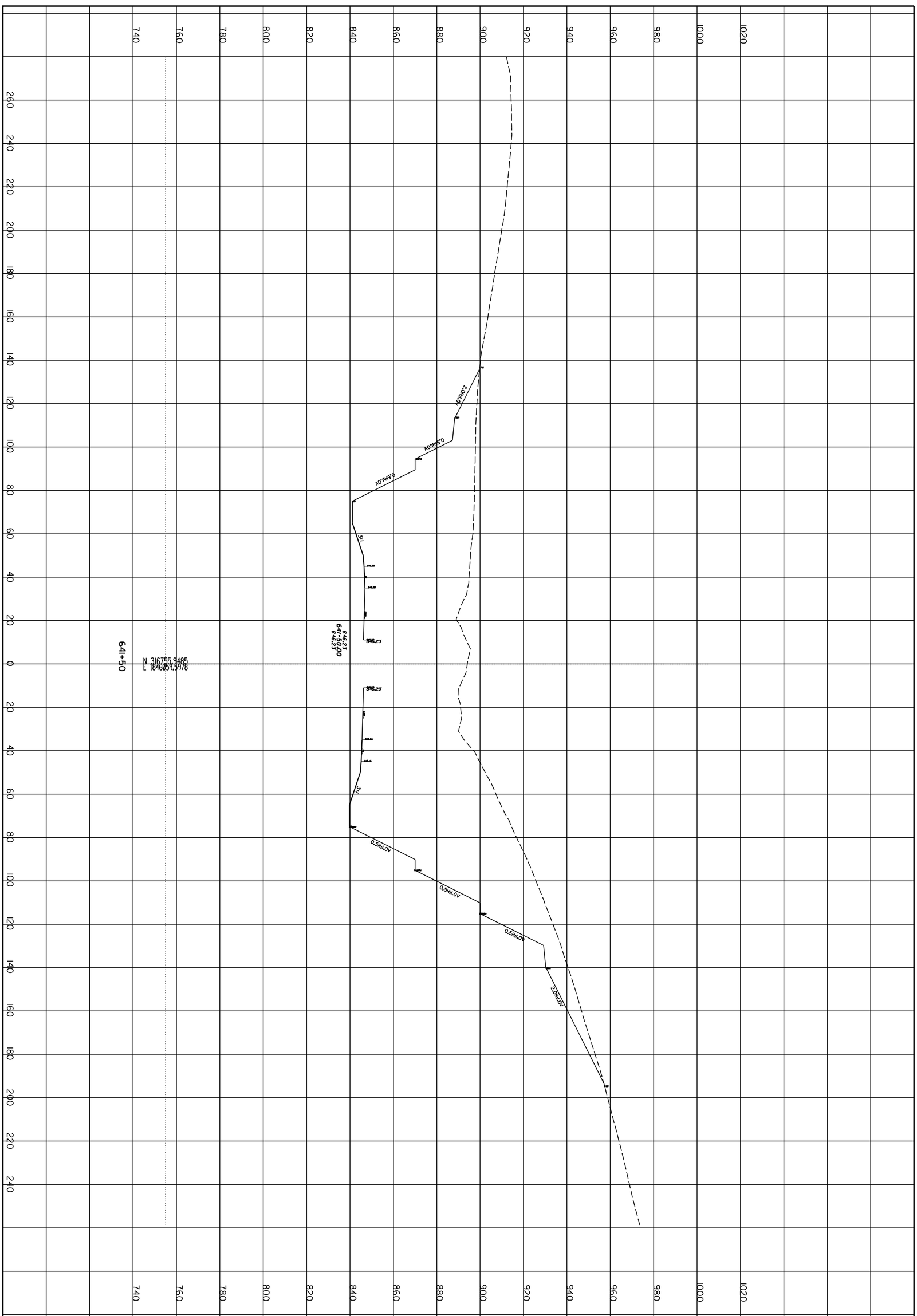


CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 641+00

SCI-823-10.13

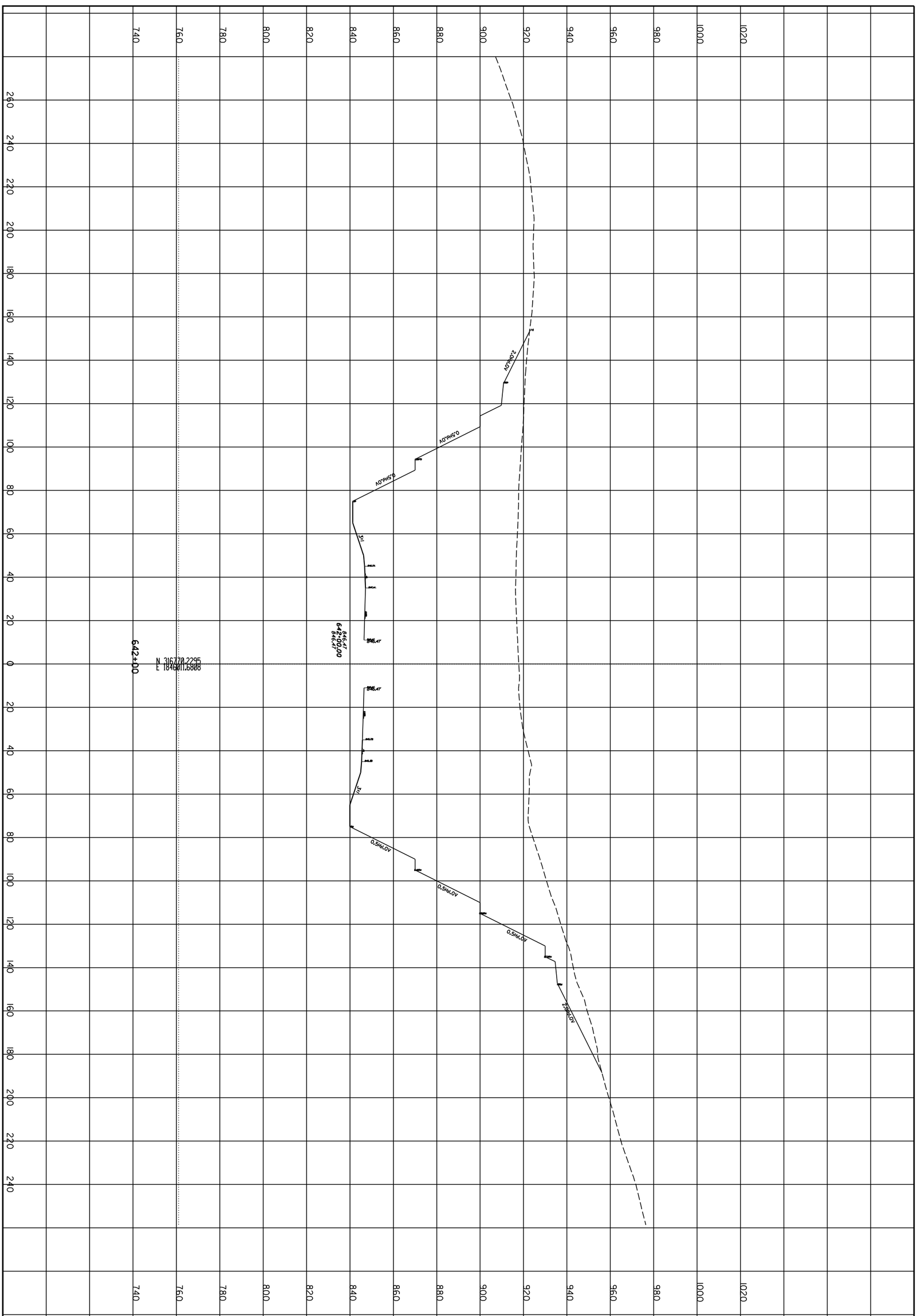
8
39



SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 641+50

CHECKED



10 / 39	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 22 STA 642+00
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22 STA 642+50

SCI-823-10.13

2.0H:1.0V

0.5H:1.0V

0.5H:1.0V

0.5H:1.0V

3:1

846.61
642+50.00
846.61

N 316784.8237
E 184596.08982

642+50

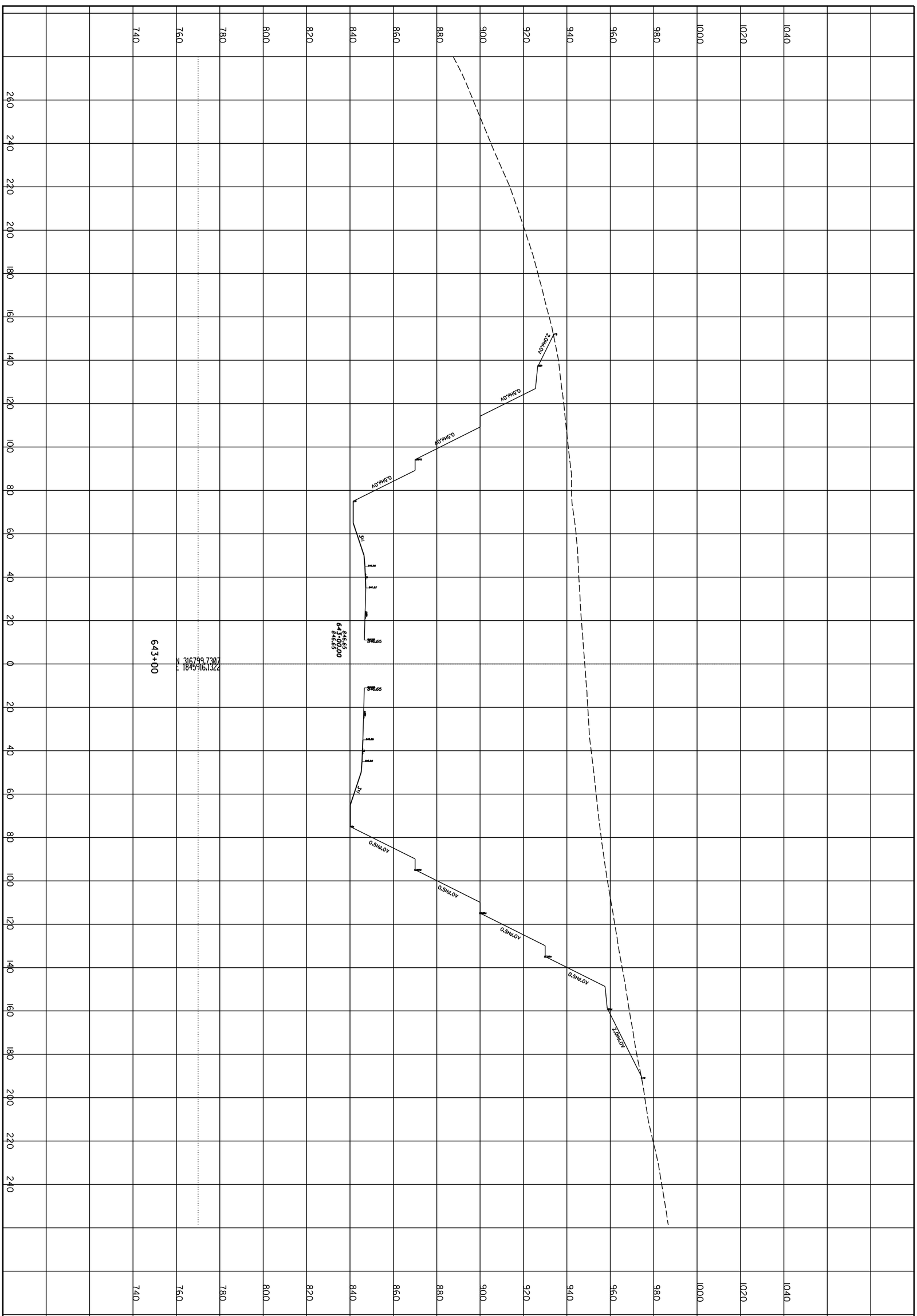
2.0H:1.0V

0.5H:1.0V

0.5H:1.0V

0.5H:1.0V

3:1



12 / 39	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 22 STA 643+00
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22 STA 643+50

SCI-823-10.13

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

2.0H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
3:1
846.61
643+50.00
846.61
3:1
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
2.0H:1.0V

N 3168149.997
E 1845868.3947

643+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

CUT SLOPE DESIGN - ROCK CUT 22
STA 644+00

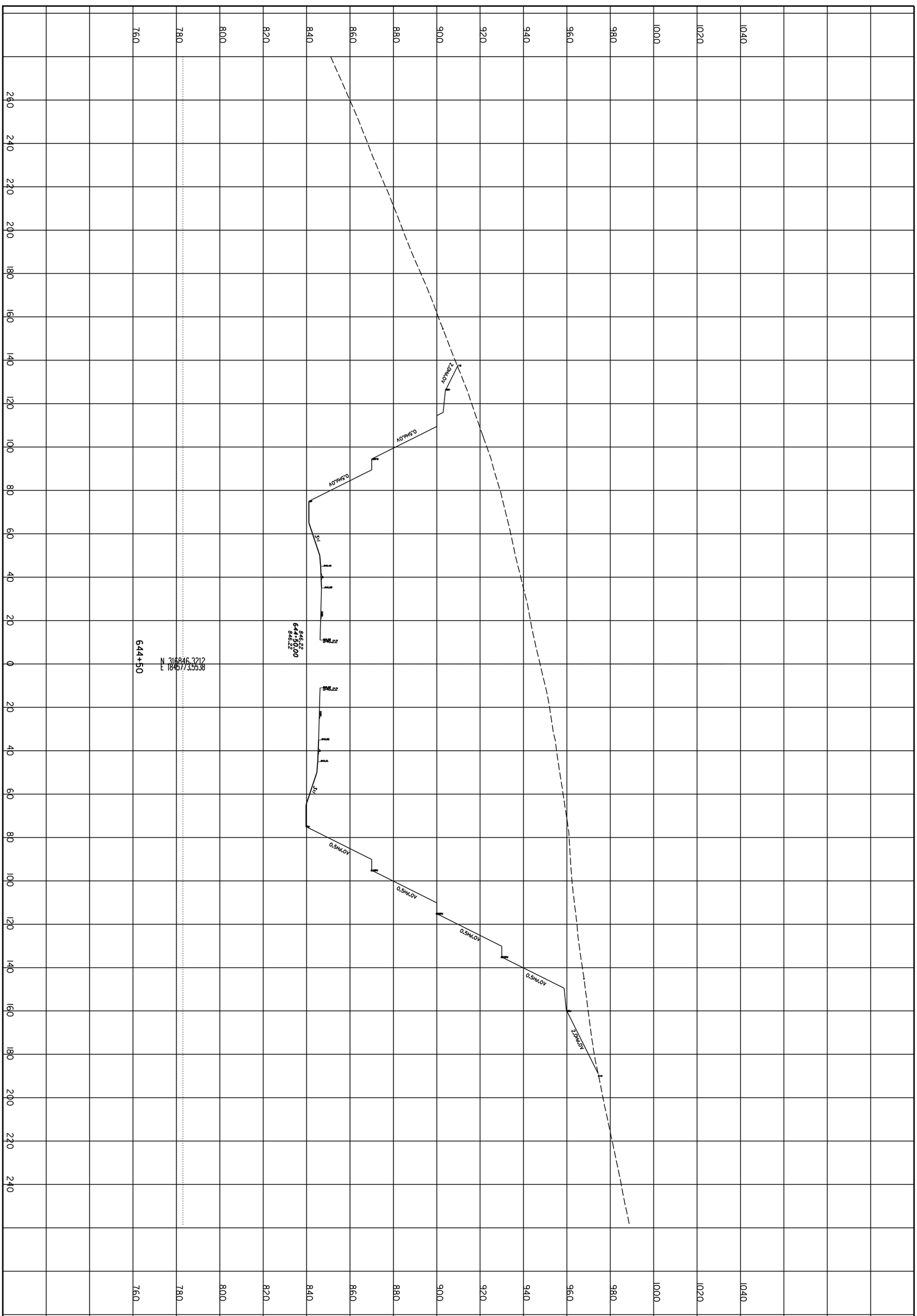
ROCK CUT

SCI-823-10.13

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2.0Mx1.0V
0.5Mx1.0V
0.5Mx1.0V
0.5Mx1.0V
2.0Mx1.0V
0.5Mx1.0V
0.5Mx1.0V
3:1
3:1
846.46
644+00.00
846.46
N 3166330.4801
E 1845820.4779
644+00



15 / 39	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 22 STA 644+50
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 645+00

SCI-823-10.13

2.0M:1.0V
0.5M:1.0V
0.5M:1.0V
0.5M:1.0V
0.5M:1.0V
0.5M:1.0V
2.0M:1.0V
3:1
3:1
845.89
645+00.00
845.89
N 1668524.723
E 1845726.243
645+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 645+50

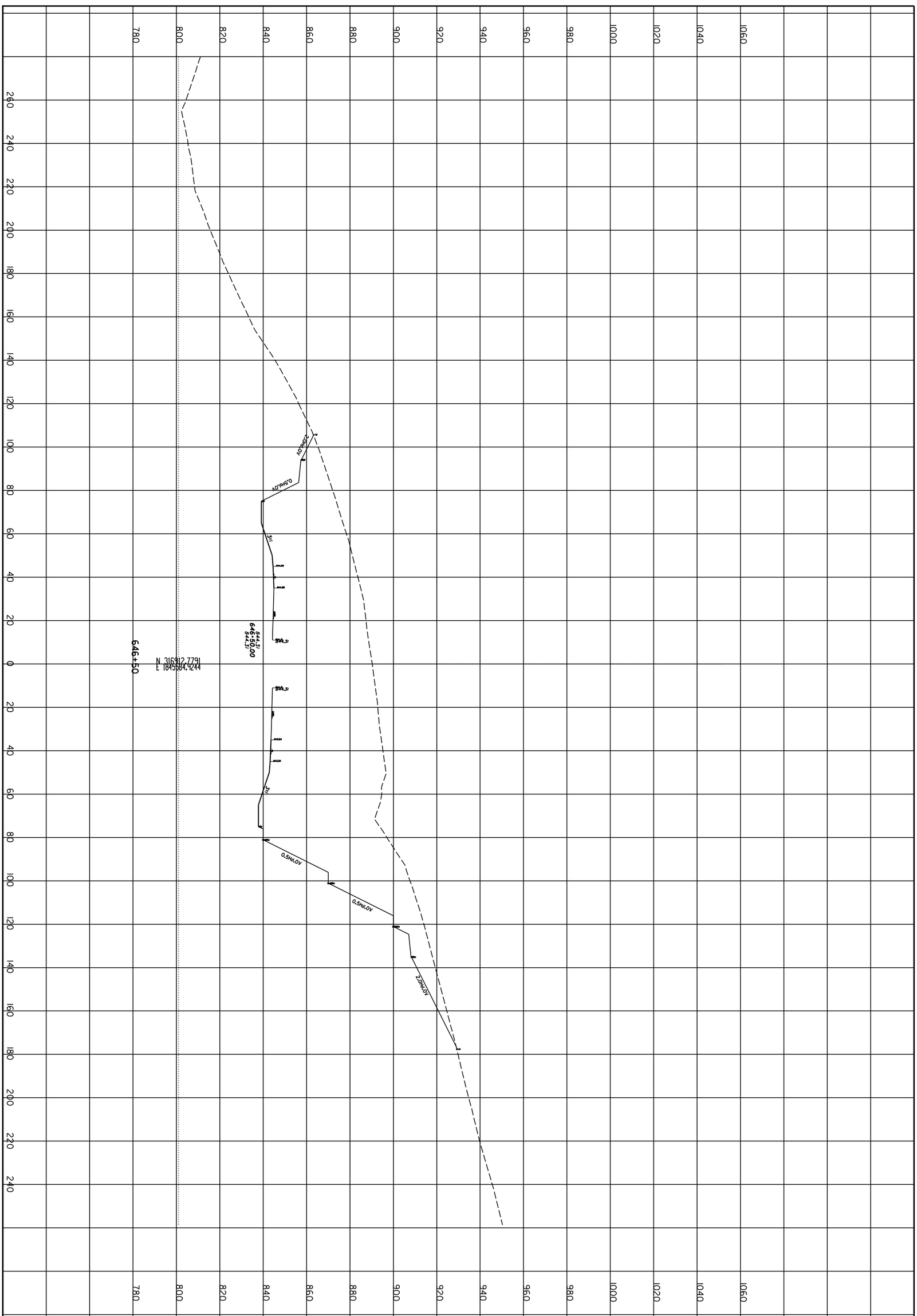
SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 646+00

2.0H:1.0V
0.5H:1.0V
3:1
844.93
646+00.00
844.93
N 316896.7020
E 104963.4176
646+00

SCI-823-10.13



19 / 39	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 22 STA 646+50
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 647+00

SCI-823-10.13

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2.0M:1.0V
3:1
843.60
647+00.00
843.60
N 3165310.1634
E 1845386.0435
647+00
0.5M:1.0V
0.5M:1.0V
2.0M:1.0V

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 647+50

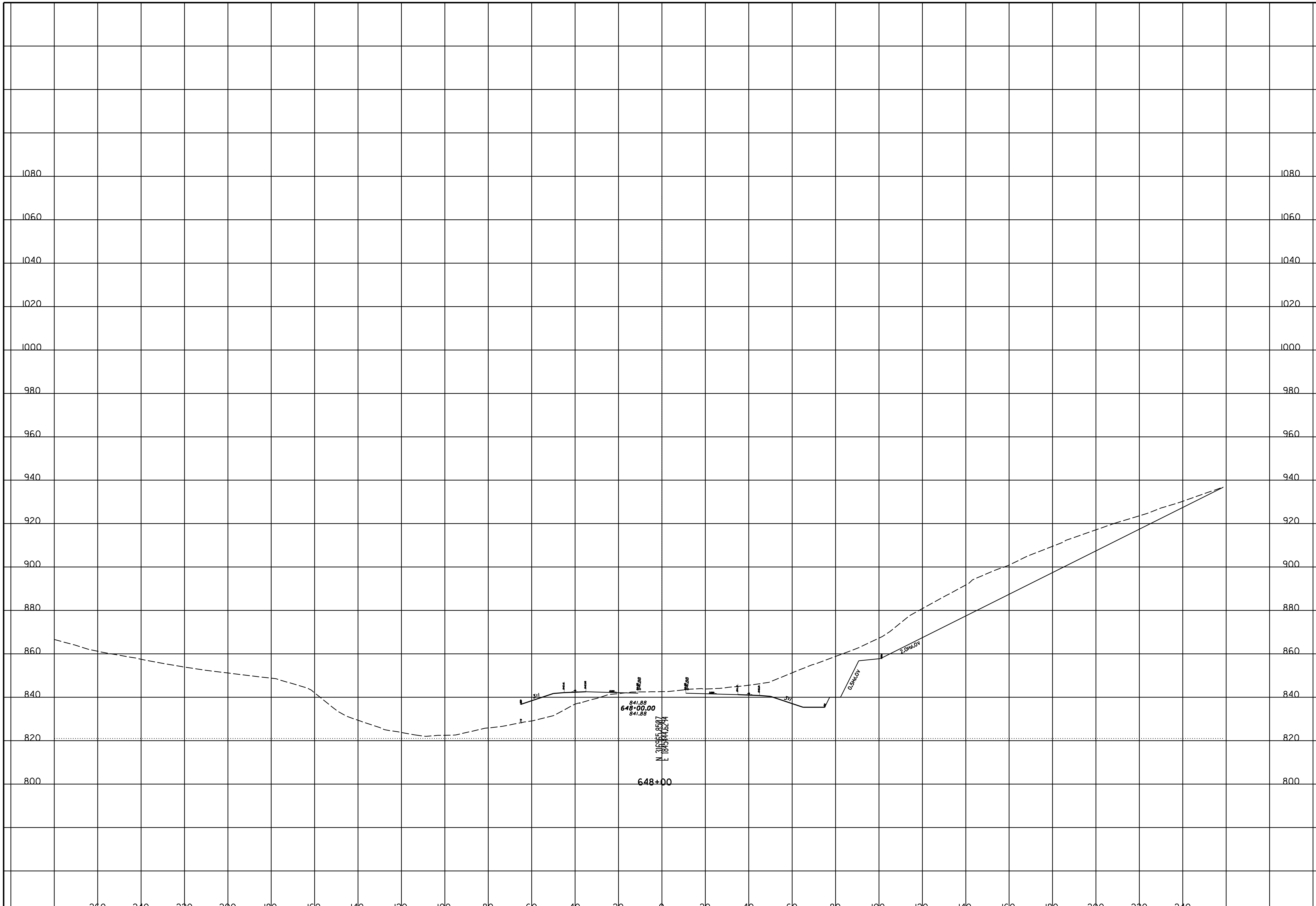
ROCK CUT

SCI-823-10.13

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2.0H:1.0V
1:1
842.79
647+50.00
842.79
0.5H:1.0V
2.0H:1.0V
N 316947.8542
E 1845412.782
647+50



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 648+00

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 648+50

ROCK CUT

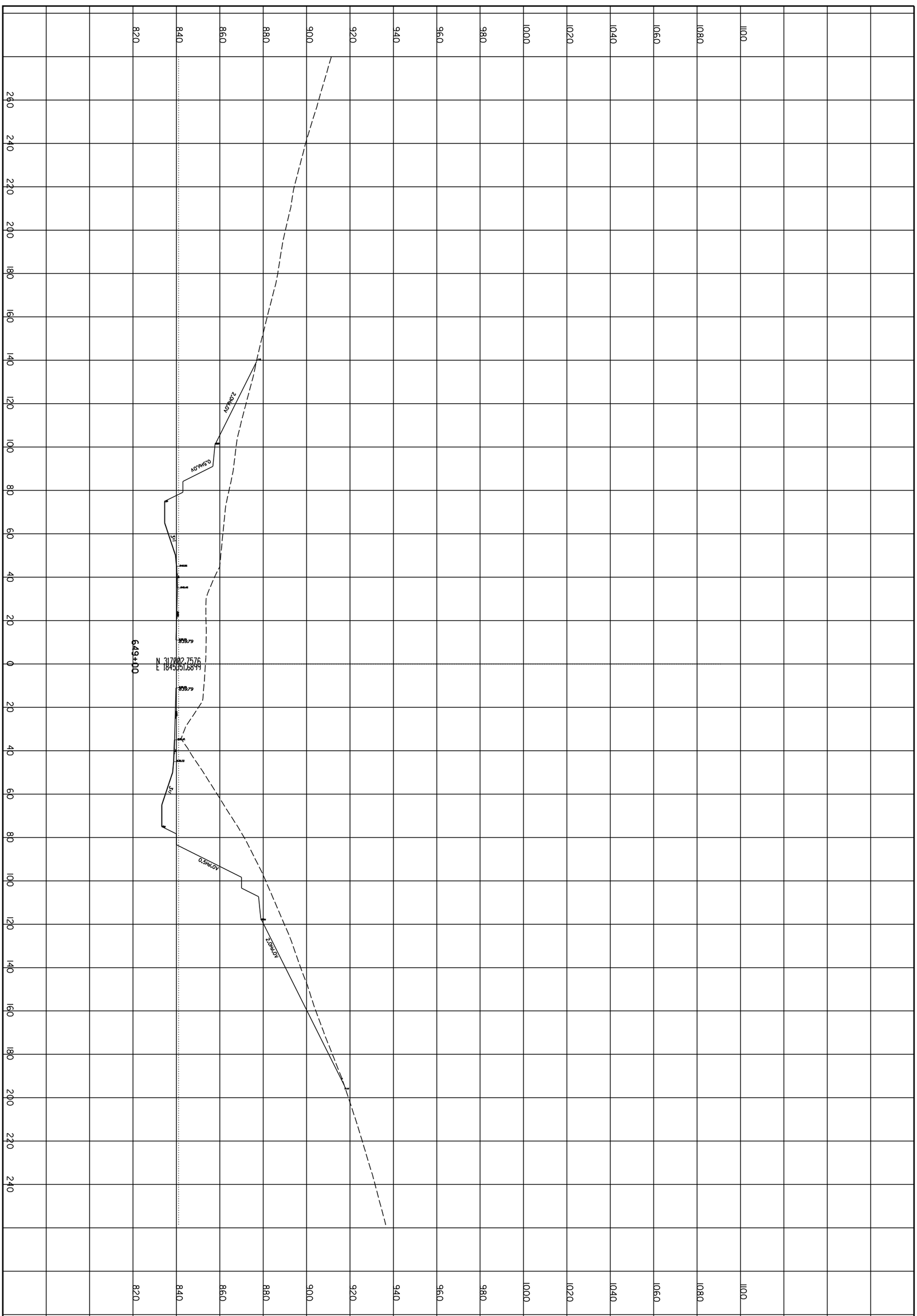
SCI-823-10.13

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2.0Hv:1V
3H:1V
840.88
648+50.00
840.88
N 3185384.4521
E 1845360.4993
0.5Hv:1V
2.0Hv:1V

648+50

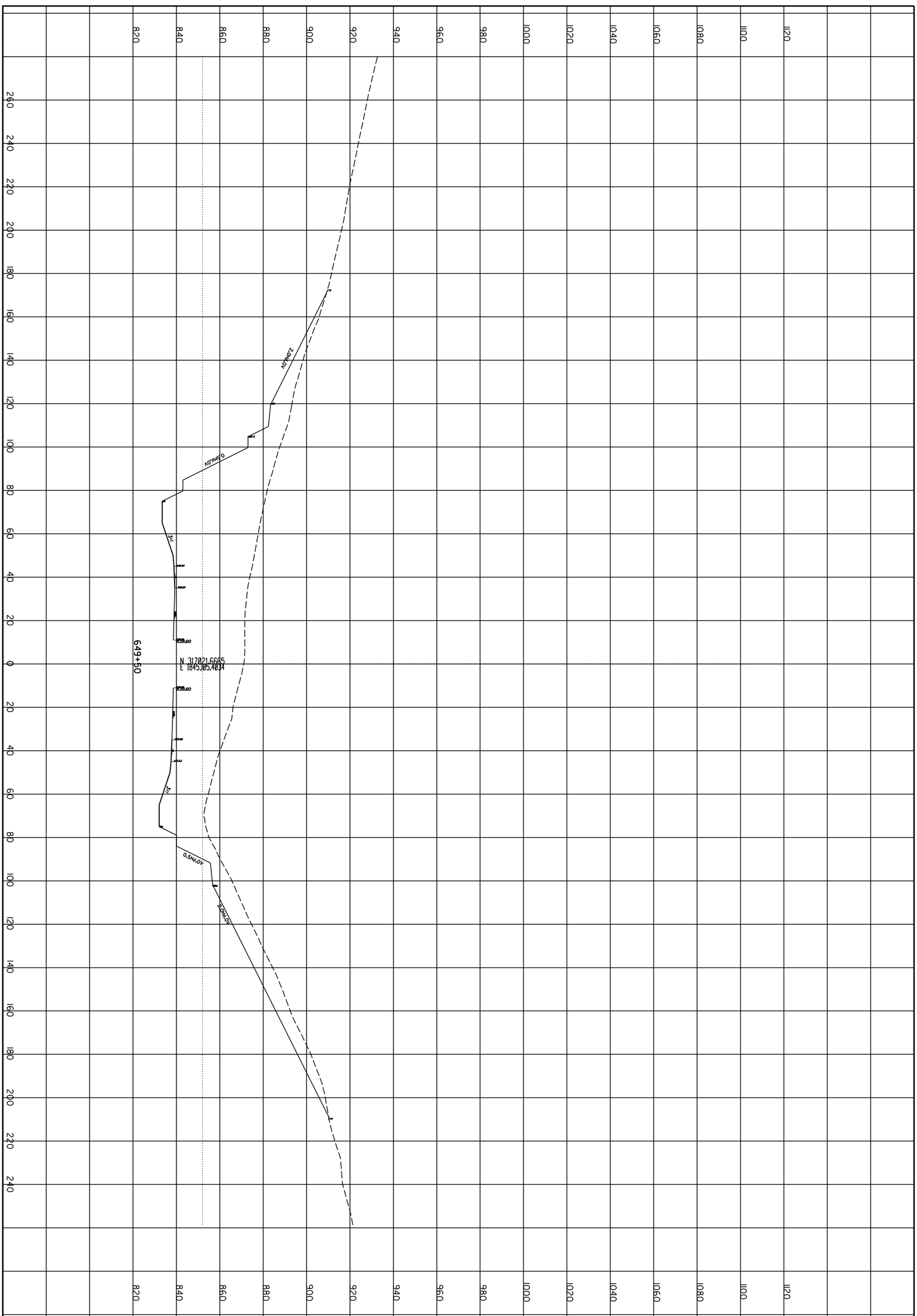


24
39

SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 649+00

CHECKED

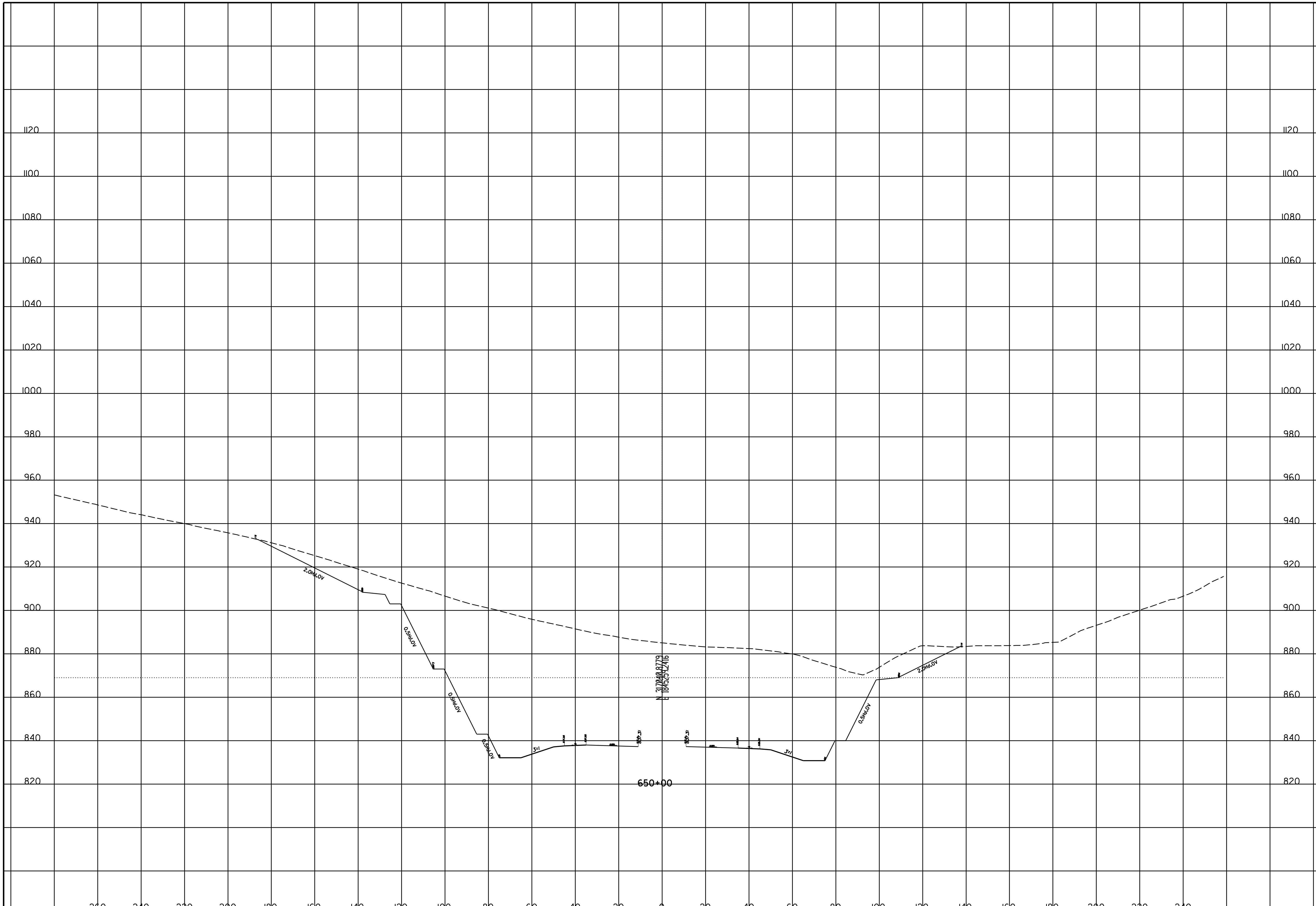


25
39

SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 649+50

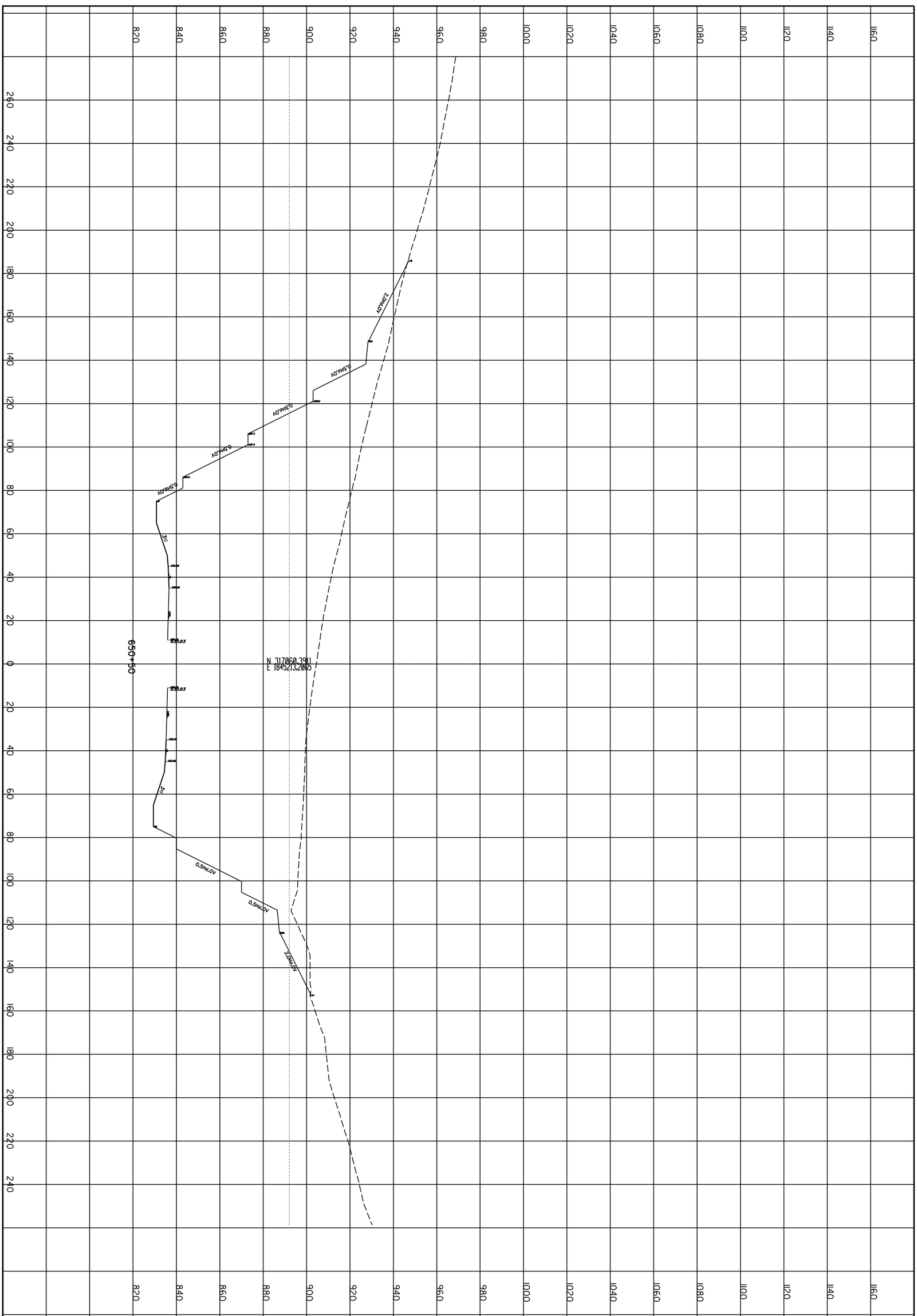
CHECKED



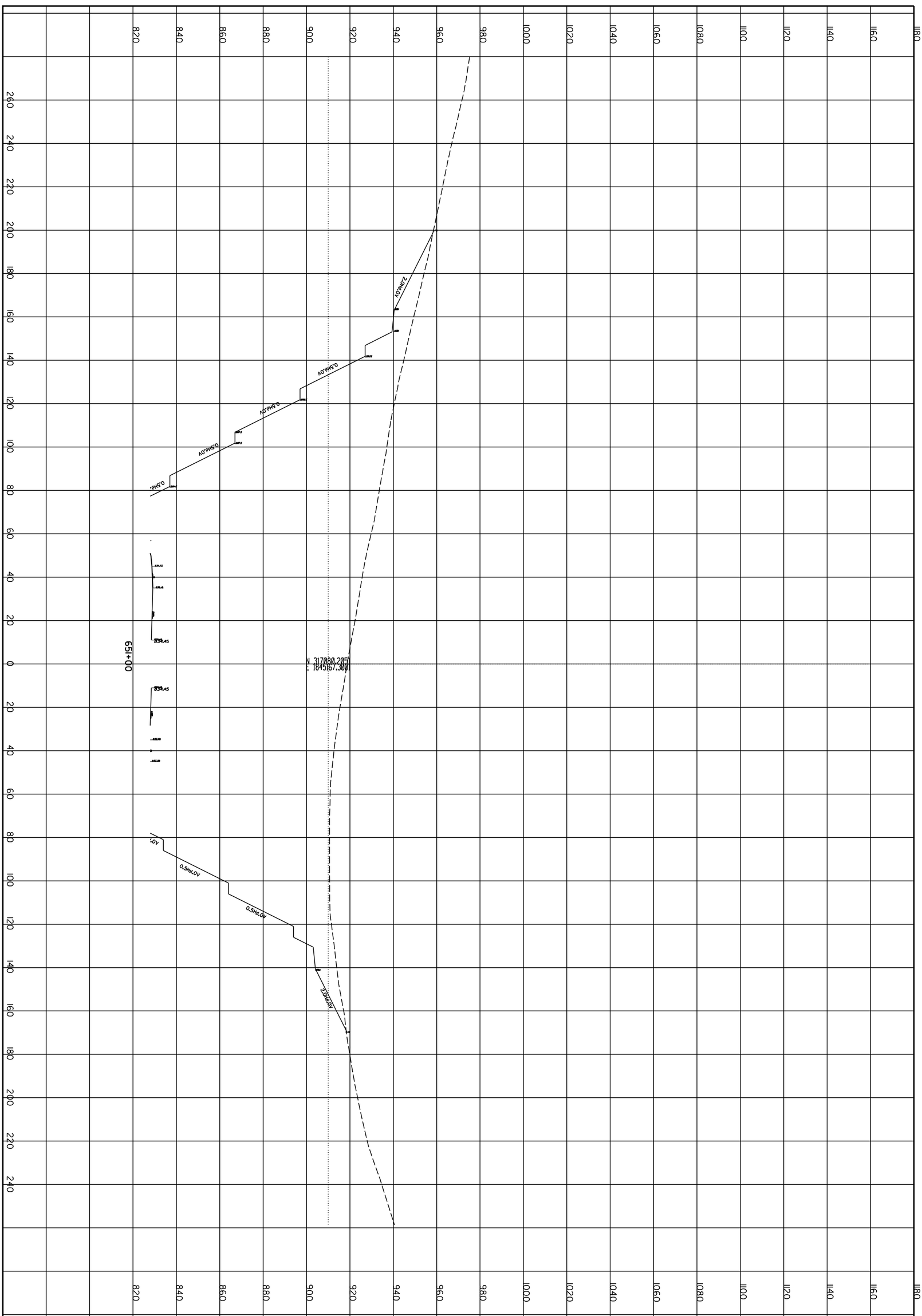
CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 650+00

SCI-823-10.13



27 / 39	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 22 STA 650+50
		CHECKED



SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 651+00

CHECKED

PSR823
651+50.00

N 3172100.3191
E 1845213.5244

651+50

2.0H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
2.0H:1.0V

1180 1160 1140 1120 1100 1080 1060 1040 1020 1000 980 960 940 920 900 880 860 840 820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 651+50

SCI-823-10.13

PSR823
652+00.00

N 317320.7323
E 1945075.8813

652+00

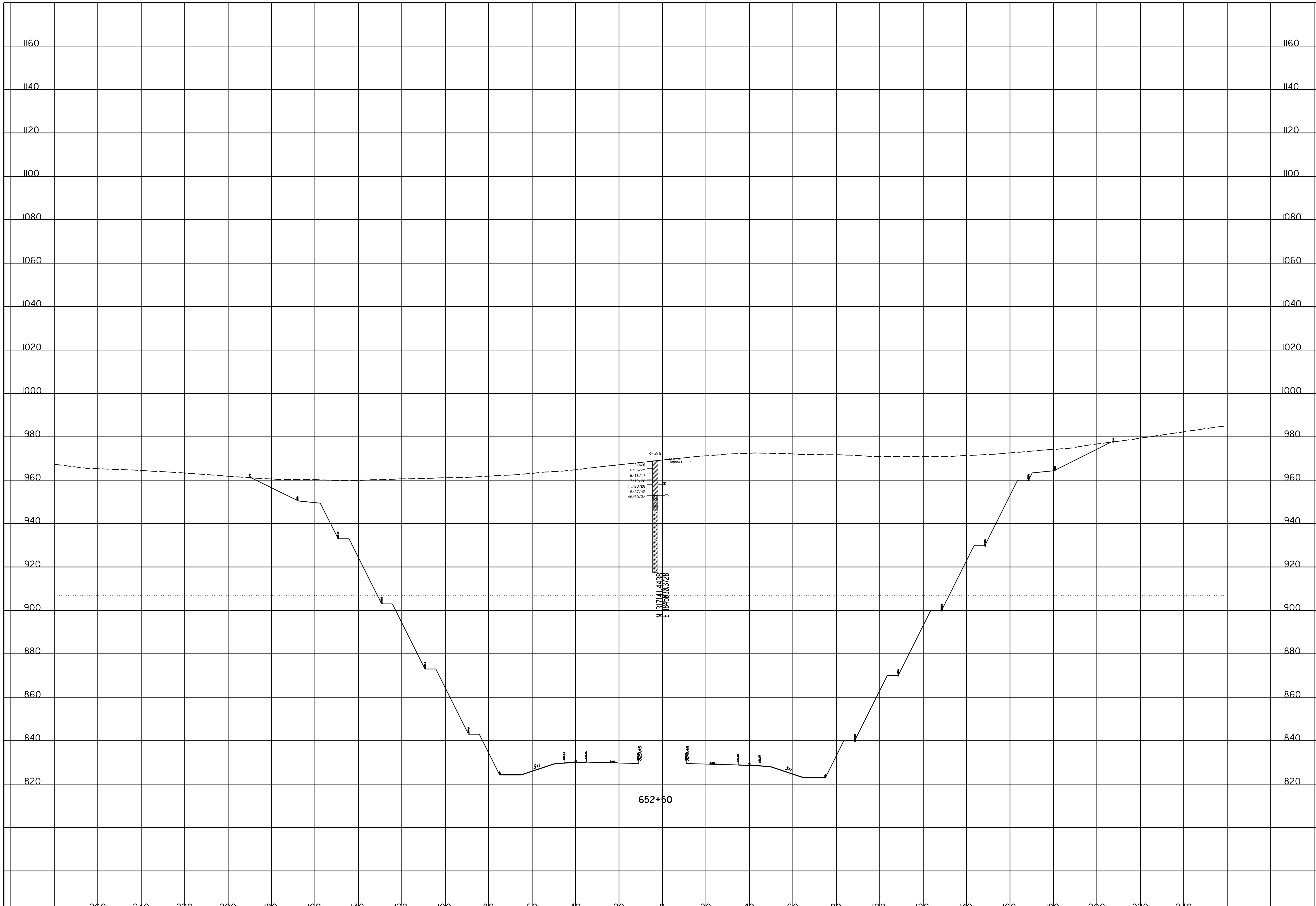
1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 652+00

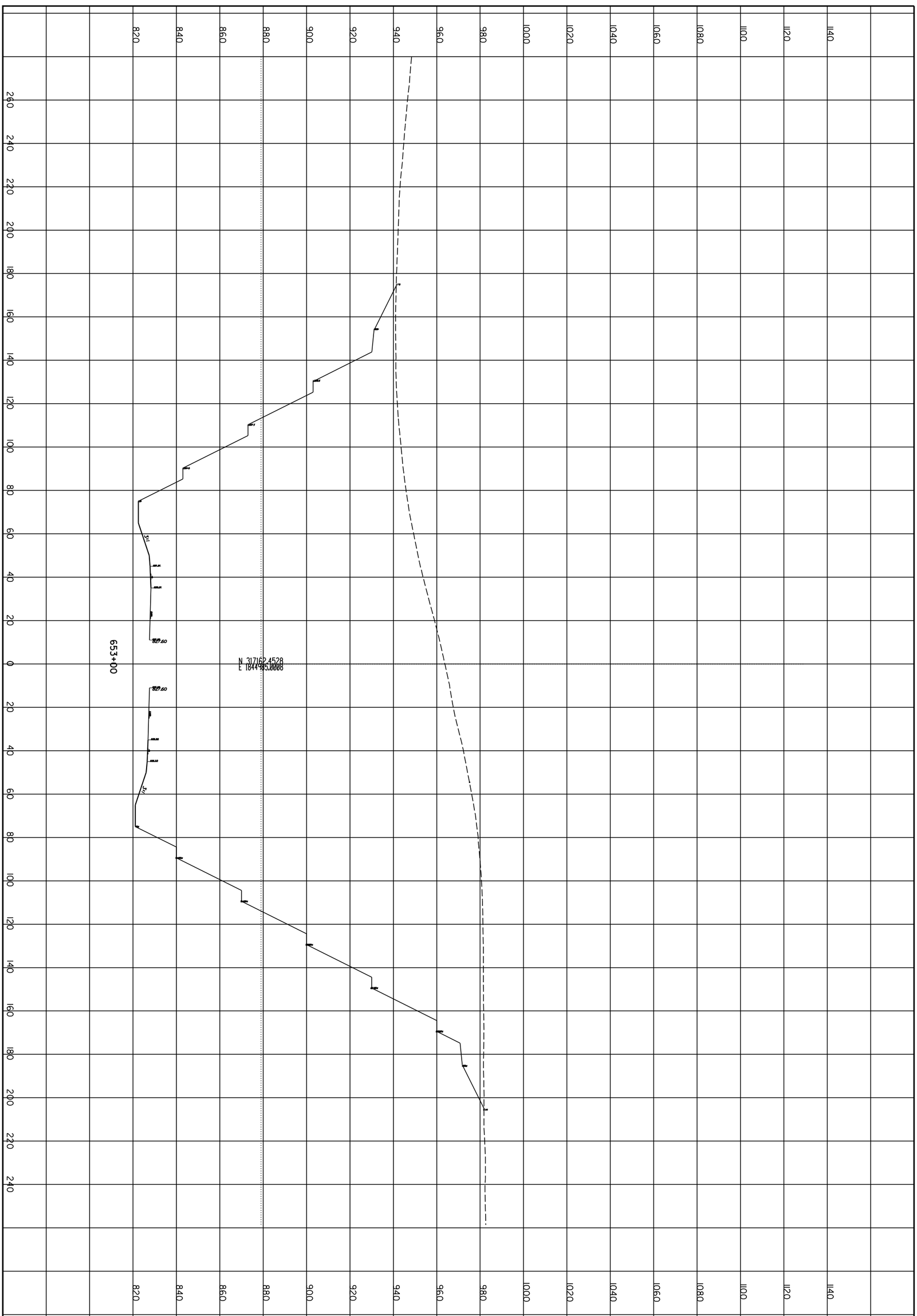
SCI-823-10.13



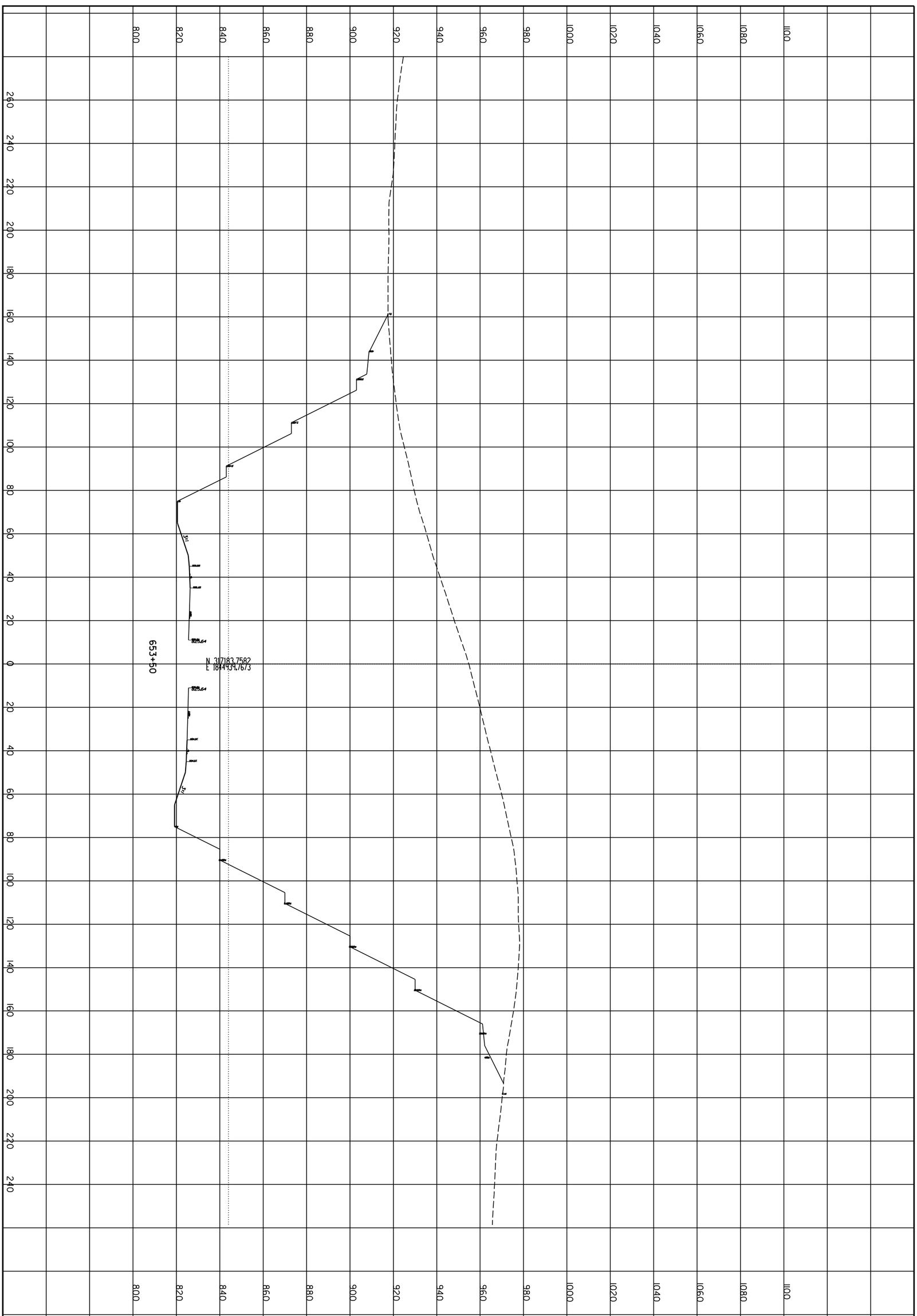
CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 652+50

SCI-823-10.13



32/39	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 22 STA 653+00
		CHECKED

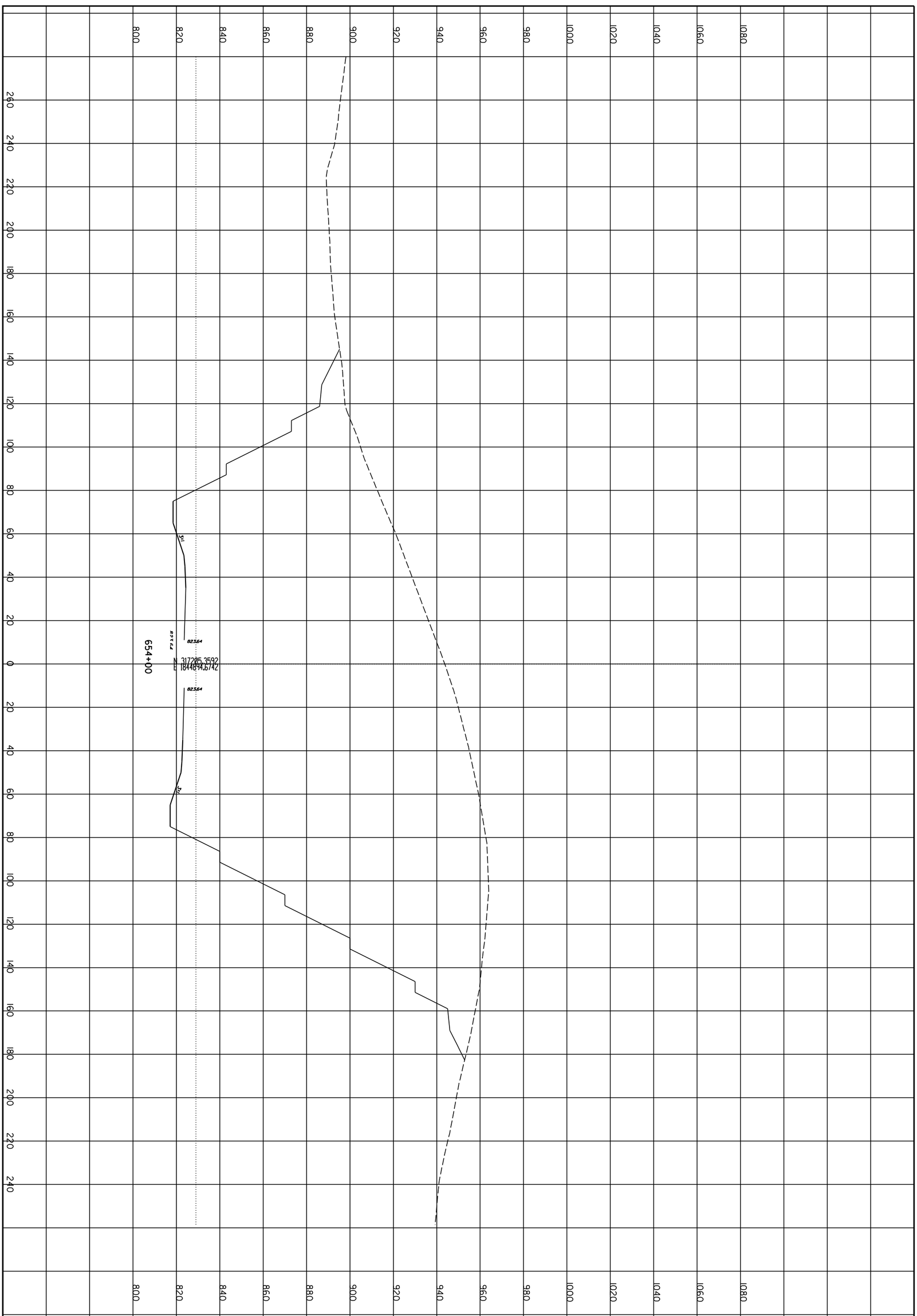


33
39

SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 653+50

CHECKED



SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 654+00

CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 654+50

SCI-823-10.13

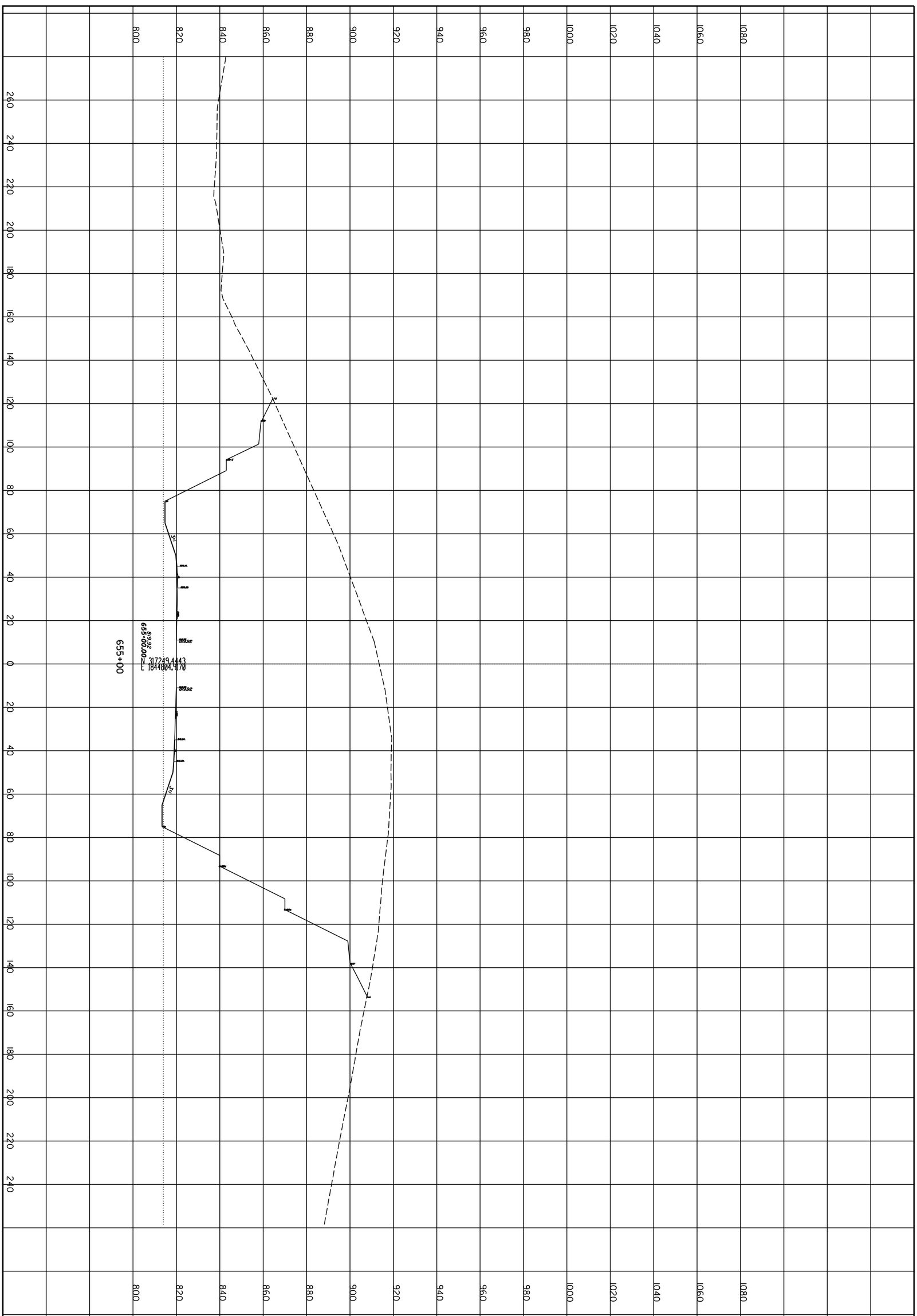
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

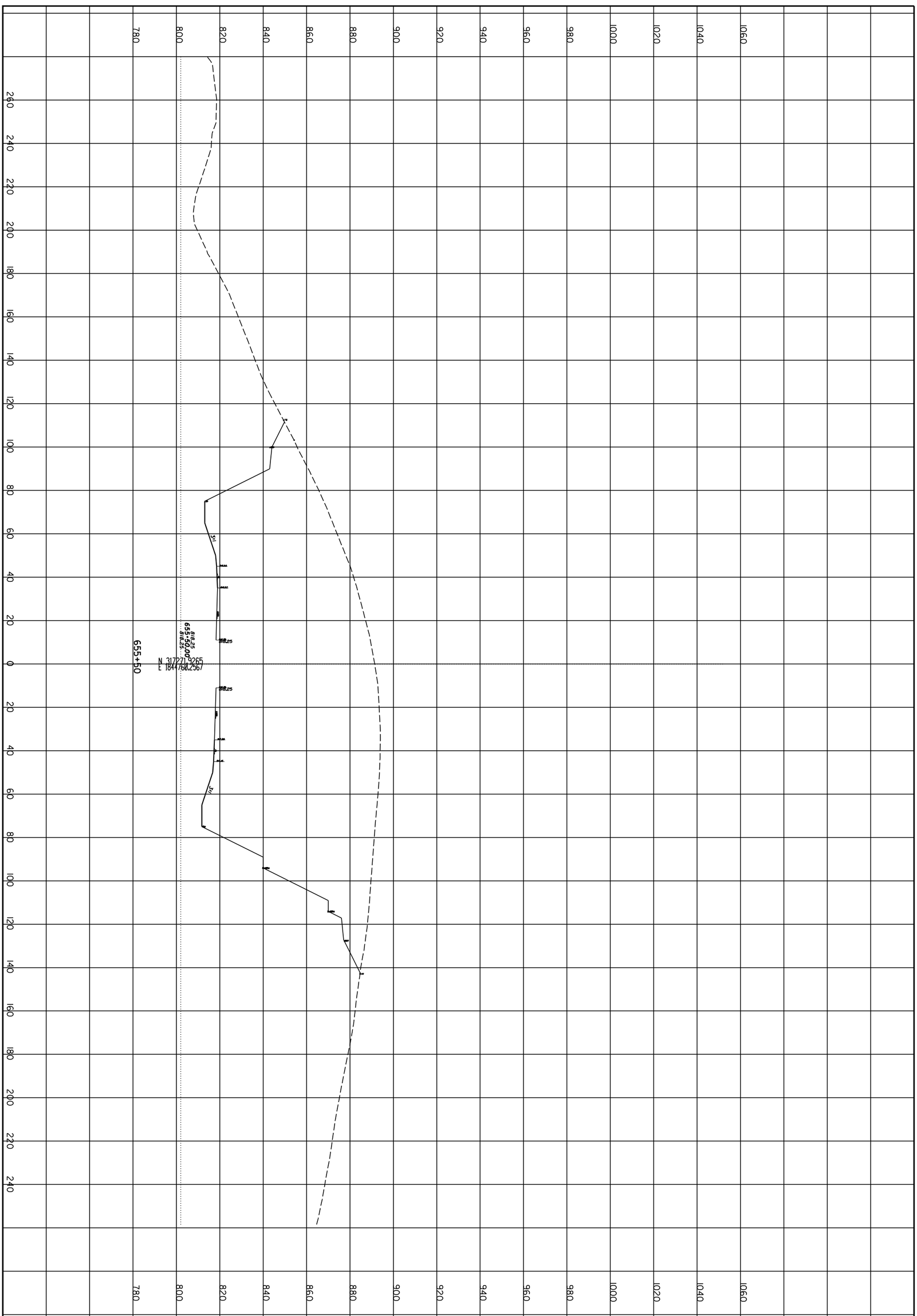
821.71
654+50.00
821.71

N 3177227.2549
E 1844849.7235

654+50



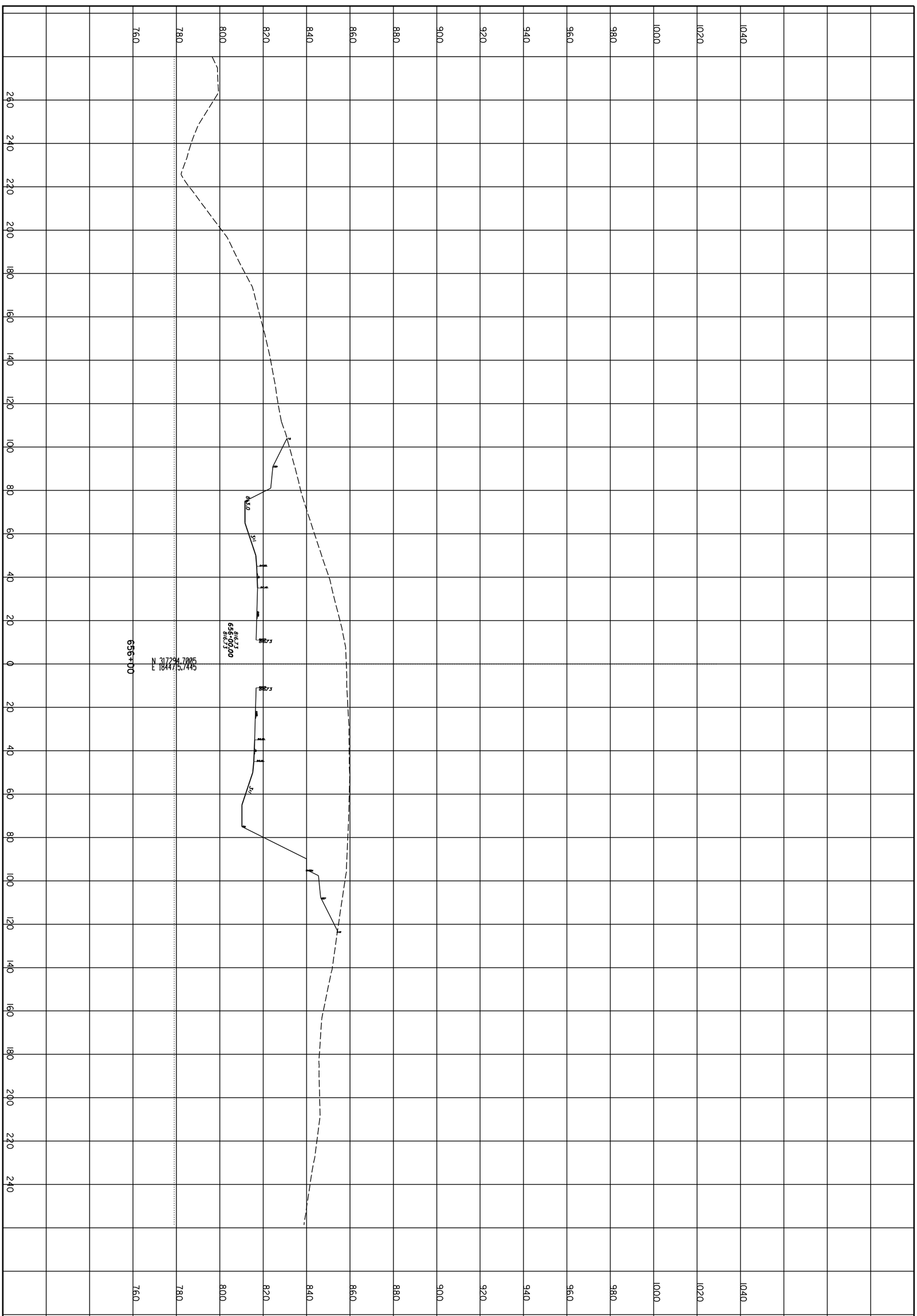
36 / 39	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 22 STA 655+00
		CHECKED



SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 22
STA 655+50

CHECKED



38 / 39	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 22 STA 656+00
		CHECKED

CHECKED

CUT SLOPE DESIGN - ROCK CUT 22
STA 656+50

ROCK CUT

SCI-823-10.13

PSR823
656+50.00

815.34
656+50.00
815.34

N 31737.7654
E 18446.1.3823

656+50

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 23
STA 661+50

SCI-823-10.13

18

1000
980
960
940
920
900
880
860
840
820
800
780
760
740
720

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

3H
808.91
661+50.00
808.91
1H
3H
807
2.0H:1.0V

N 1775641.1868
E 1844236.4257

661+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 23
STA 662+00

SCI-823-10.13

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

3:1
3:1
0.5H:1.0V
2.0H:1.0V

809.02
662+00.00
809.02

N 3177590.3838
E 1844953.8375

662+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 23
STA 662+50

ROCK CUT

SCI-823-10.13

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

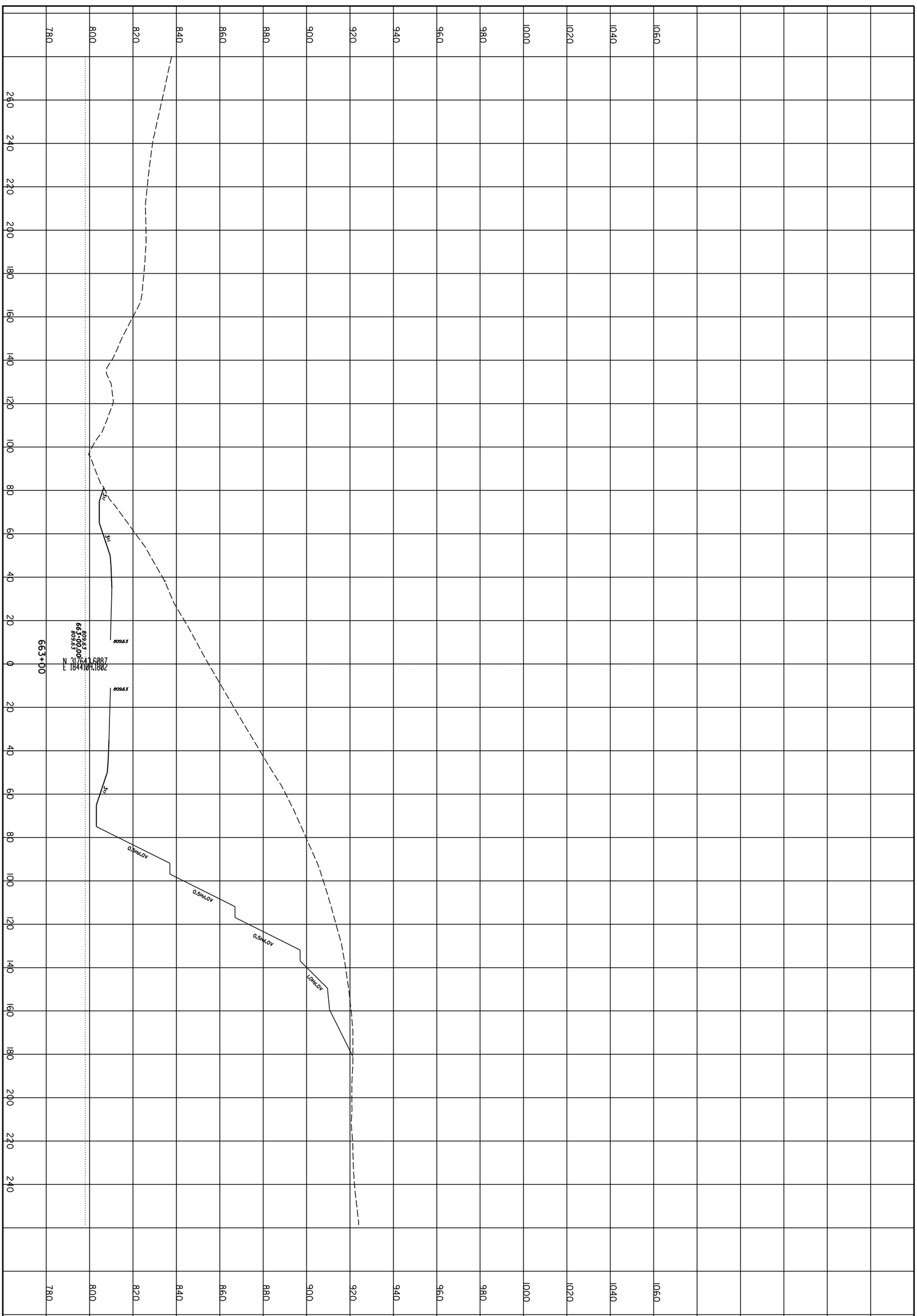
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

809.25
662+50.00
809.25

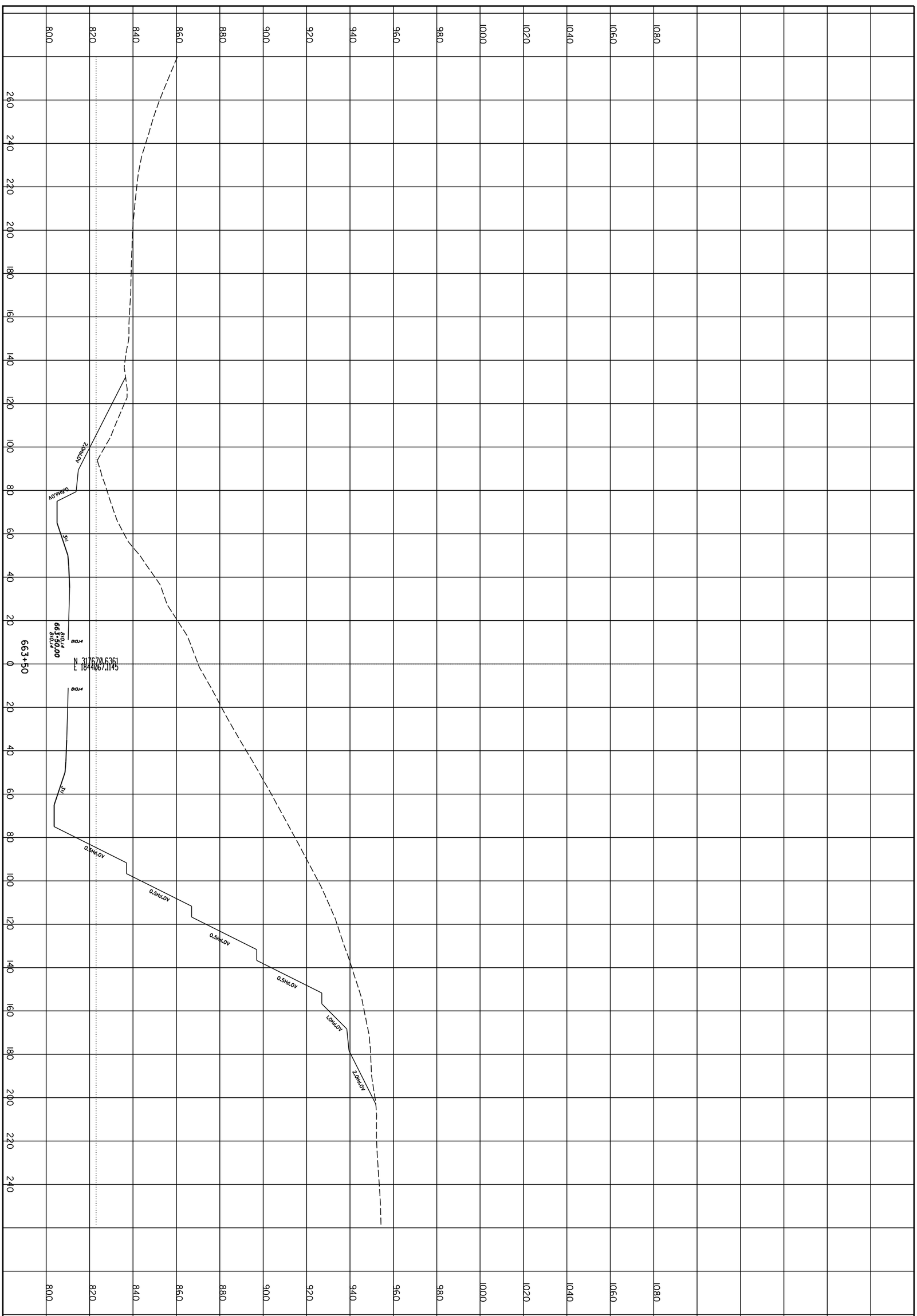
N 1776168.8573
E 1844150.4218

662+50

3:1
3:1
809.25
809.25
3:1
0.5H:1.0V
0.5H:1.0V
1.0H:1.0V



4 / 18	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 23 STA 663+00
		CHECKED



5 / 18	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 23 STA 663+50
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 23
STA 664+00

SCI-823-10.13

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2.0Hx1.0V
0.5Hx1.0V
3:1
ECRB
810.79
664+00.00
N 317697.9181
E 1844025.2267
664+00
0.5Hx1.0V
0.5Hx1.0V
0.5Hx1.0V
0.5Hx1.0V
1.0Hx1.0V
2.0Hx1.0V

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 23 STA 664+50

SCI-823-10.13

1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

664+50

N 317725.5137
E 184,980.5185

2.0H:4.0V
0.5H:4.0V
0.5H:4.0V
3H
BKOF
811.57
664+50.00
BKOF
3H
0.5H:4.0V
0.5H:4.0V
0.5H:4.0V
0.5H:4.0V
0.5H:4.0V
1.0H:4.0V
2.0H:4.0V

ROCK CUT SLOPE DESIGN - ROCK CUT 23
STA 665+00

CHECKED

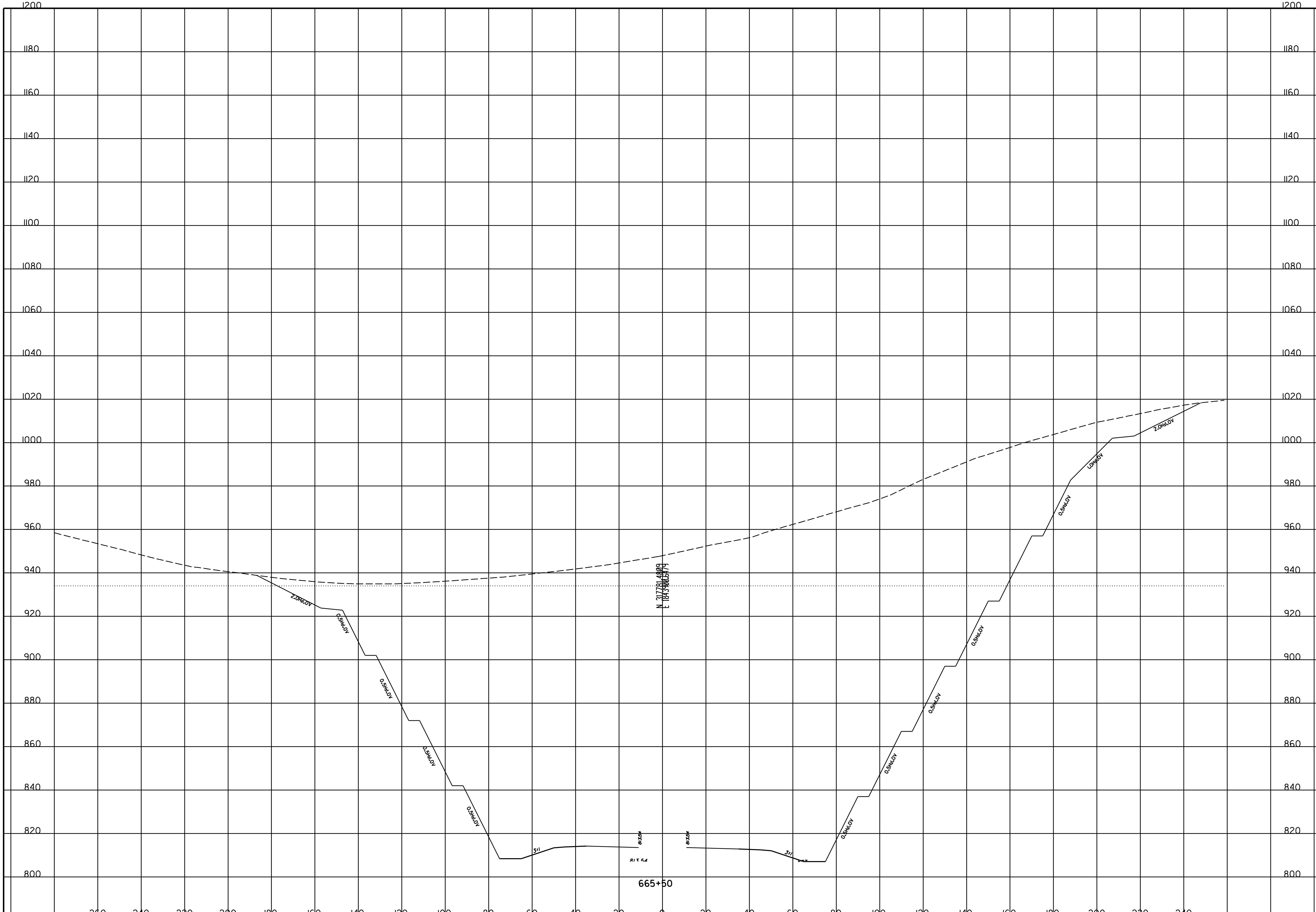
N 3775.3617
E 1043941.3916

812.49

665+00

2.0H:4.0V
0.5H:4.0V
3:1

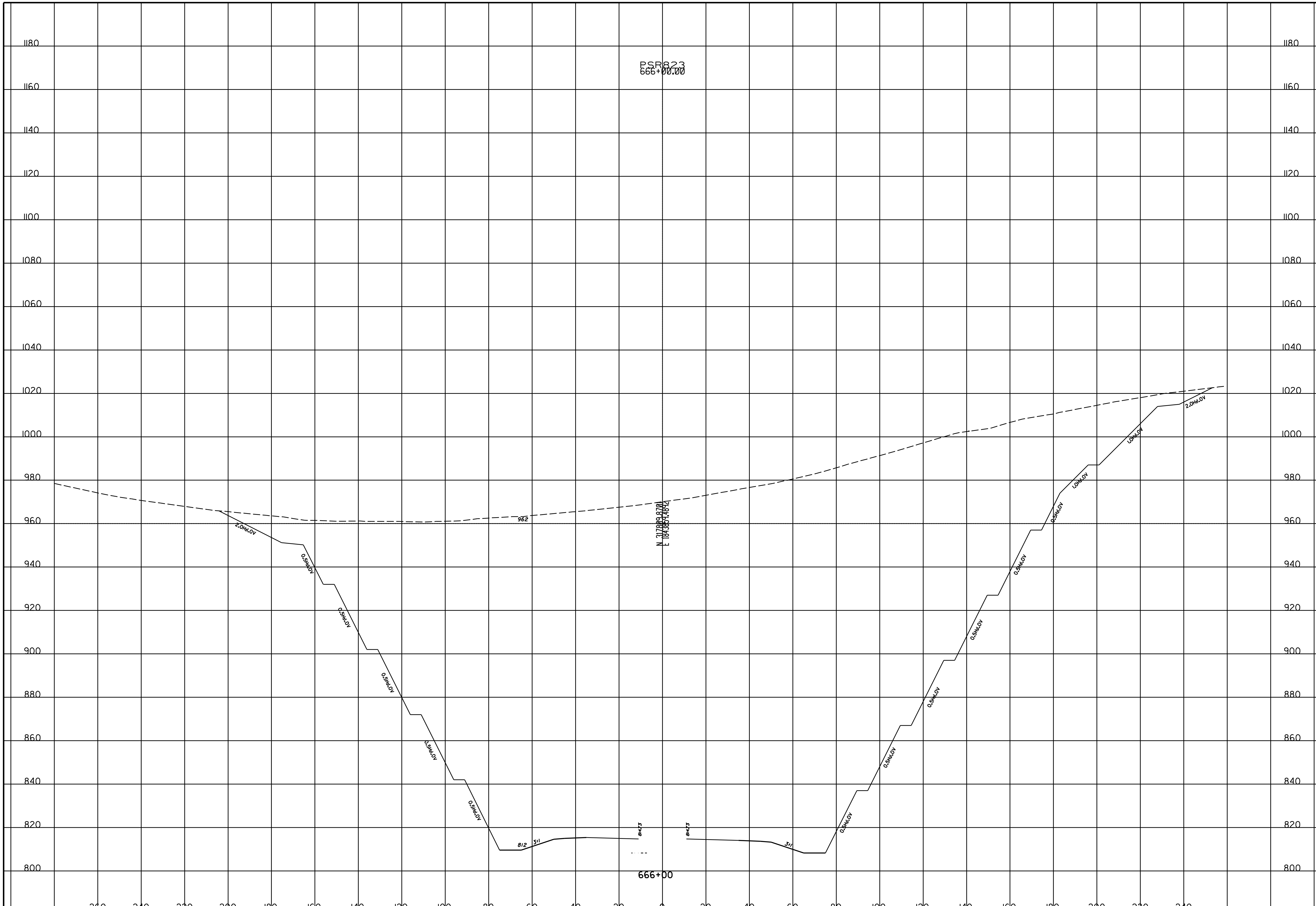
SCI-823-10.13



ROCK CUT SLOPE DESIGN - ROCK CUT 23
STA 665+50

SCI-823-10.13

9
18



ROCK CUT SLOPE DESIGN - ROCK CUT 23
STA 666+00

SCI-823-10.13

10
18

PSR823
666+50.00

N 3178838.5281
E 1843888.5171

2.0M:4.0V
1.0M:4.0V
0.5M:4.0V
8.5M:4.0V
0.5M:4.0V
0.5M:4.0V
0.5M:4.0V
3:1
SLOPE
SLOPE
3:1
0.5M:4.0V
0.5M:4.0V
0.5M:4.0V
0.5M:4.0V
0.5M:4.0V
0.5M:4.0V
1.0M:4.0V
2.0M:4.0V

666+50

CHECKED

SLOPE DESIGN - ROCK CUT 23
STA 666+50

ROCK CUT SLOPE

SCI-823-10.13

11
18

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 23
STA 667+00

SCI-823-10.13

667+00

N 3178674536
E 1843771334

2.0H:1.0V
1.0H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
3%
6%*52
6%*52
3%
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
1.0H:1.0V
2.0H:1.0V

CHECKED

SLOPE DESIGN - ROCK CUT 23
STA 667+50

ROCK CUT SLOPE

SCI-823-10.13

13
18

1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2.0H:1.0V
1.0H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
3:1
3:1
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
1.0H:1.0V
1.0H:1.0V
2.0H:1.0V

N 3179966.6454
E 1847377.1394

667+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 23
STA 668+00

SCI-823-10.13

14
18

1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2.0H:1.0V
1.0H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
3H
820.84
668+00
820.84
3H
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
1.0H:1.0V
2.0H:1.0V

N 3179326.1023
E 1843696.7384

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 23
STA 668+50

ROCK CUT

SCI-823-10.13

15
18

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2.0H:1.0V
1.0H:1.0V
0.5H:1.0V
0.5H:1.0V
1:1
822.64
822.64
822.64
1:1
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
1.0H:1.0V
2.0H:1.0V

N 3177855.8229
E 1841836.5305

668+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 23
STA 669+00

ROCK CUT

SCI-823-10.13

16
18

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

R-612
884.28
Topsoil - 4'
8/11/8
8/9/9
10/15/7
17/26/50/5

R-615
890.53
Topsoil - 4'
6/8/8
12/18/16
28/50/5*

2.0H:1.0V
1.0H:1.0V
0.5H:1.0V
3:1
82K.44
N 3179858.8061
E 1843616.5180
669+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 23
STA 669+50

ROCK CUT

SCI-823-10.13

17
18

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2.0Hx1.0V
1.0Hx1.0V
0.5Hx1.0V
3:1
826.24
826.24
669+50.00
826.24
N 318016.0065
E 184357.1027
669+50
3:1
0.5Hx1.0V
0.5Hx1.0V
1.0Hx1.0V
2.0Hx1.0V

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 23
STA 670+00

ROCK CUT

SCI-823-10.13

18
18

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

3:1
3:1
3:1
1.0H:1.0V
2.0H:1.0V
828.04
828.04
828.04
828.04
670+00.00
828.04
N 318046.5549
E 1845537.0861
670+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 24
STA 674+50

SCI-823-10.13

1
14

1000
980
960
940
920
900
880
860
840
820
800
780
760
740

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

844.24
674+50.00
844.24

3:1
3:1
1.0H:4.0V
2.0H:4.0V
837

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 24
STA 675+00

2.0H:1.0V

1.0H:1.0V

3:1

846.04
675+00.00
846.04

N 3183855.6024
E 1843852.2238

1.0H:1.0V

3:1

0.5H:1.0V

1.0H:1.0V

2.0H:1.0V

840 820 800 780 760 740 720 700 680 660 640 620 600 580 560 540 520

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

SCI-823-10.13

2
14

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 24
STA 675+50

SCI-823-10.13

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2.0Hx2.0V
1.0Hx1.0V
0.5Hx1.0V
3:1
847.84
675+50.00
847.84
0.5Hx1.0V
0.5Hx1.0V
1.0Hx1.0V
2.0Hx4.0V

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 24
STA 676+00

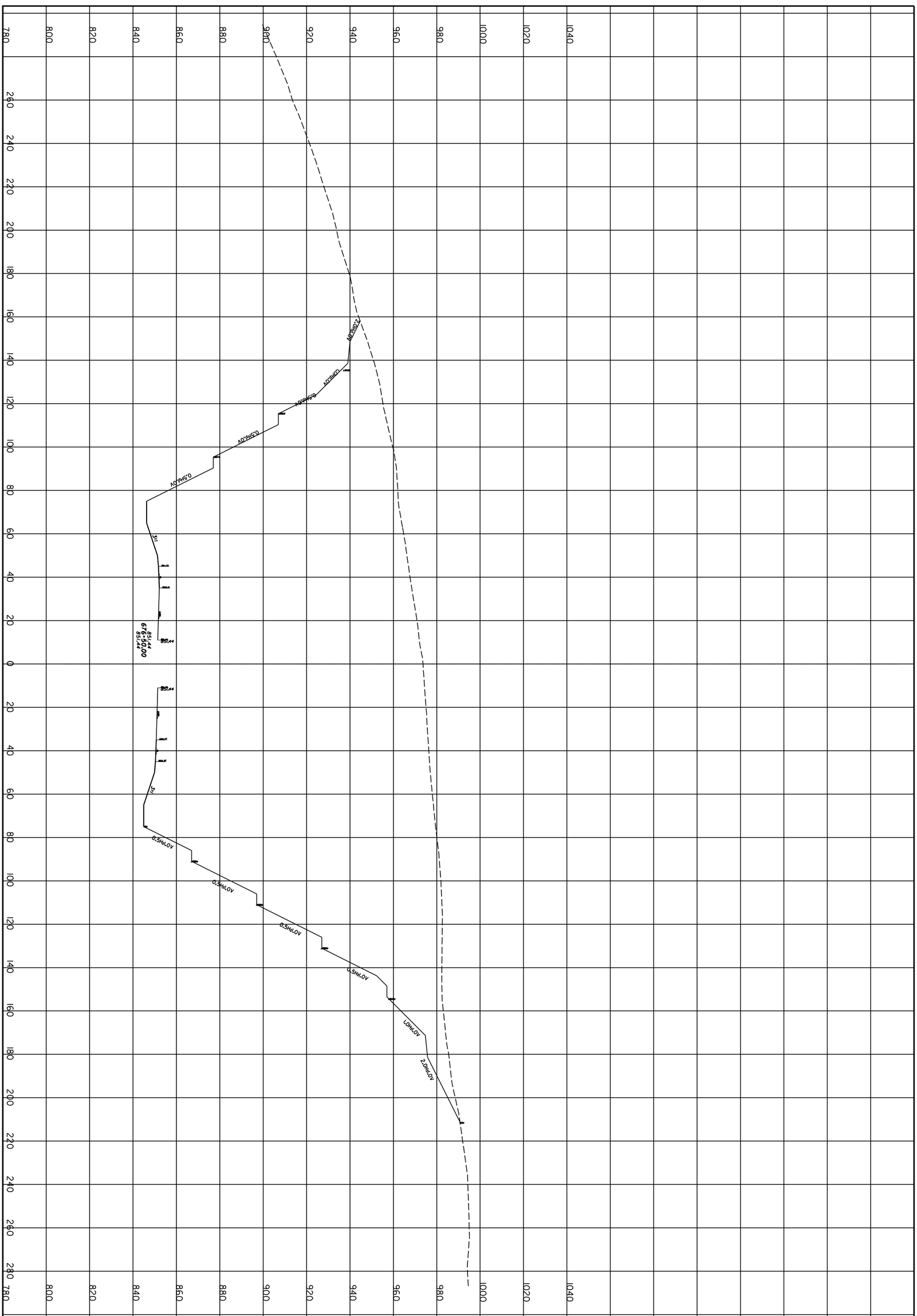
SCI-823-10.13

4
14

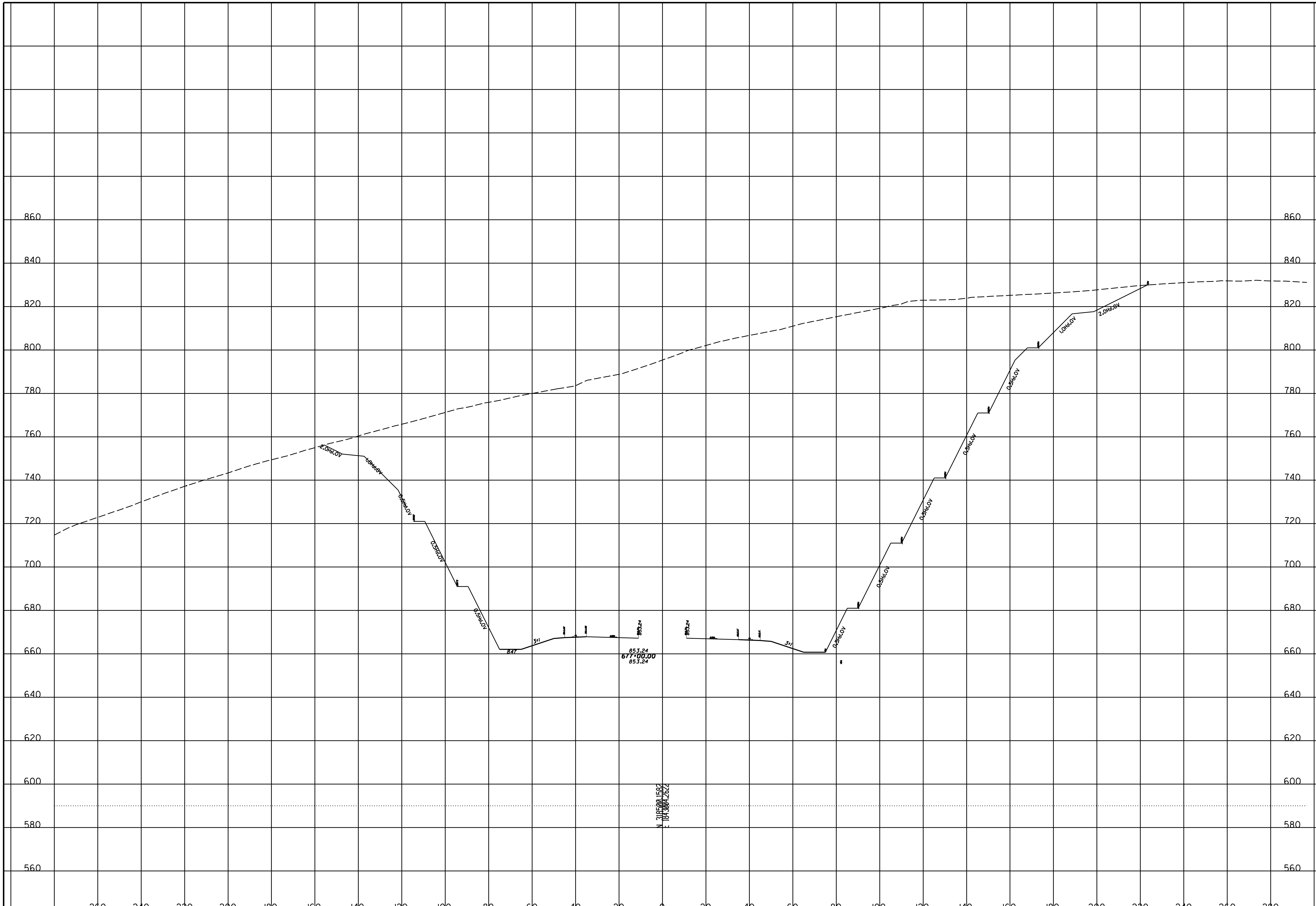
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2.0Rd:4.0V
1.0Rd:4.0V
0.5Rd:4.0V
0.5Hd:4.0V
3:1
849.64
676+00.00
849.64
0.5Hd:4.0V
0.5Hd:4.0V
0.5Hd:4.0V
1.0Hd:4.0V
2.0Hd:4.0V



5 / 14	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 24 STA 676+50
		CHECKED

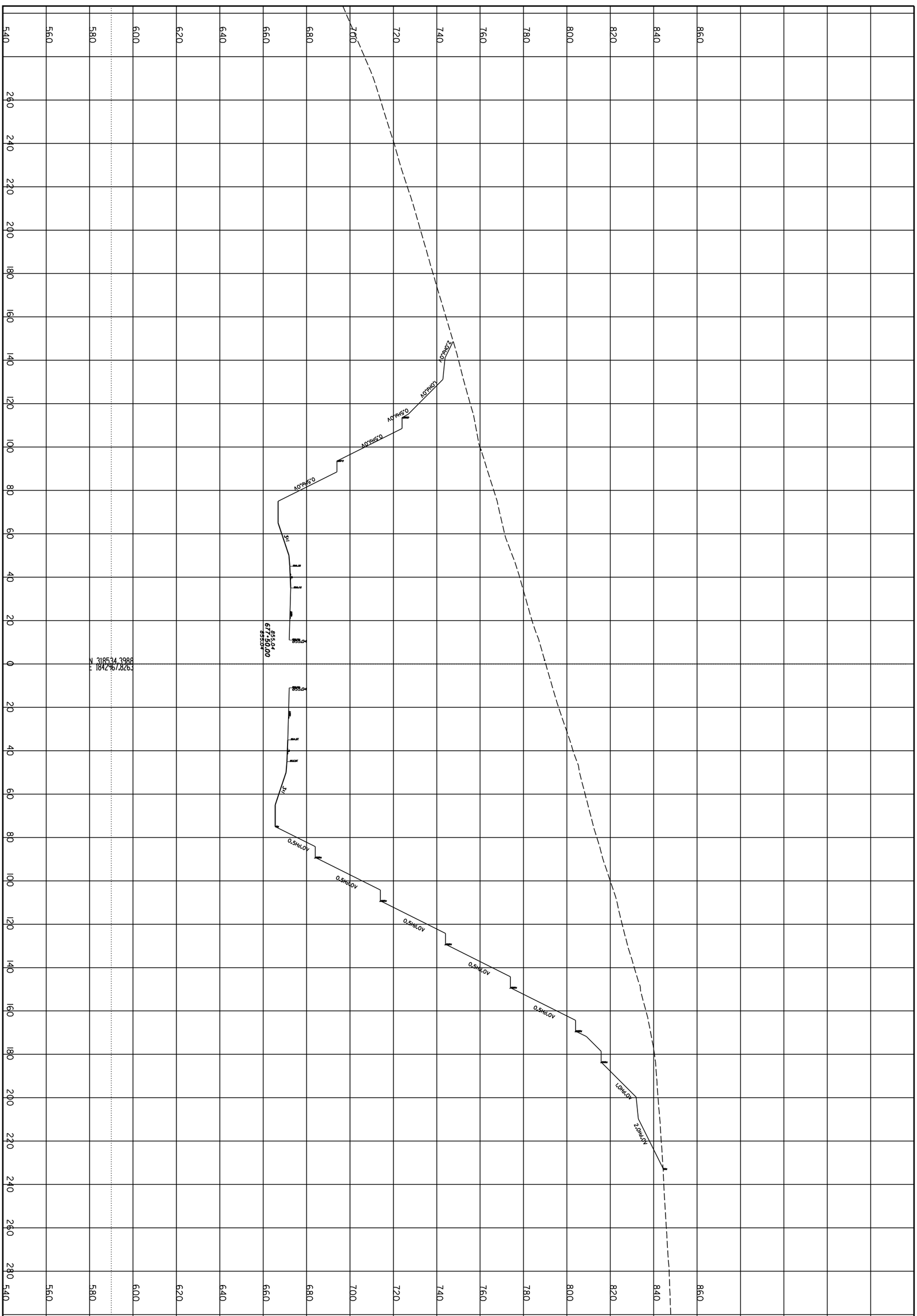


CHECKED

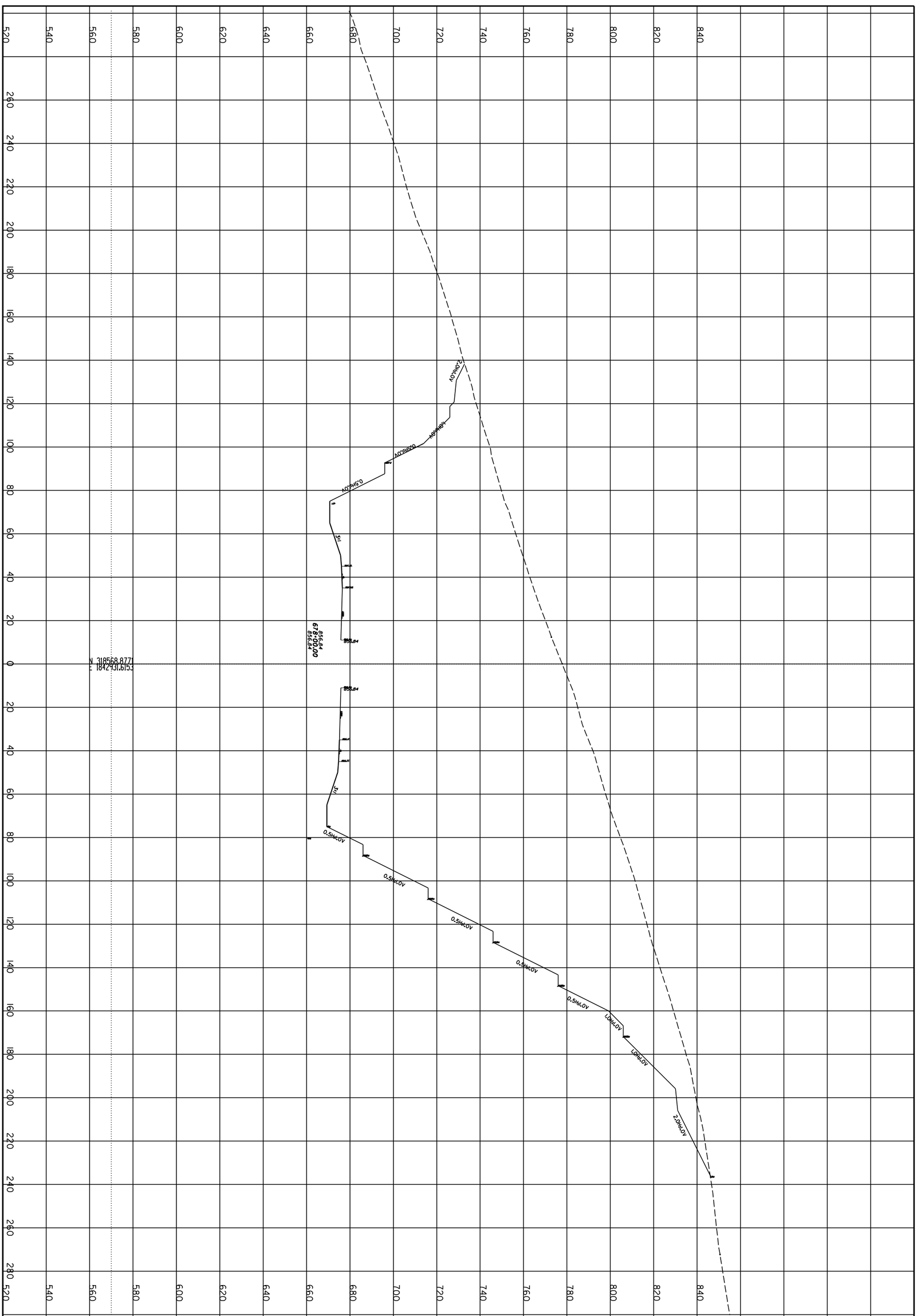
ROCK CUT SLOPE DESIGN - ROCK CUT 24
STA 677+00

SCI-823-10.13

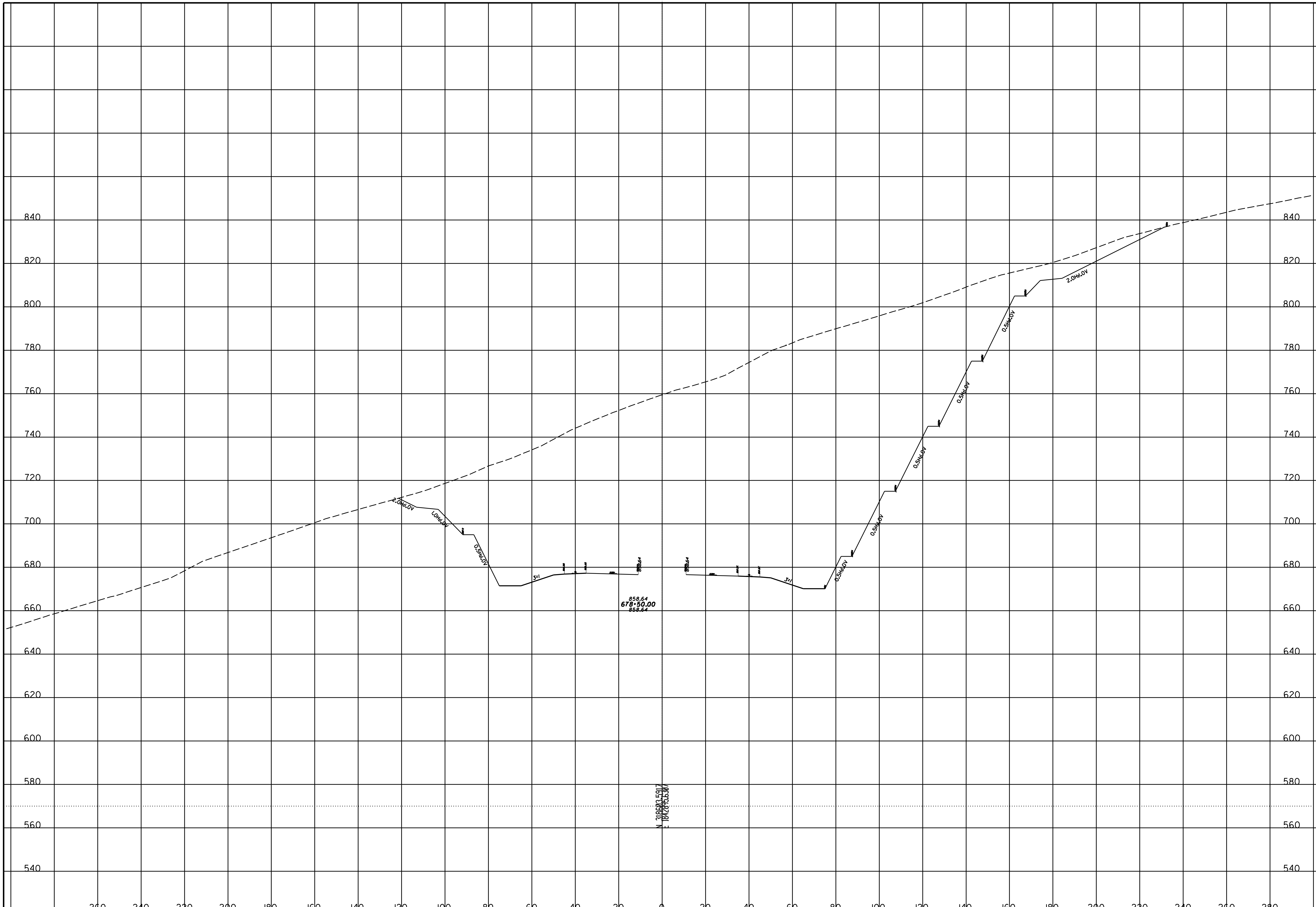
6
14



7 / 14	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 24 STA 677+50
		CHECKED



8/14	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 24 STA 678+00	CHECKED



ROCK CUT SLOPE DESIGN - ROCK CUT 24
STA 678+50

SCI-823-10.13

9
14

CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 24 STA 679+00

SCI-823-10.13

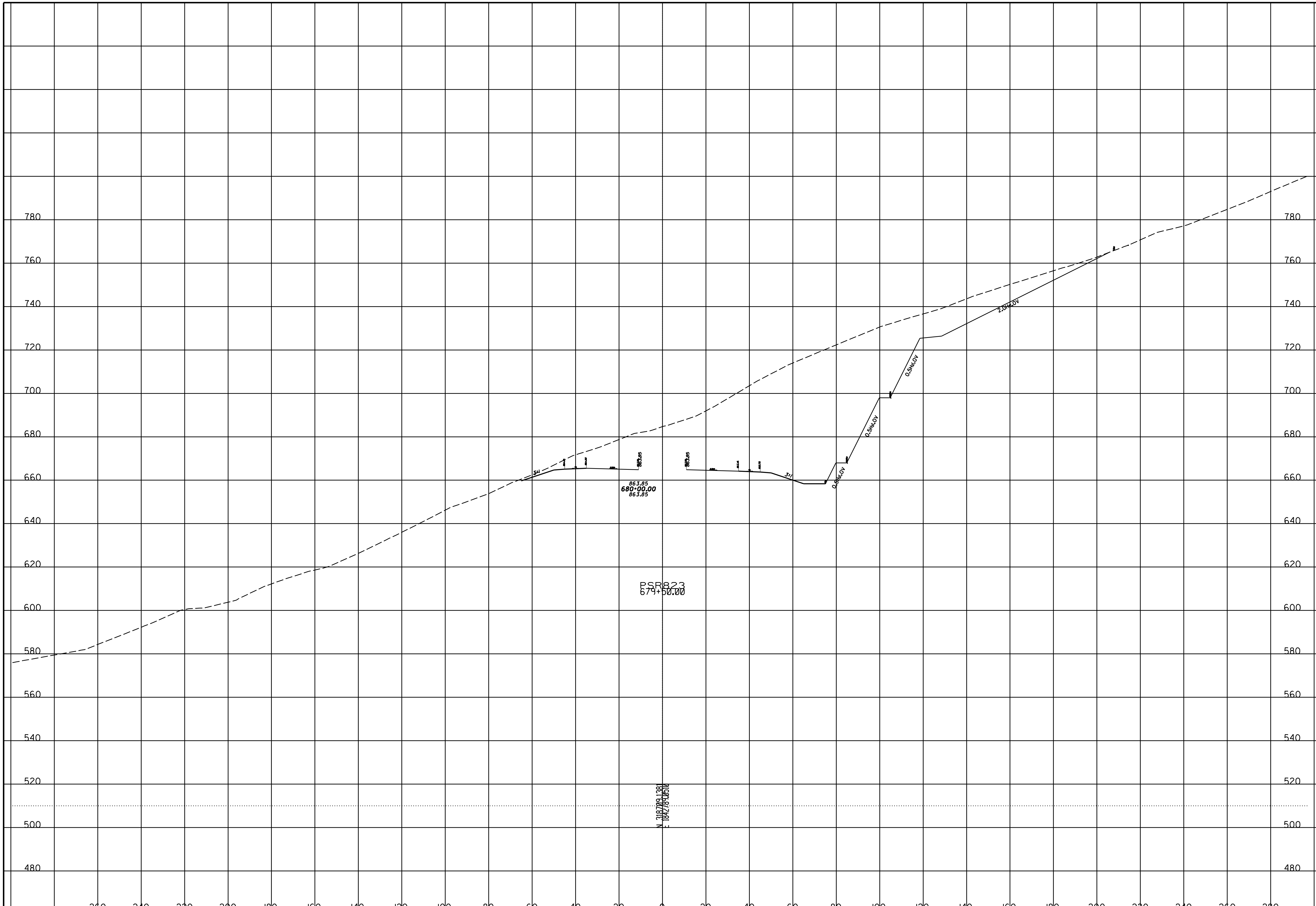
10
14

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 24
STA 679+50

SCI-823-10.13

2.0H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
2.0H:1.0V
3H
3H
862.19
679+50.00
862.19
PSR823
679+00.00
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

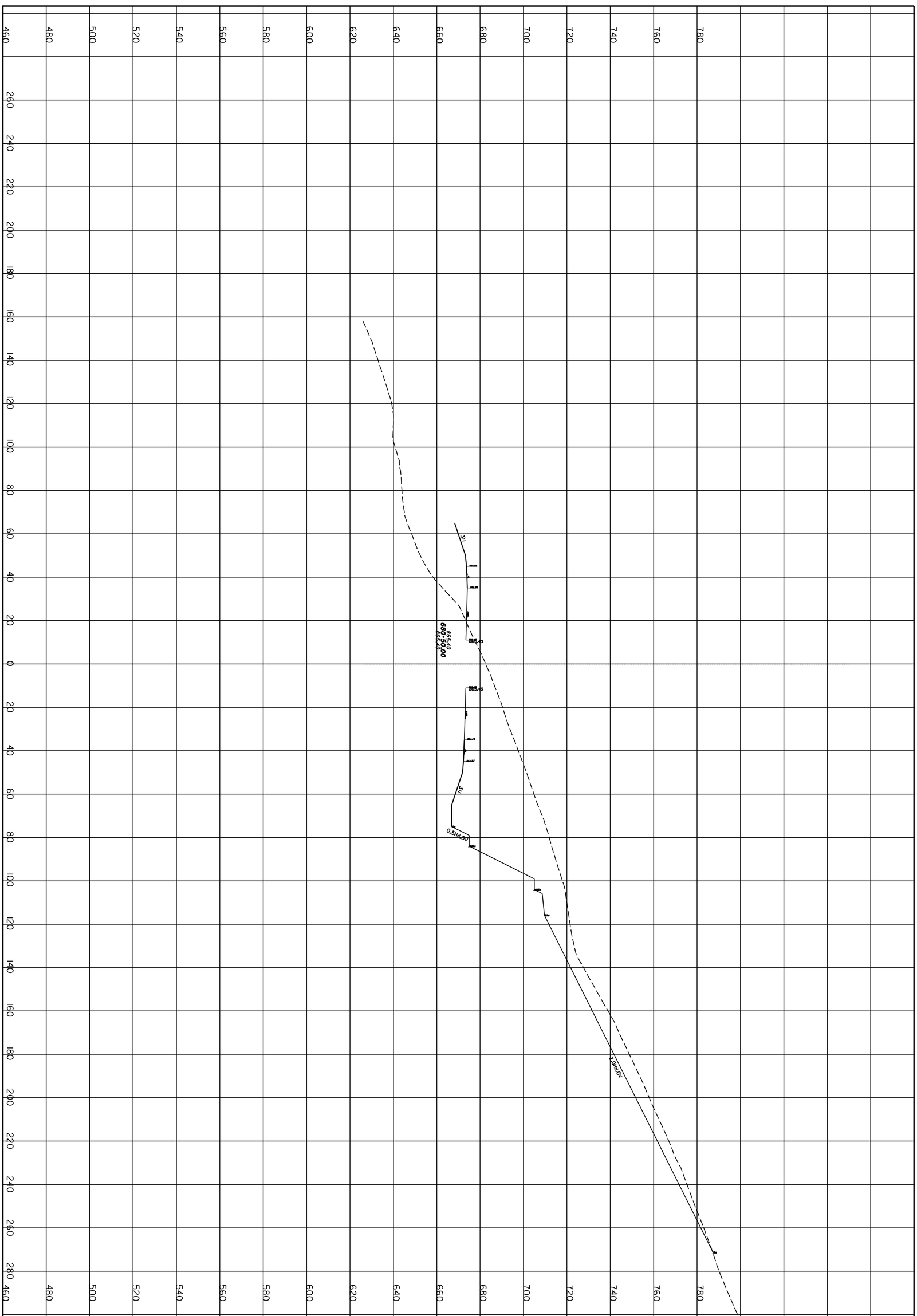


ROCK CUT SLOPE DESIGN - ROCK CUT 24
STA 680+00

SCI-823-10.13

12
14

CHECKED



13 / 14	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 24 STA 680+50
		CHECKED

980
960
940
920
900
880
860
840
820
800
780
760
740
720
700
680
660
640
620

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

866.86
681+00.00
866.86

PSR823
680+50.00

3:1

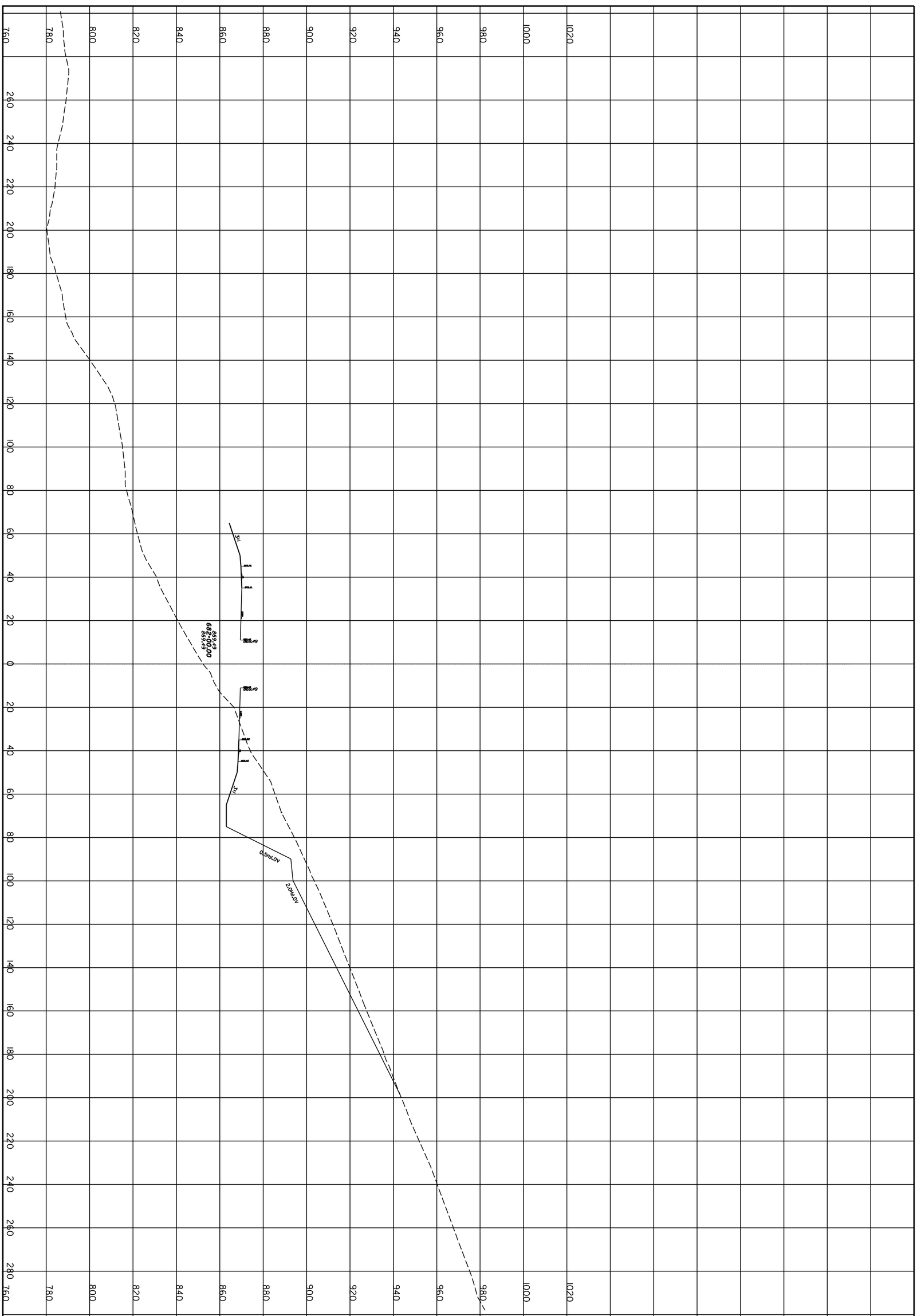
2.0H:1.0V

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 24
STA 681+00

SCI-823-10.13

14
14



16	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 25 STA 682+00

CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25
STA 682+50

SCI-823-10.13

860
840
820
800
780
760
740
720
700
680
660
640
620
600
580
560
540

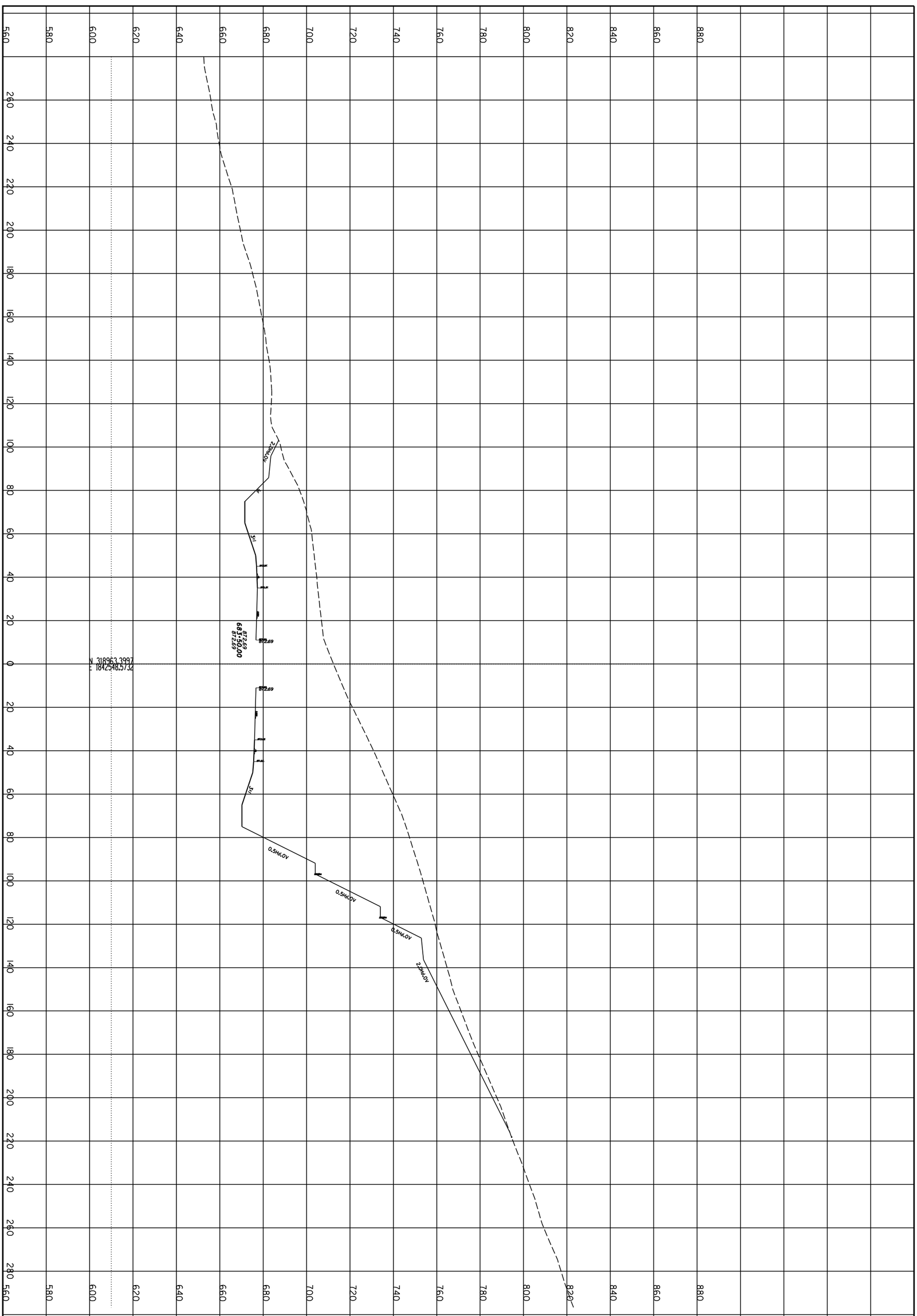
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

900
870
3:1
2.0H:1.0V
0.5H:1.0V
870.65
682+50.00
870.65
N 318889.6332
E 1042616.0887
PSR823
682+00.00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25
STA 683+00

SCI-823-10.13



4 / 16	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 25 STA 683+50
		CHECKED

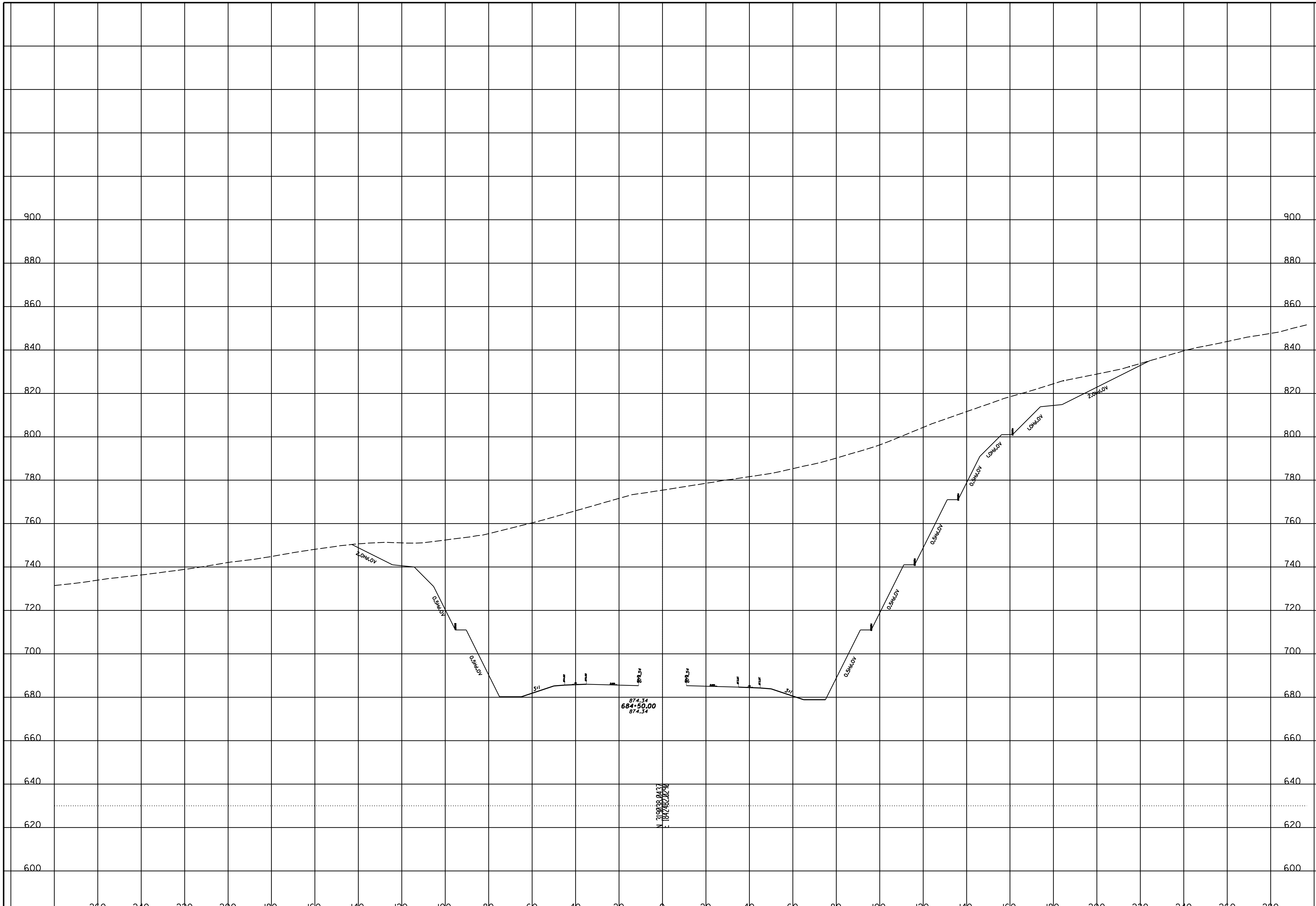
CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25
STA 684+00

SCI-823-10.13

5
16

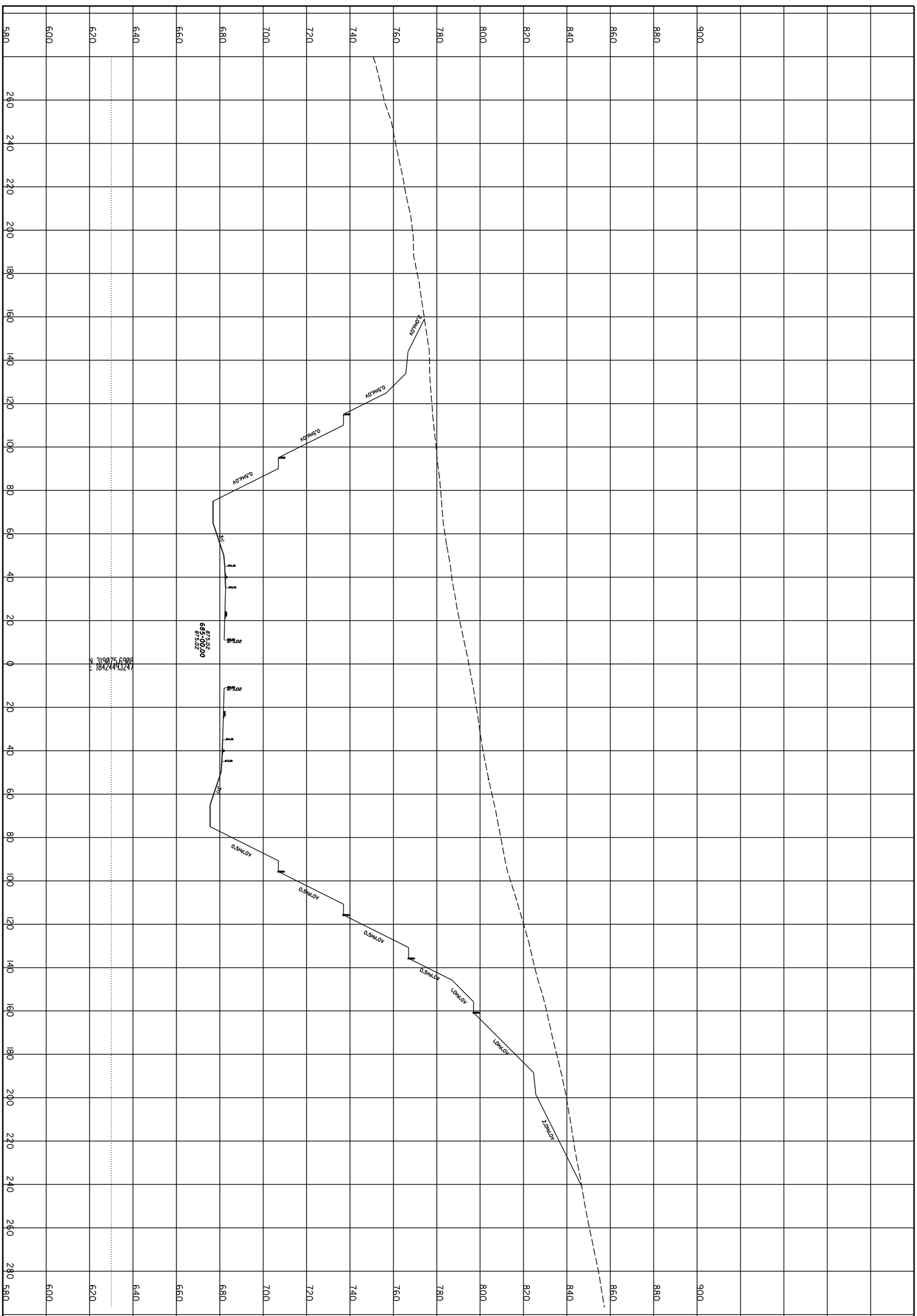
2.0H:1.0V
0.5H:1.0V
4'
87.0
3:1
87.3.57
684+00.00
87.3.57
N 319000.6128
E 184251.5178



ROCK CUT SLOPE DESIGN - ROCK CUT 25
STA 684+50

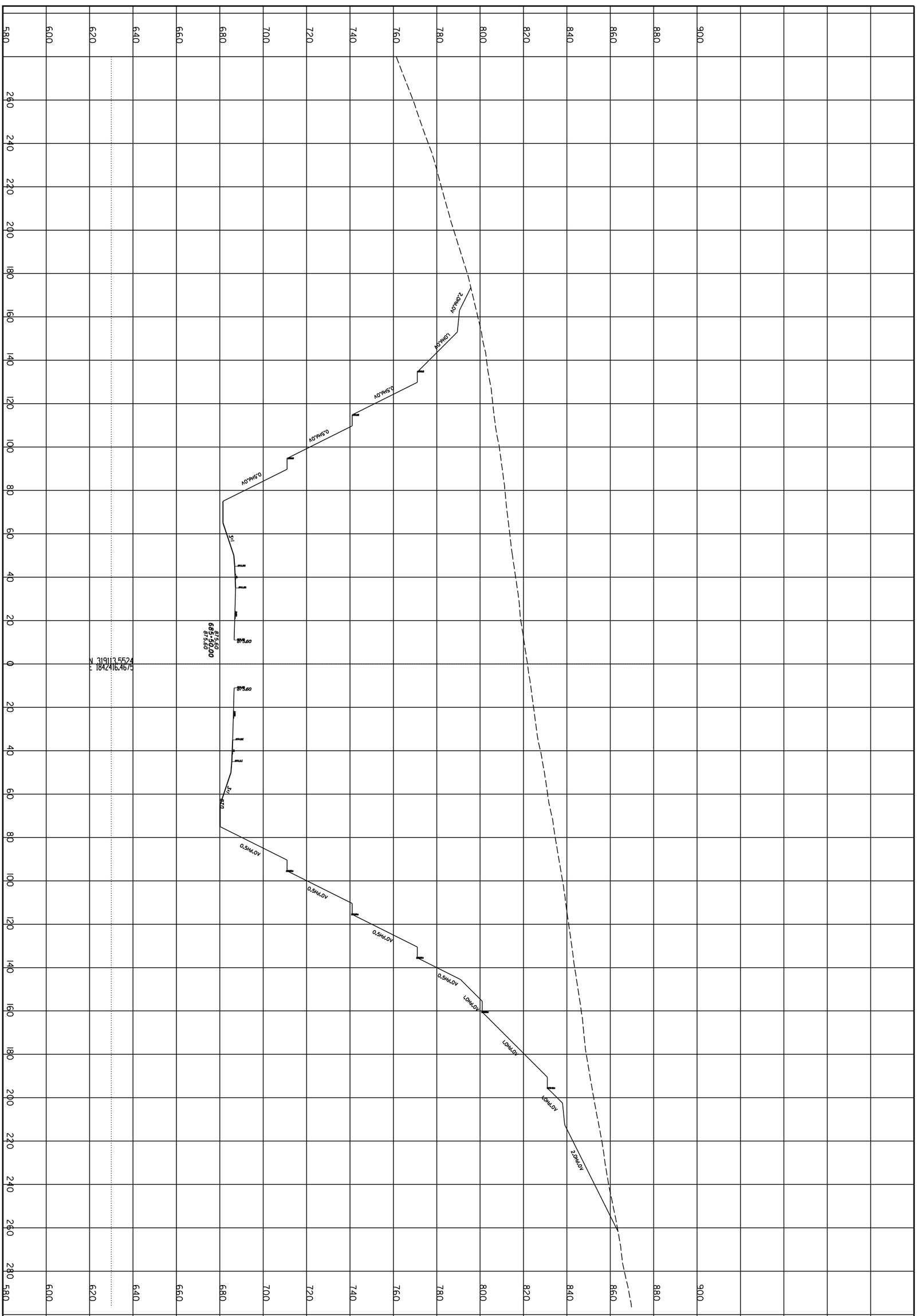
SCI-823-10.13

6
16



7 / 16	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 25 STA 685+00

CHECKED



8 / 16	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 25 STA 685+50
		CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25
STA 686+00

CHECKED

2.0H:1.0V
1.0H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
3:1
876.09
686+00.00
876.09
3:1
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
1.0H:1.0V
2.0H:1.0V

N 3191516.263
E 1842894.068

900 880 860 840 820 800 780 760 740 720 700 680 660 640 620 600 580

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

SCI-823-10.13

9
16

CHECKED

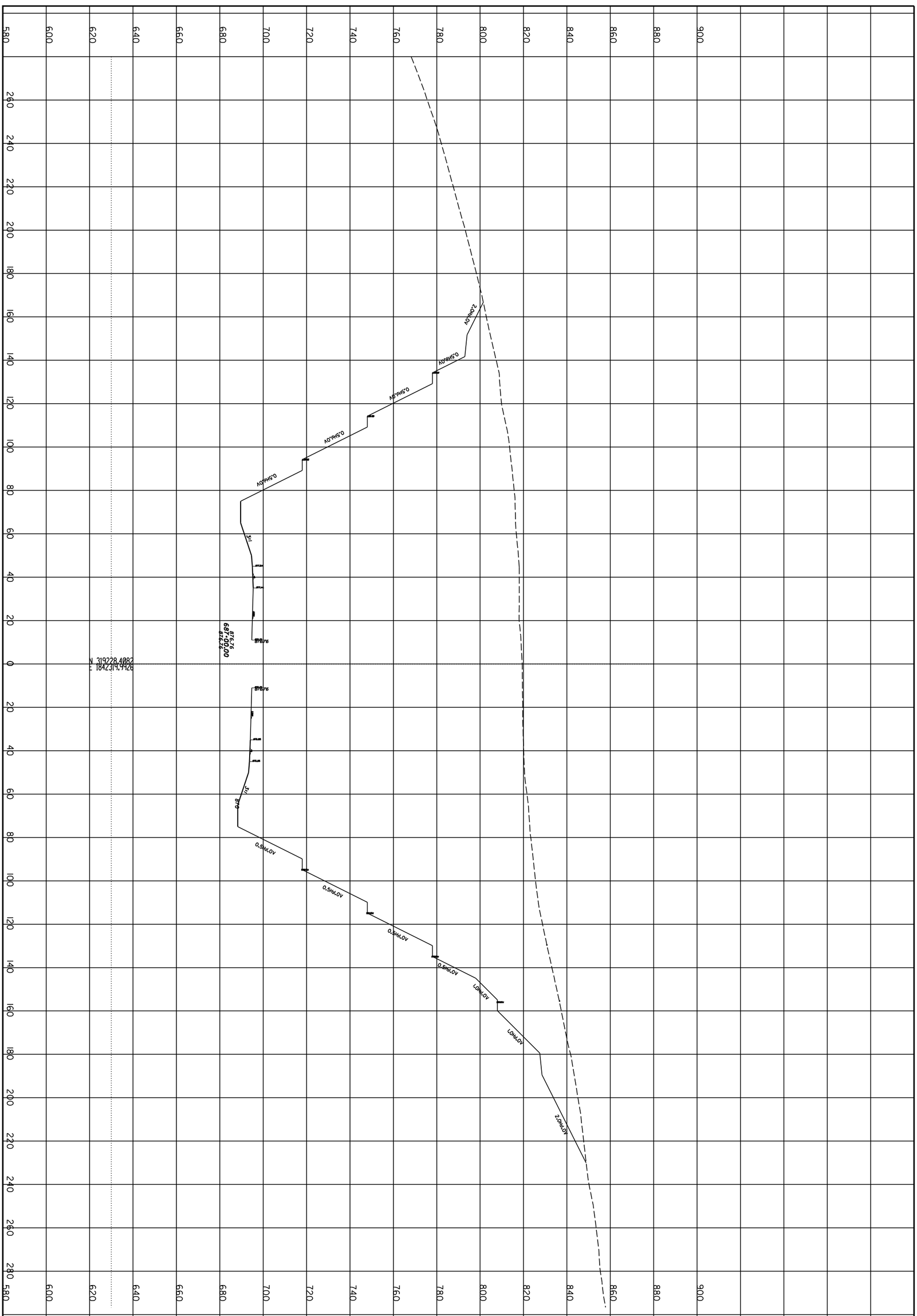
CUT SLOPE DESIGN - ROCK CUT 25
STA 686+50

ROCK CUT

SCI-823-10.13

876,47
686•50,00
876,47

N 7191899,9127
E 1842351,9007



16 / 16	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 25 STA 687+00

CHECKED

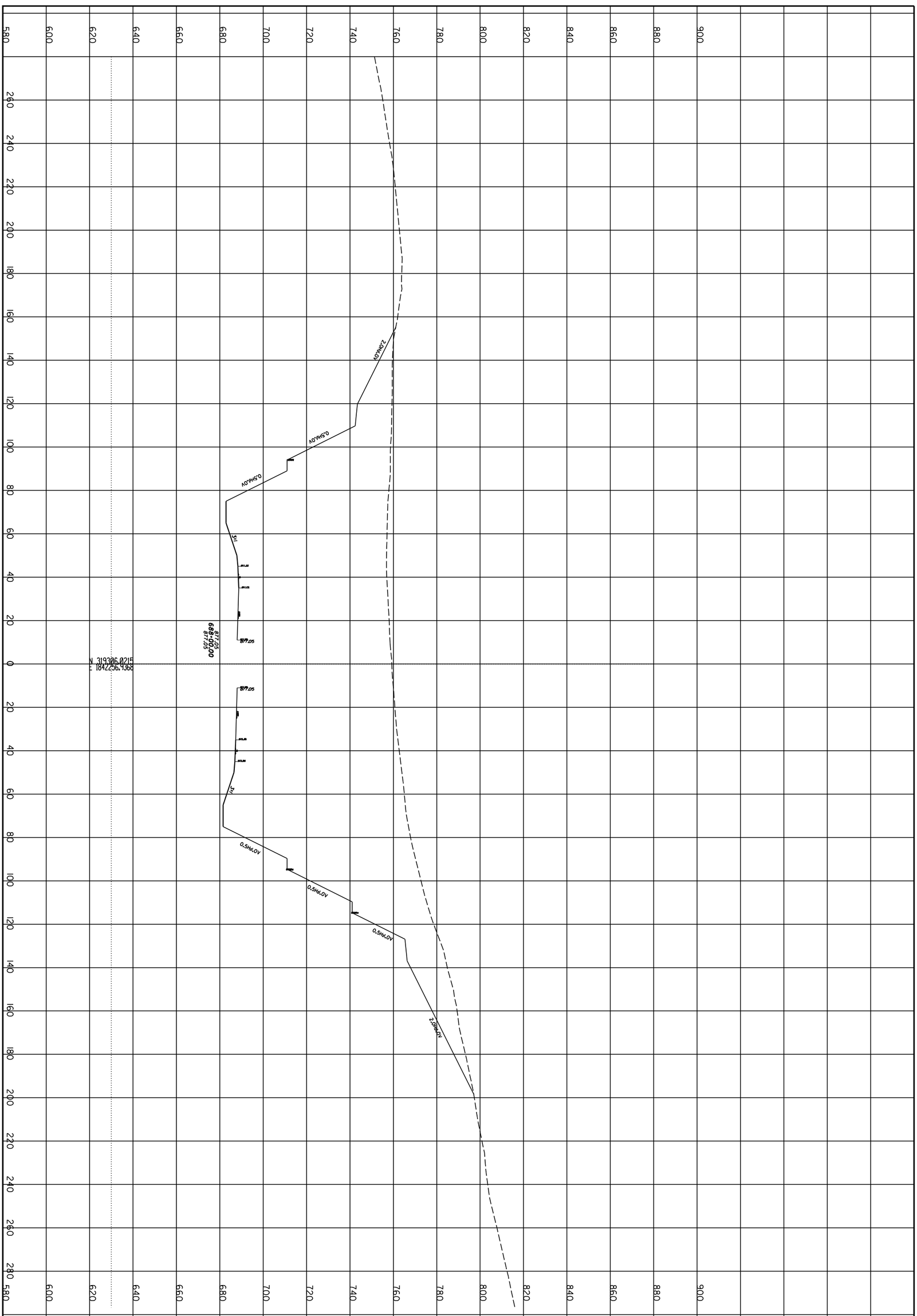
CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25
STA 687+50

SCI-823-10.13

12
16

2.0H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
0.5H:1.0V
2.0H:1.0V
3:1
3:1
876.95
687+50.00
876.95
N 3192671.117
E 1842288.337



13 / 16	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 25 STA 688+00
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25
STA 688+50

ROCK CUT

SCI-823-10.13

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2.0H:1.0V
0.5H:1.0V
3:1
0.5H:1.0V
2.0H:1.0V

877.04
688+50.00
877.04

N 1939345.136
E 1842225.791

688+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25
STA 689+00

ROCK CUT

SCI-823-10.13

15
16

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2.0H:1.0V
0.5H:1.0V
3:1
876.94
689+00.00
876.94
3:1
0.5H:1.0V
2.0H:1.0V

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25
STA 689+50

SCI-823-10.13

16
16

1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

3:1

876.74
689+50.00
876.74

2.0Hd.0V

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25A STA 693+00

SCI-823-10.13

980
960
940
920
900
880
860
840
820
800
780
760
740
720

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

Clear Zone Offset 30.0

Clear Zone Offset 30.0

872.62

872.62

872.62
693+00.00

872.62
693+00.00

849.5

Clear Zone Offset
30.0

Clear Zone Offset
30.0

693+50.00
768.49

693+50.00
776.47

N 319737.1668
E 1841428.6672

856.7

800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25A STA 693+50

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25A STA 694+00

SCI-823-10.13

780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

Clear Zone Offset
30.0

Clear Zone Offset
30.0

970.57
694+00.00

970.57
694+00.00

N 319788.4196
E 1941400.4160

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25A STA 694+50

Clear Zone Offset 30.0

Clear Zone Offset 30.0

4H

6H

2H

852.5

869.39
694+50.00

694+50.00
828.79

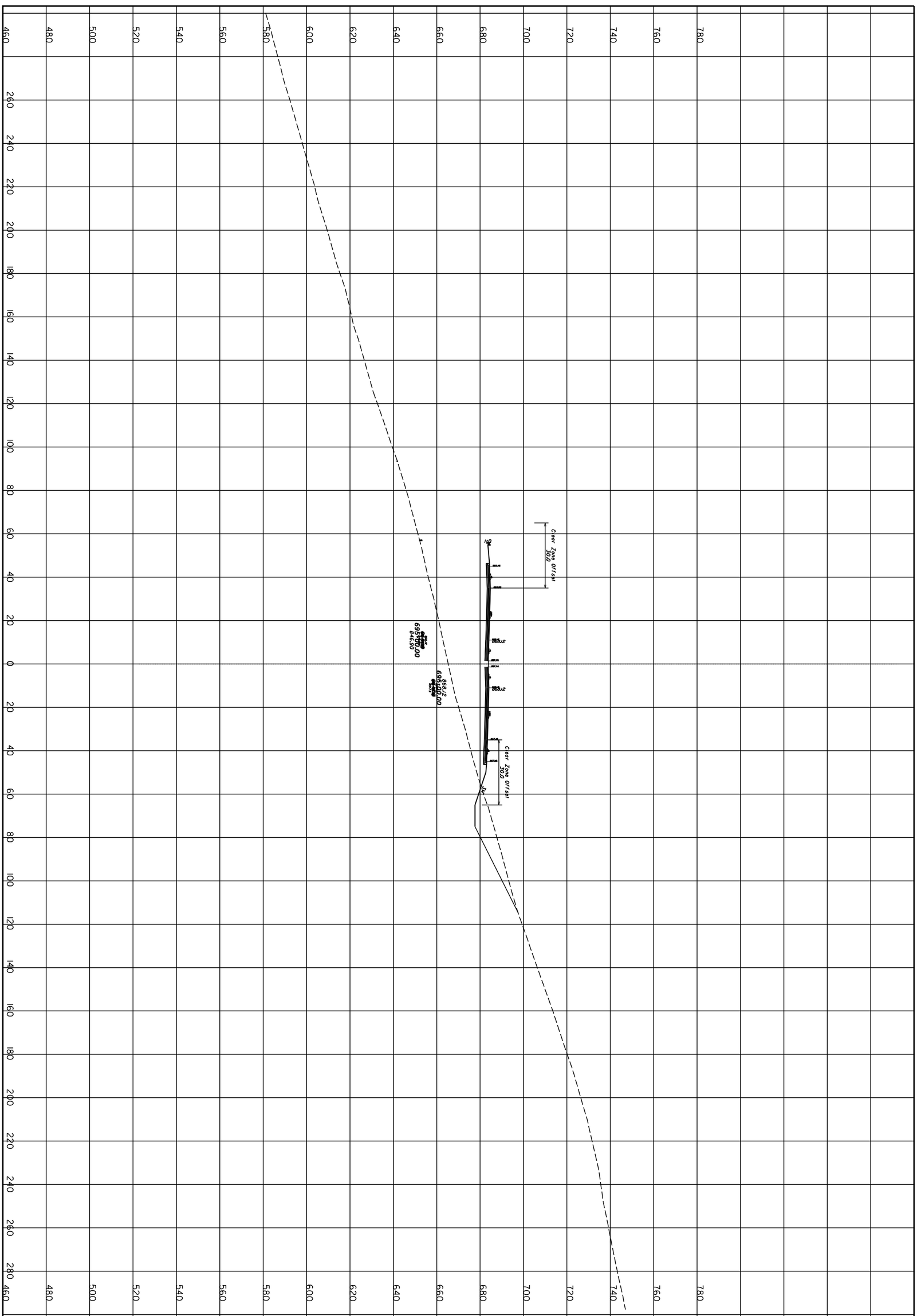
N 318829.8572
E 184187.2435

780 760 740 720 700 680 660 640 620 600 580 560 540 520 500 480 460

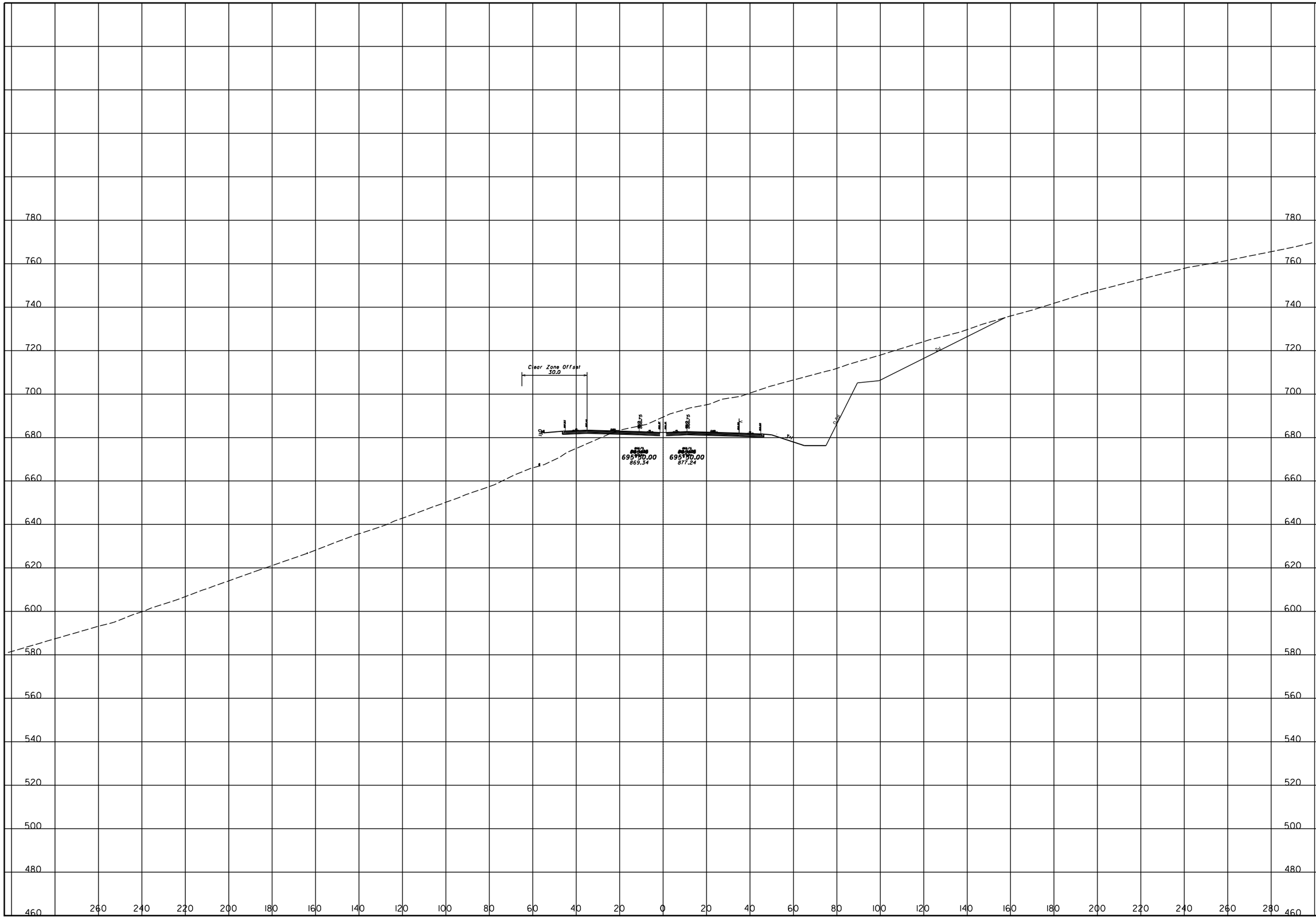
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

SCI-823-10.13

4
10



5 / 10	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 25A STA 695+00
		CHECKED



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25A STA 695+50

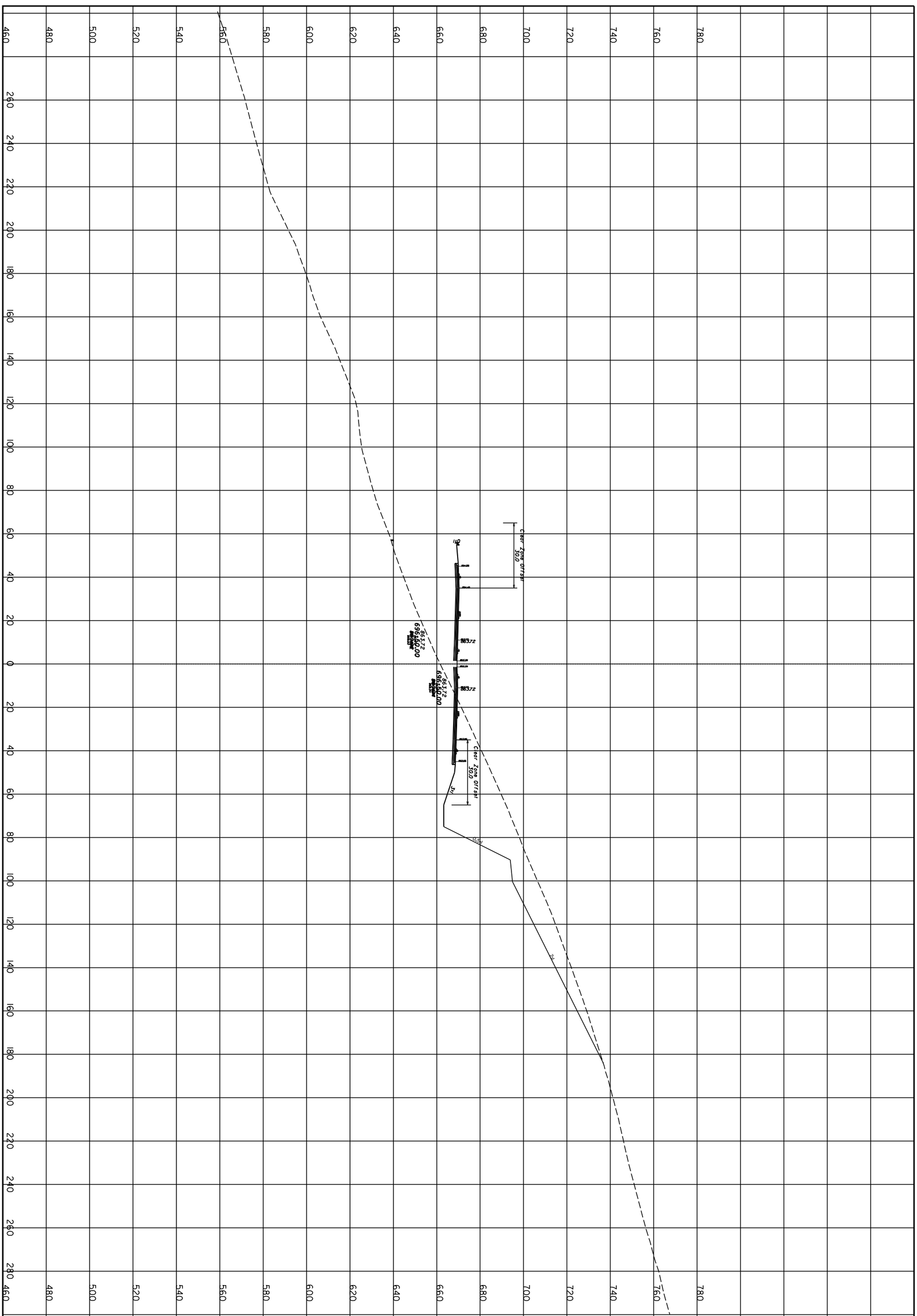
SCI-823-10.13

6
10

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25A STA 696+00

SCI-823-10.13



8/10	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 25A STA 696+50	CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25A STA 697+00

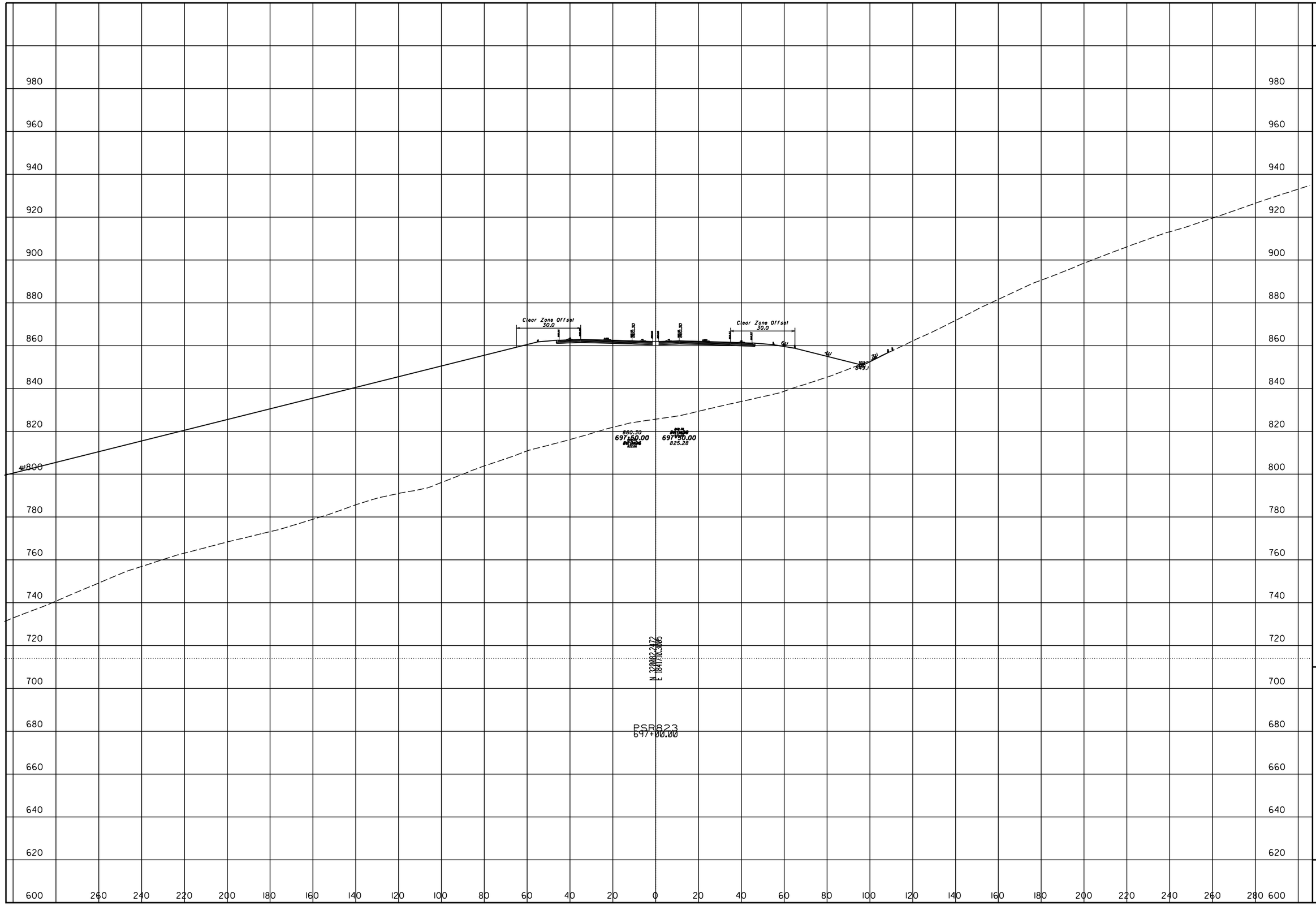
SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 25A STA 697+50

SCI-823-10.13

10
10



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 702+00

SCI-823-10.13

1
26

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

841.84
702+00.00
841.84

N 1204472.2783
E 1841485.7855

702+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 702+50

ROCK CUT

SCI-823-10.13

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2H
3H
R=654
3/4/5
4/2/3
4/2/4
4/5/5
839.74
702+50.00
839.74
N 2706164.136
E 1841462.489
702+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 703+00

SCI-823-10.13

PSR823
703+00.00

703+00

N 320650.7018
E 1841491.2824

CHECKED

CUT SLOPE DESIGN - ROCK CUT 26
STA 703+50

ROCK CUT

SCI-823-10.13

PSR823
703+50.00

N 1220615.410
E 1041916.367

703+50

0.5:1
1:1
3:1
2:1

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 704+00

ROCK CUT

SCI-823-10.13

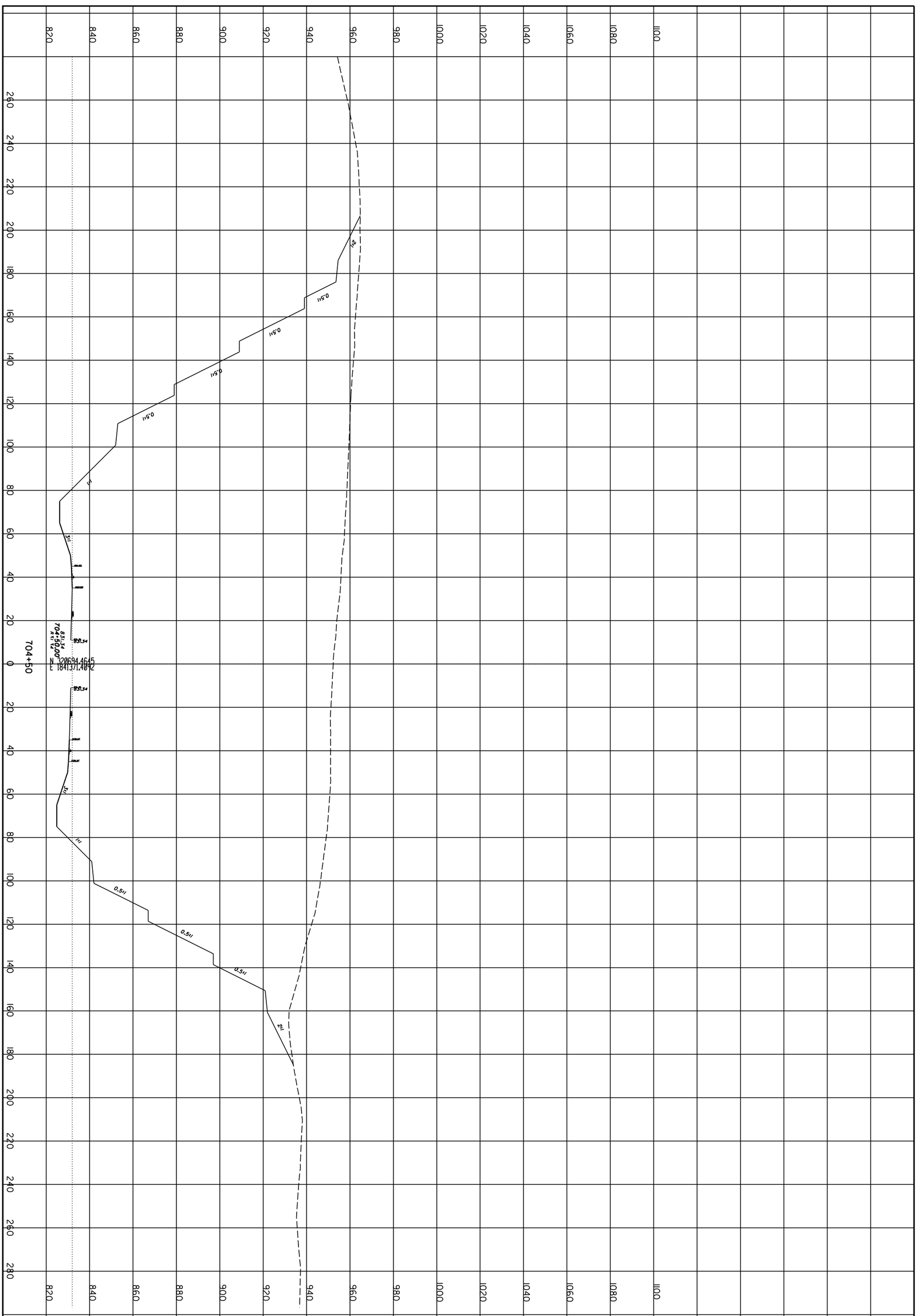
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
0.5:1
0.5:1
0.5:1
1:1
3:1
3:1
0.5:1
0.5:1
2:1

N 2206349.7732
E 1841357.4118

704+00



6 / 26	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 26 STA 704+50
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 705+00

SCI-823-10.13

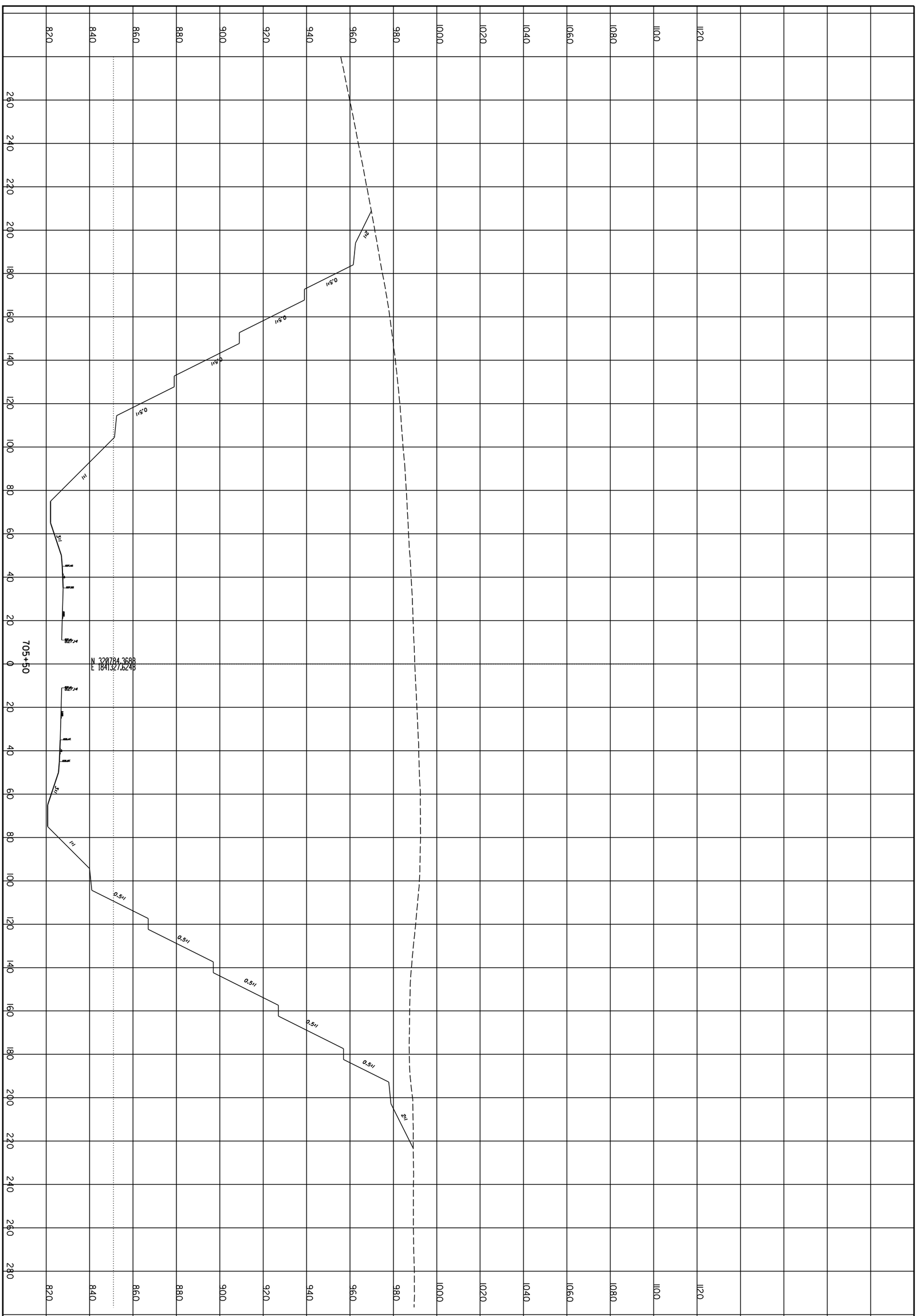
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
0.5:1
0.5:1
0.5:1
0.5:1
1:1
3:1
3:1
1:1
0.5:1
0.5:1
0.5:1
0.5:1
2:1

N 1241739.3456
E 1841341.3696

705+00



8 / 26	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 26 STA 705+50
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 706+00

SCI-823-10.13

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
0.5:1
0.5:1
0.5:1
0.5:1
1:1
1:1
1:1
0.5:1
0.5:1
0.5:1
0.5:1
0.5:1
2:1

N 2208825.5339
E 1841366.1749

706+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 706+50

SCI-823-10.13

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
0.5:1
0.5:1
0.5:1
0.5:1
1:1
1:1
822.94
706+50
N 1208714.8385
E 1941285.9210
1:1
0.5:1
0.5:1
0.5:1
0.5:1
0.5:1
0.5:1
2'

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 707+00

SCI-823-10.13

1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

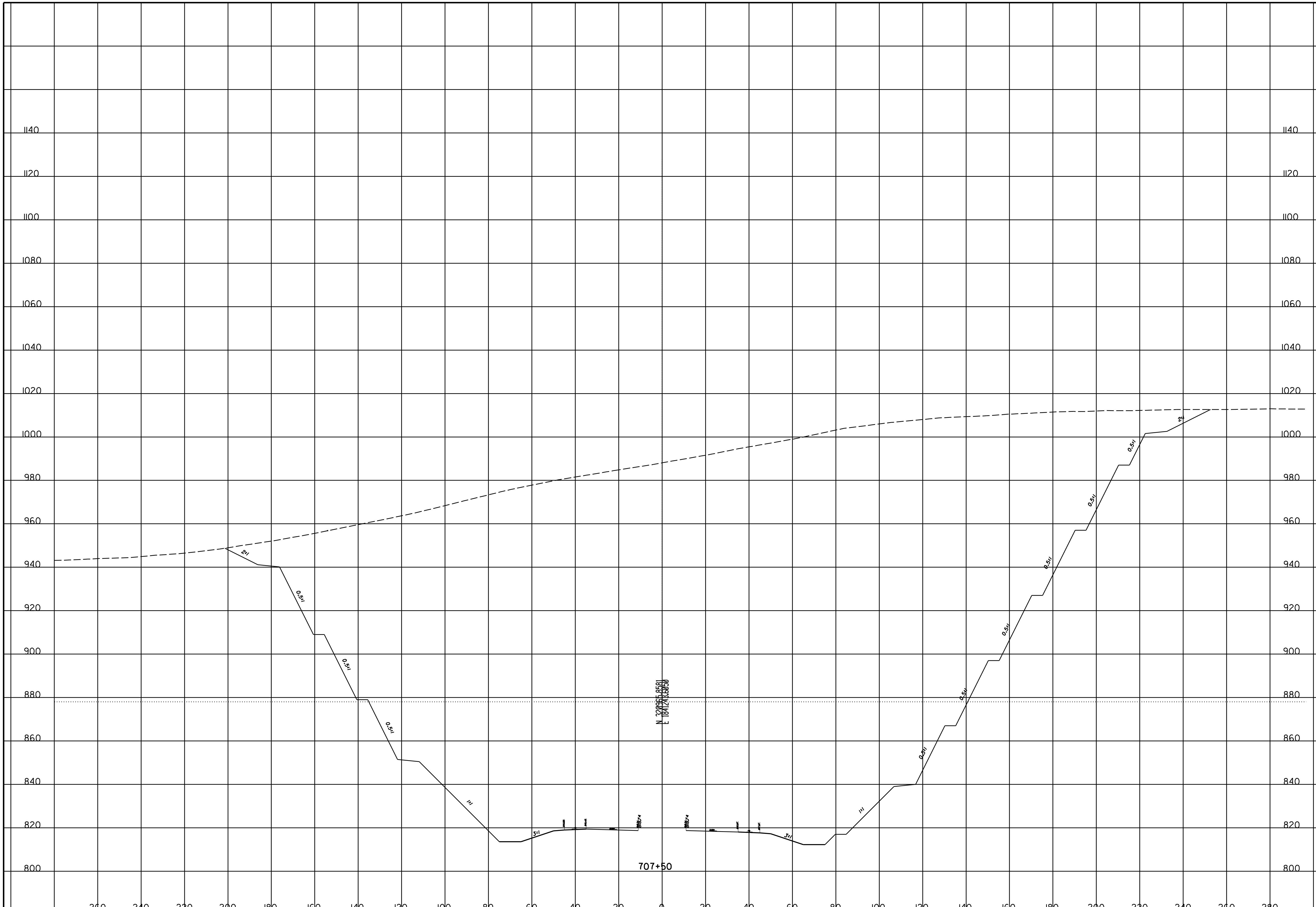
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

0.5H
1H
3H

N 1209320.2805
E 1841264.1640

820.84
707+00.00

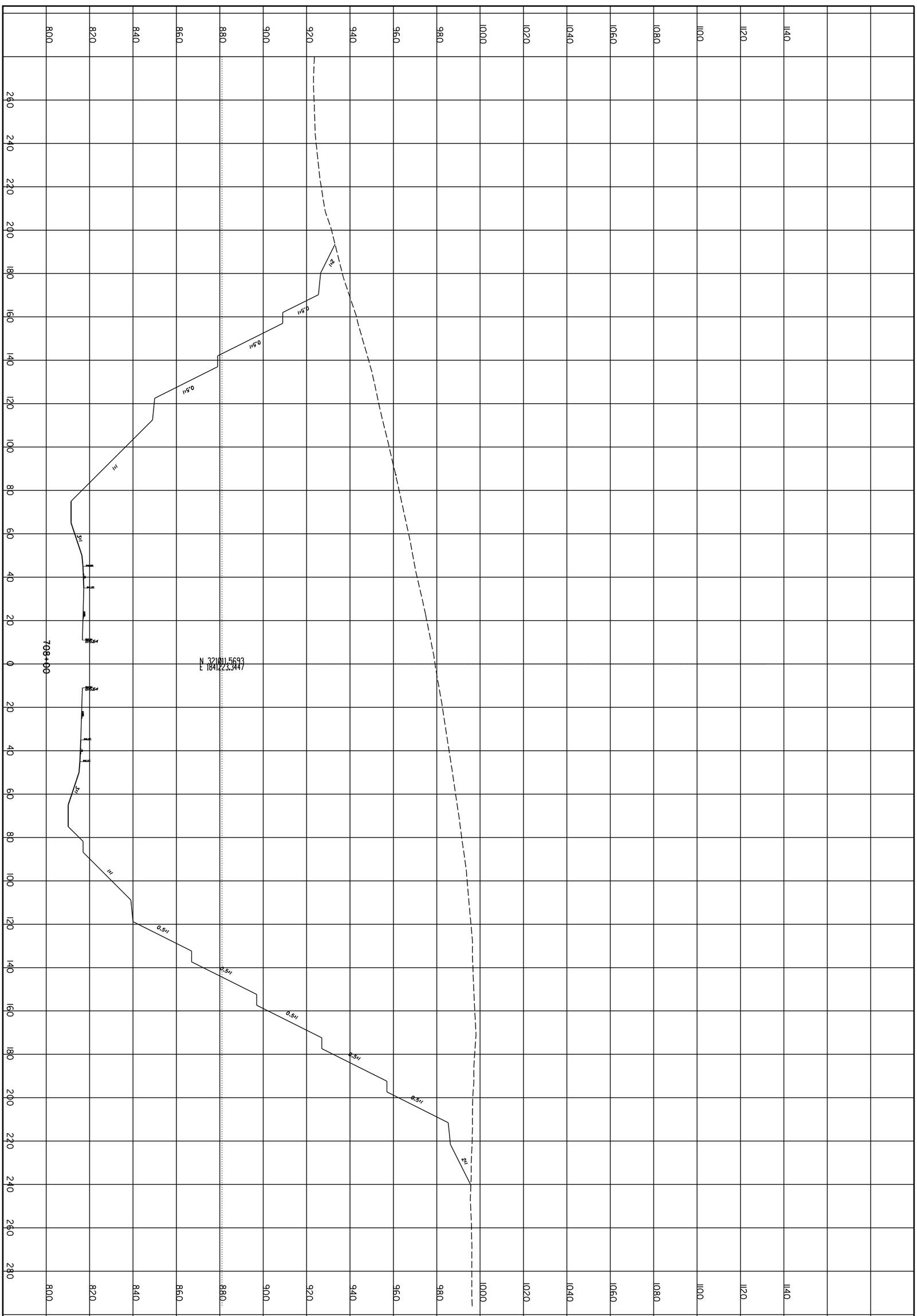
707+00



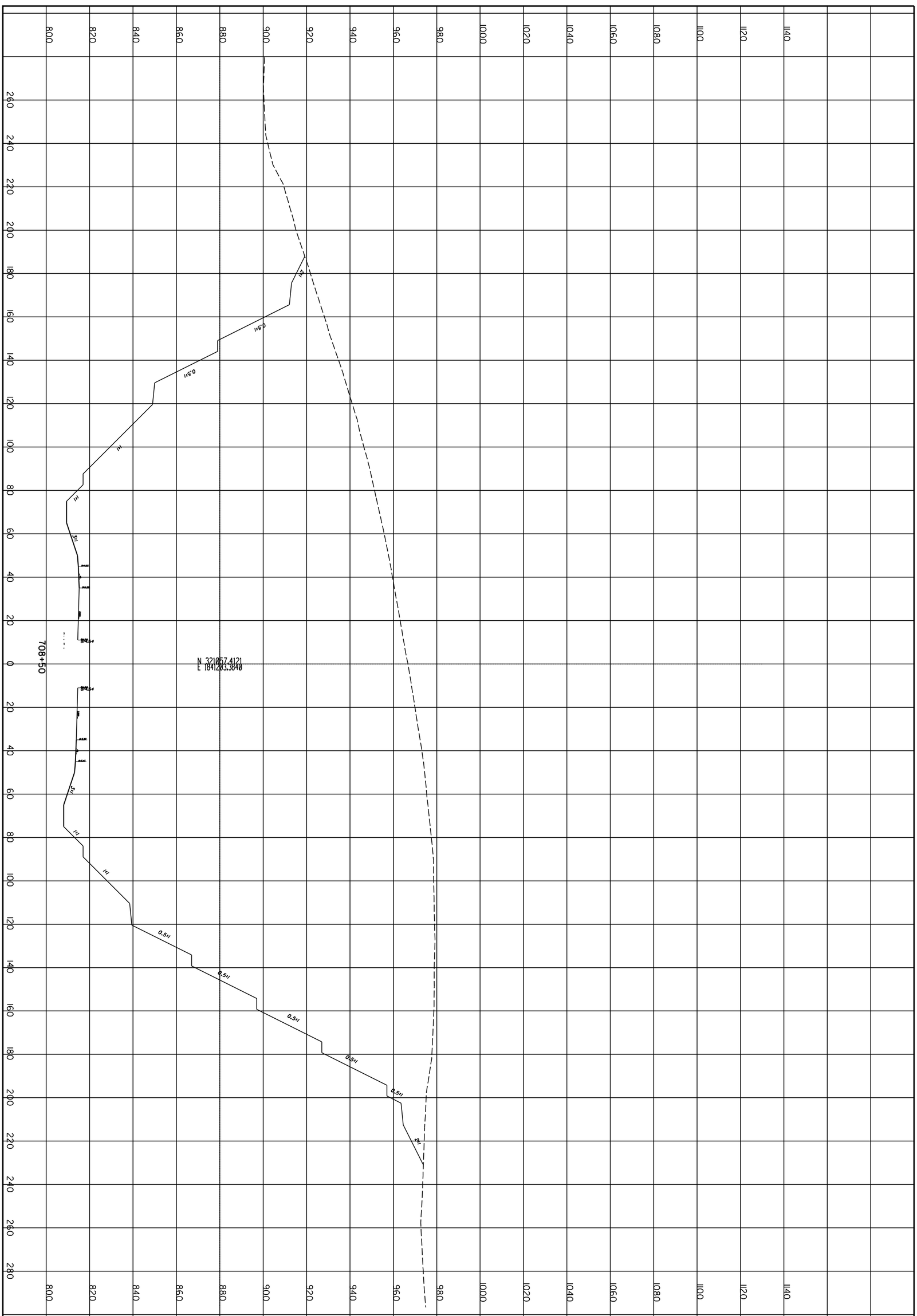
ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 707+50

SCI-823-10.13

CHECKED



13 / 26	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 26 STA 708+00
		CHECKED



14 / 26	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 26 STA 708+50
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 709+00

ROCK CUT

SCI-823-10.13

1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
0.5:1
0.5:1
1:1
1:1
3:1
812.44
812.44
3:1
1:1
1:1
0.5:1
0.5:1
0.5:1
2:1

N 321183.3885
E 1841183.7257

709+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 709+50

ROCK CUT

SCI-823-10.13

16
26

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

709+50

N 321149.4886
E 1841164.3848

810.34
709+50.00

2:1
0.5:1
1:1
3:1
1:1
0.5:1
0.5:1
0.5:1
2:1

R-661
12/15/20
22/18/20
13/18/19
28/50/4"
28/50/2"
132.25
Topsoil - 3"

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 710+00

ROCK CUT

SCI-823-10.13

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

710+00

N 321195.17005
E 1841145.08000

0.5H
1H
3H
2H

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 710+50

ROCK CUT

SCI-823-10.13

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2H
0.5H
1H
1H
1H
0.5H
0.5H
2H
5H
5H

N 32124.2650
E 18412.6.5541

710+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 711+00

ROCK CUT

SCI-823-10.13

1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
1:1
1:1
3:1
BENCH
BENCH
3:1
1:1
1:1
0.5:1
2:1

804.04
711+00.00
N 1841100.1040
E 321288.5314

711+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 711+50

ROCK CUT

SCI-823-10.13

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
1:1
1:1
5:1
2:1
1:1
1:1
0.5:1

801.94
711+50.00
801.94

N 322335.1188
E 1841089.9490

711+50

CHECKED

CUT SLOPE DESIGN - ROCK CUT 26
STA 712+00

ROCK CUT

SCI-823-10.13

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
1:1
1:1
3:1
799.84
712+00.00
799.84
N 1321381.7951
E 1841072.0236
712+00
3:1
1:1
0.5:1
2:1

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 712+50

ROCK CUT

SCI-823-10.13

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
1:1
3:1
1:1
1:1
2:1

797.74
712+50.00
797.74

N 321428.5253
E 1841065.2408

712+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 713+00

ROCK CUT

SCI-823-10.13

1000
980
960
940
920
900
880
860
840
820
800
780
760
740
720

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
1:1
3:1
795.64
713+00.00
795.64
N 321475.2781
E 1841036.5140
713+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 26
STA 713+50

ROCK CUT

SCI-823-10.13

1000
980
960
940
920
900
880
860
840
820
800
780
760
740
720

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2H
1V
3H
793.54
713+50.00
793.54
N 3215224.0316
E 1841086.7069
713+50

CHECKED

CUT SLOPE DESIGN - ROCK CUT 26
STA 714+00

ROCK CUT

SCI-823-10.13

980
960
940
920
900
880
860
840
820
800
780
760
740
720

PSR823
714+00.00

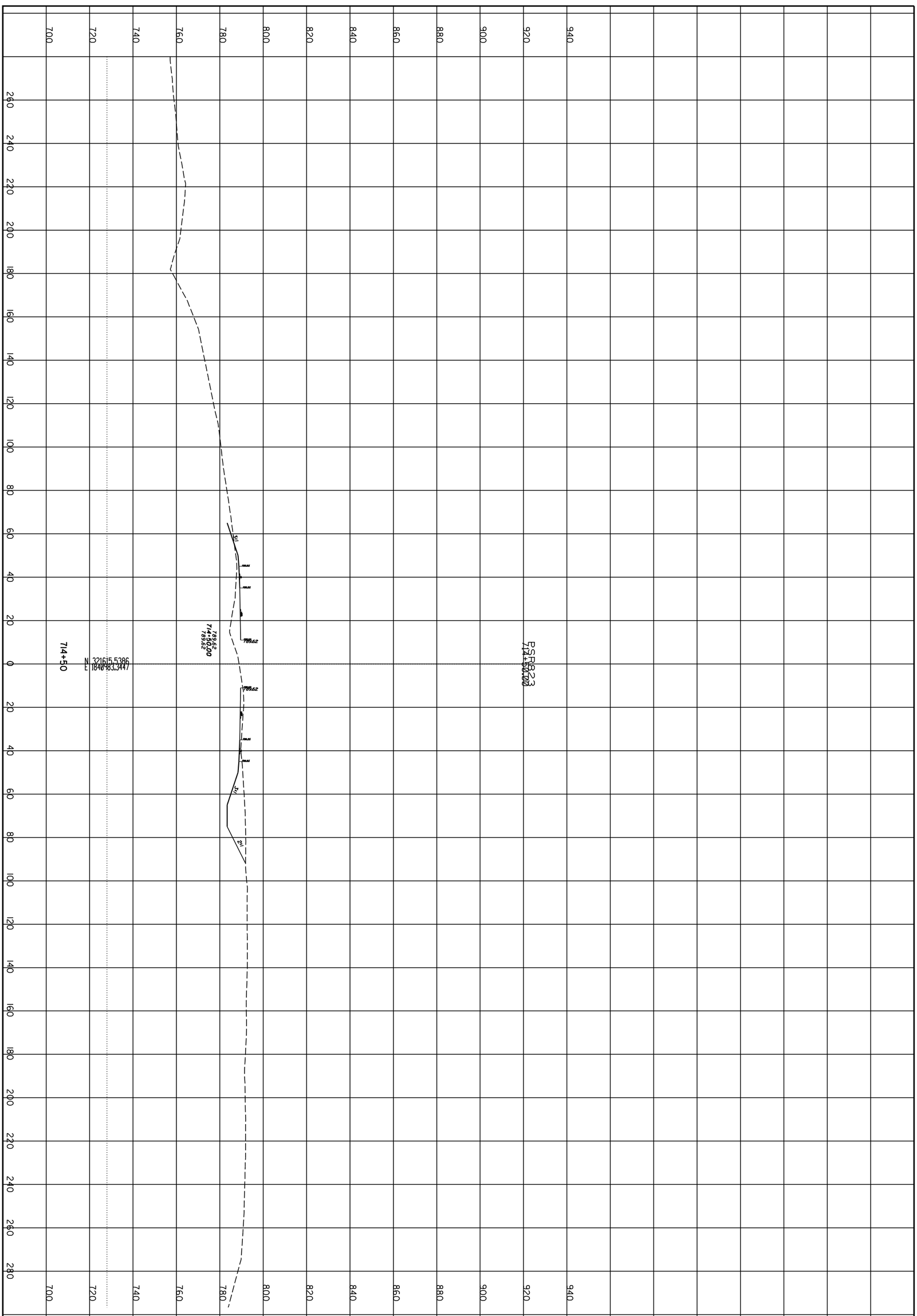
791.51
714+00.00
791.51

2:1
3:1
1:1

N 321668.7851
E 1841001.3678

714+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280



26 / 26	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 26 STA 714+50
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 725+00

ROCK CUT

SCI-823-10.13

980
960
940
920
900
880
860
840
820
800
780
760
740
720
700

781.61
725+00.00
781.61

3H
3H

N 1226837.3626
E 1840611.1598

725+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 725+50

ROCK CUT

SCI-823-10.13

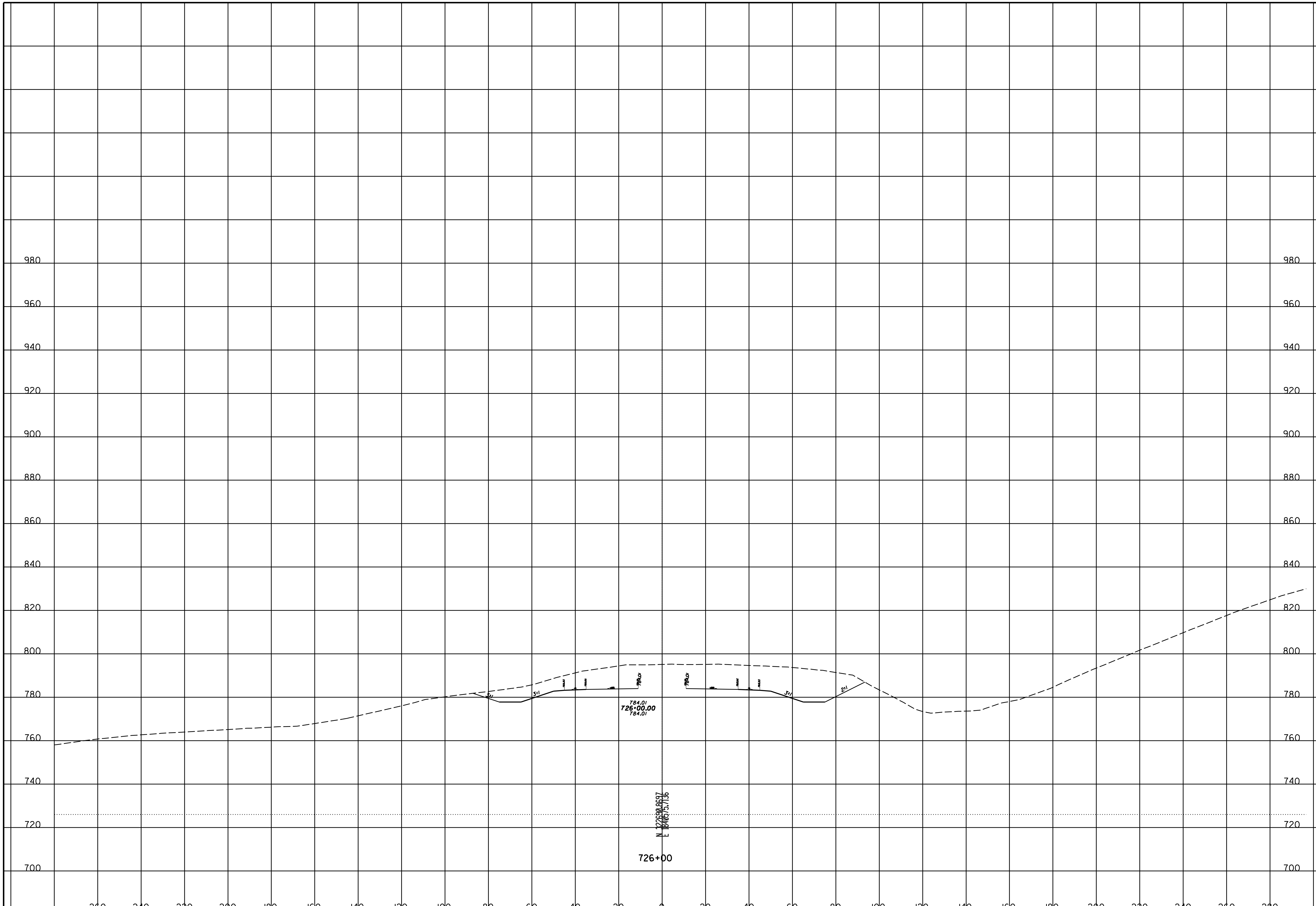
980
960
940
920
900
880
860
840
820
800
780
760
740
720
700

782.74
725+50.00
782.74

N 3276414.1162
E 1240513.4367

725+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 726+00

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 726+50

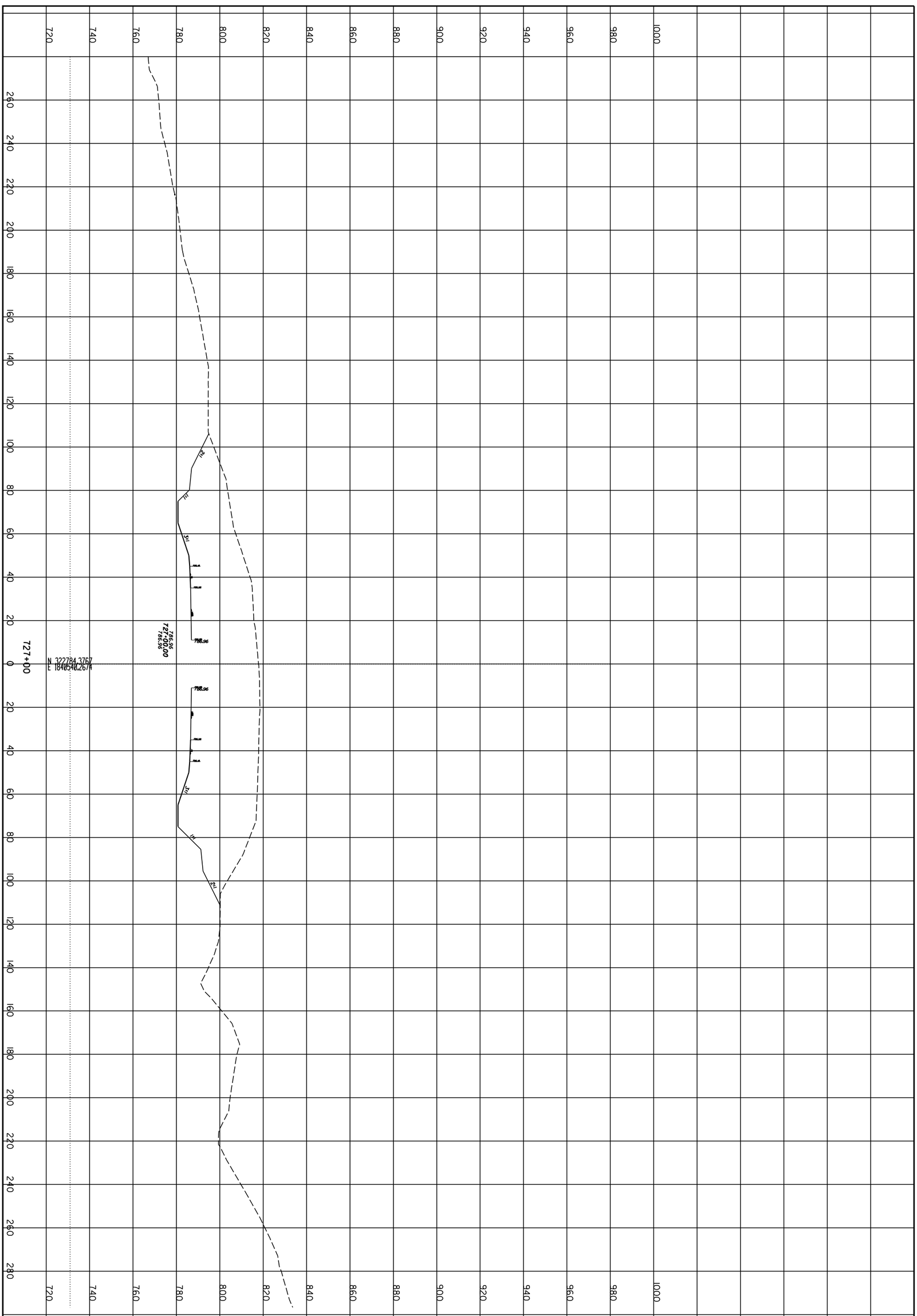
ROCK CUT

SCI-823-10.13

980
960
940
920
900
880
860
840
820
800
780
760
740
720
700

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
3:1
785.42
785.42
785.42
726+50.00
785.42
N 1227317.6232
E 1840597.4405
726+50



5 / 42	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 27 STA 727+00
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 727+50

ROCK CUT

SCI-823-10.13

1000
980
960
940
920
900
880
860
840
820
800
780
760
740
720

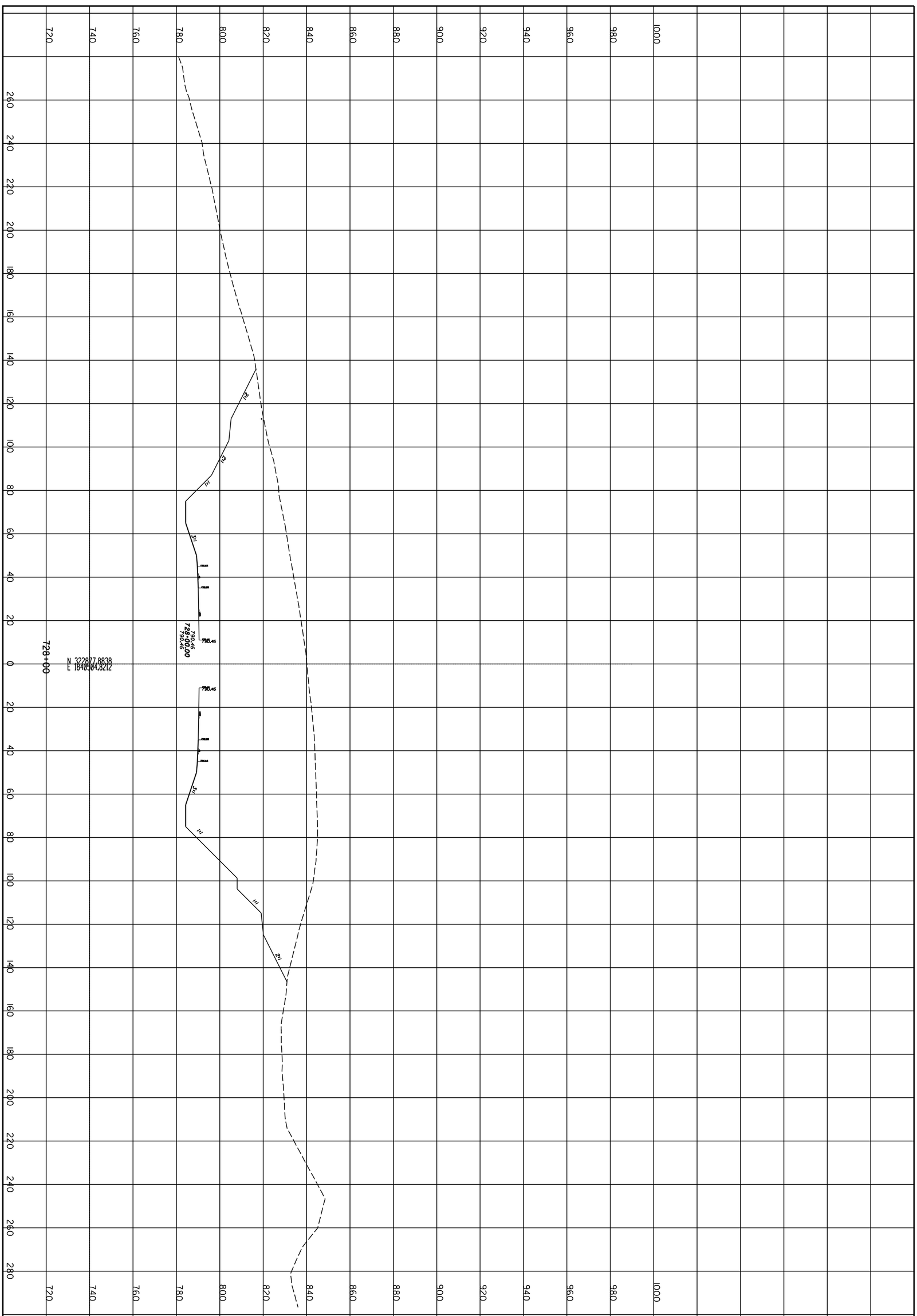
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
1:1
3:1

788.64
727+50.00
788.64

N 3228314.303
E 1840522.443

727+50



7/42	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 27 STA 728+00
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 728+50

ROCK CUT

SCI-823-10.13

1000
980
960
940
920
900
880
860
840
820
800
780
760
740
720

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
2:1
1:1
3:1
792.42
728+50.00
792.42
792.42
792.42
3:1
1:1
1:1
2:1
2:1

N 1329324.6323
E 1640487.0981

728+50

CHECKED

CUT SLOPE DESIGN - ROCK CUT 27
STA 729+00

ROCK CUT

SCI-823-10.13

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740
720

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
2:1
1:1
3:1
794.51
729+00.00
794.51
N 322971.3908
E 1840463.3756
729+00
3:1
1:1
2:1
2:1

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 729+50

ROCK CUT

SCI-823-10.13

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

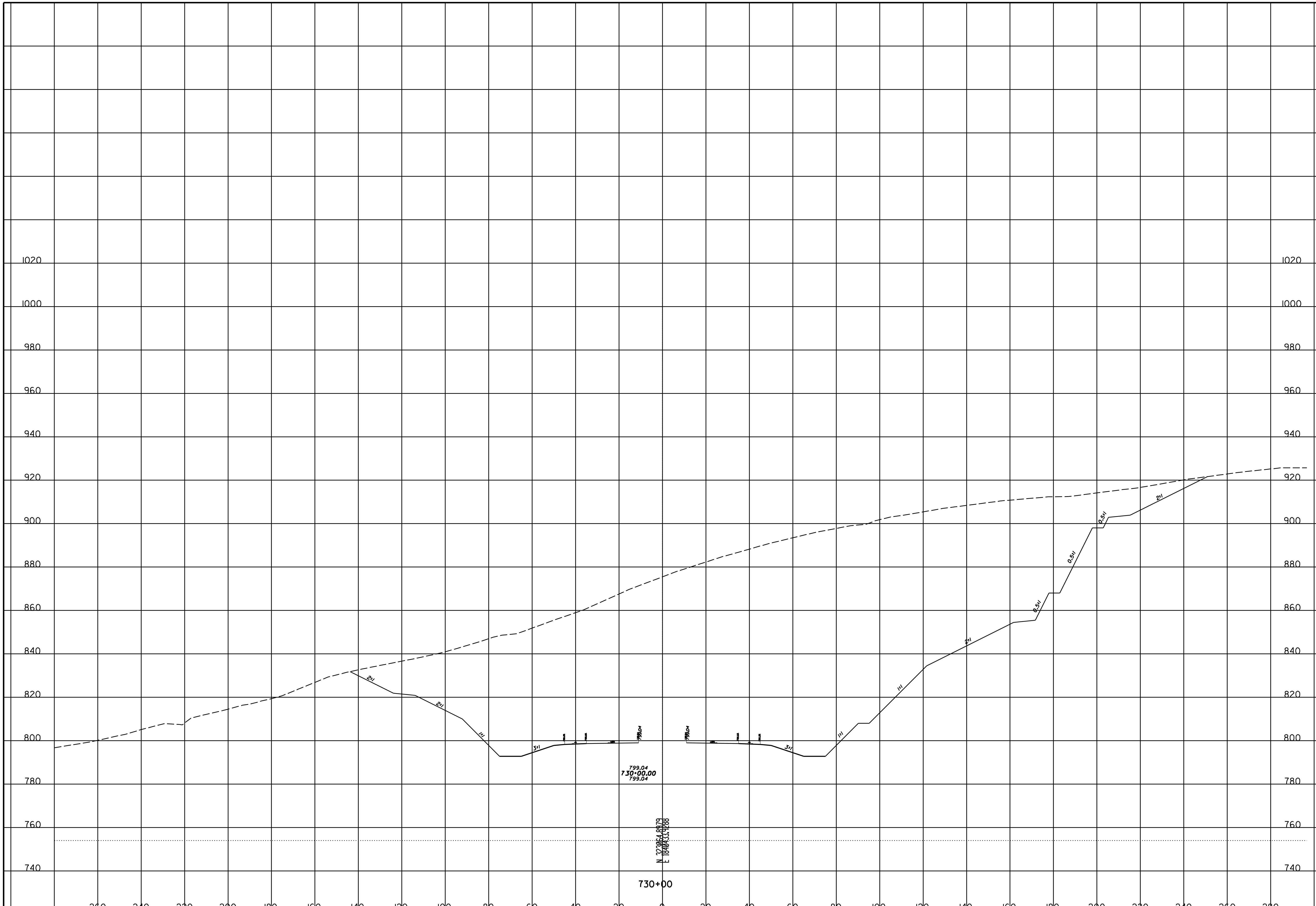
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
2:1
1:1
3:1
3:1
1:1
1:1
2:1
2:1

796.74
729+50.00
796.74

N 1220018.1444
E 1840451.6594

729+50

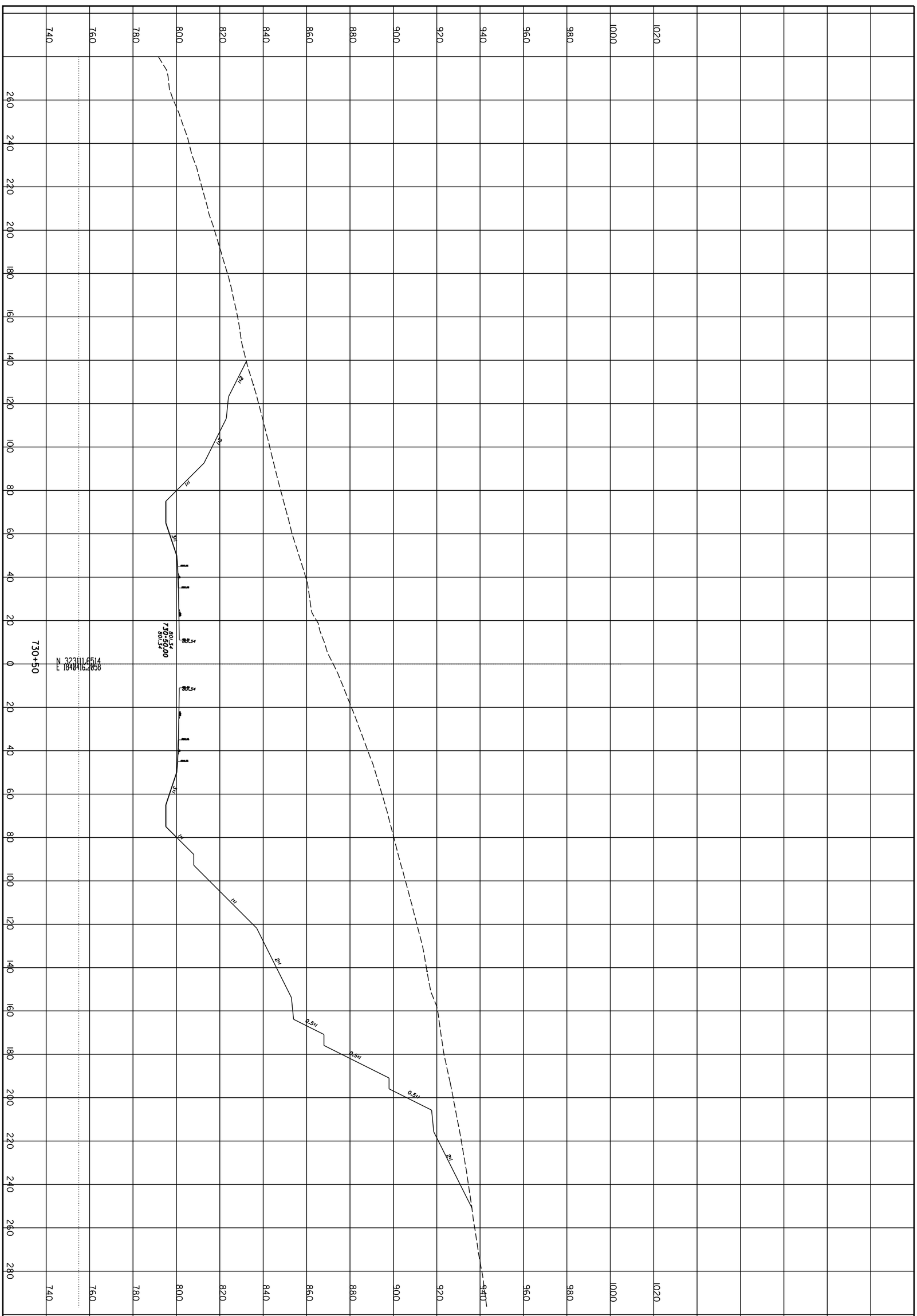


CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 730+00

SCI-823-10.13

11
42



12 / 42	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 27 STA 730+50
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 731+00

SCI-823-10.13

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2H
2H
1H
3H
803.64
731+00.00
803.64
N 3231581.1049
E 1840398.4827
731+00
1H
2H
2.5H
0.5H
0.5H
0.5H
2H

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27 STA 731+50

SCI-823-10.13

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
1:1
3:1
0.5:1

805.94
731+50.00
805.94

N 1322205.1585
E 1840387.7596

731+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 732+00

SCI-823-10.13

808.24
732+00.00
808.24

N 322251.912ft
E 184035.308ft

732+00

2:1
1:1
3:1
0.5:1

900
880
860
840
820
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

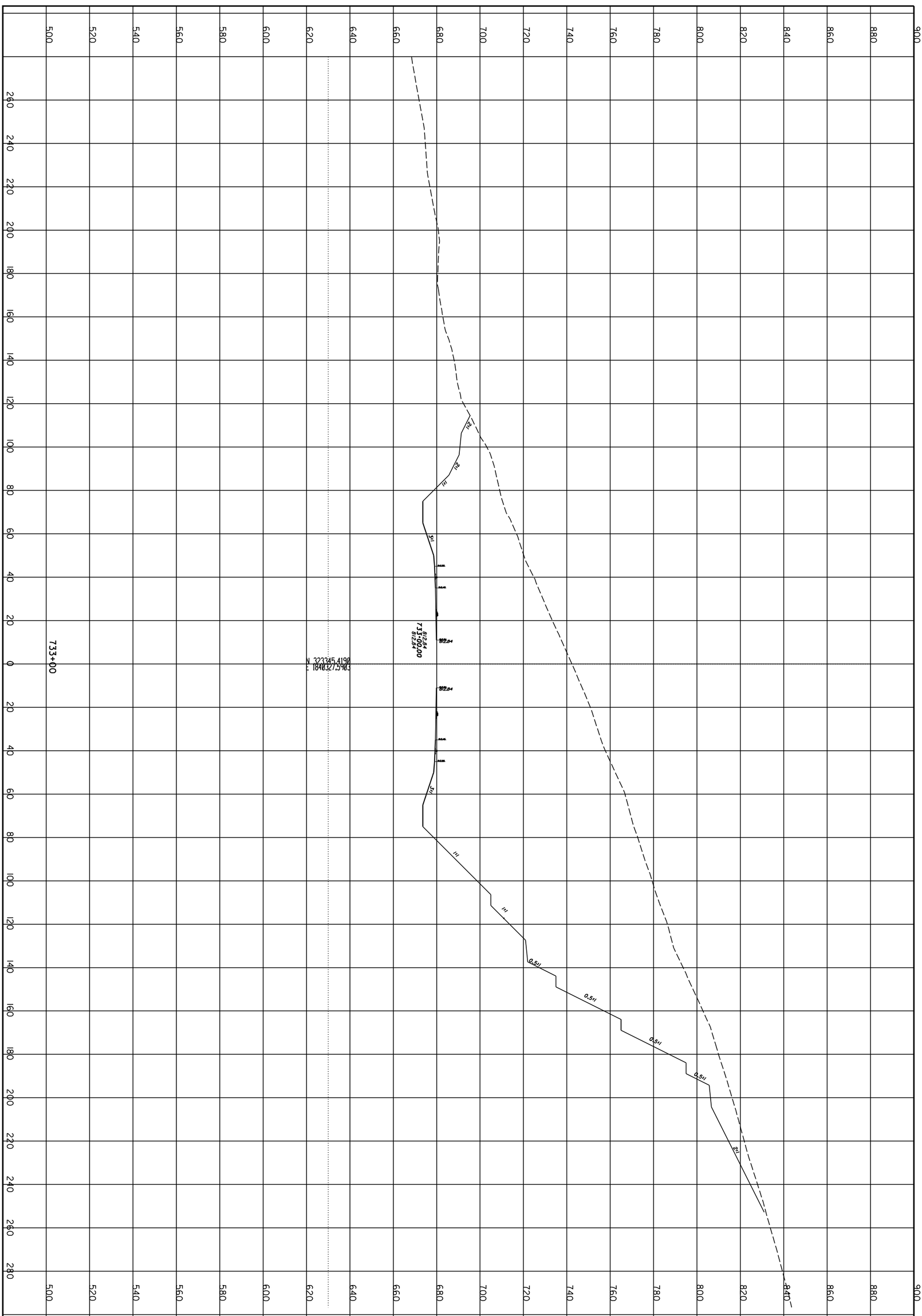
2:1
2:1
1:1
3:1
810.54
732+50.00
810.54
N 1223280.6655
E 1840345.3134
1:1
2:1
0.5:1
0.5:1
0.5:1
0.5:1
2:1
732+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27 STA 732+50

SCI-823-10.13

16
42



17
42

SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 733+00

CHECKED

CUT SLOPE DESIGN - ROCK CUT 27
STA 733+50

ROCK CUT

SCI-823-10.13

815.14
733+50.00
815.14

N 1233382.1728
E 1840394.8672

733+50

2:1
2:1
1:1
3:1
3:1
1:1
0.5:1
0.5:1
0.5:1
0.5:1
2:1

CHECKED

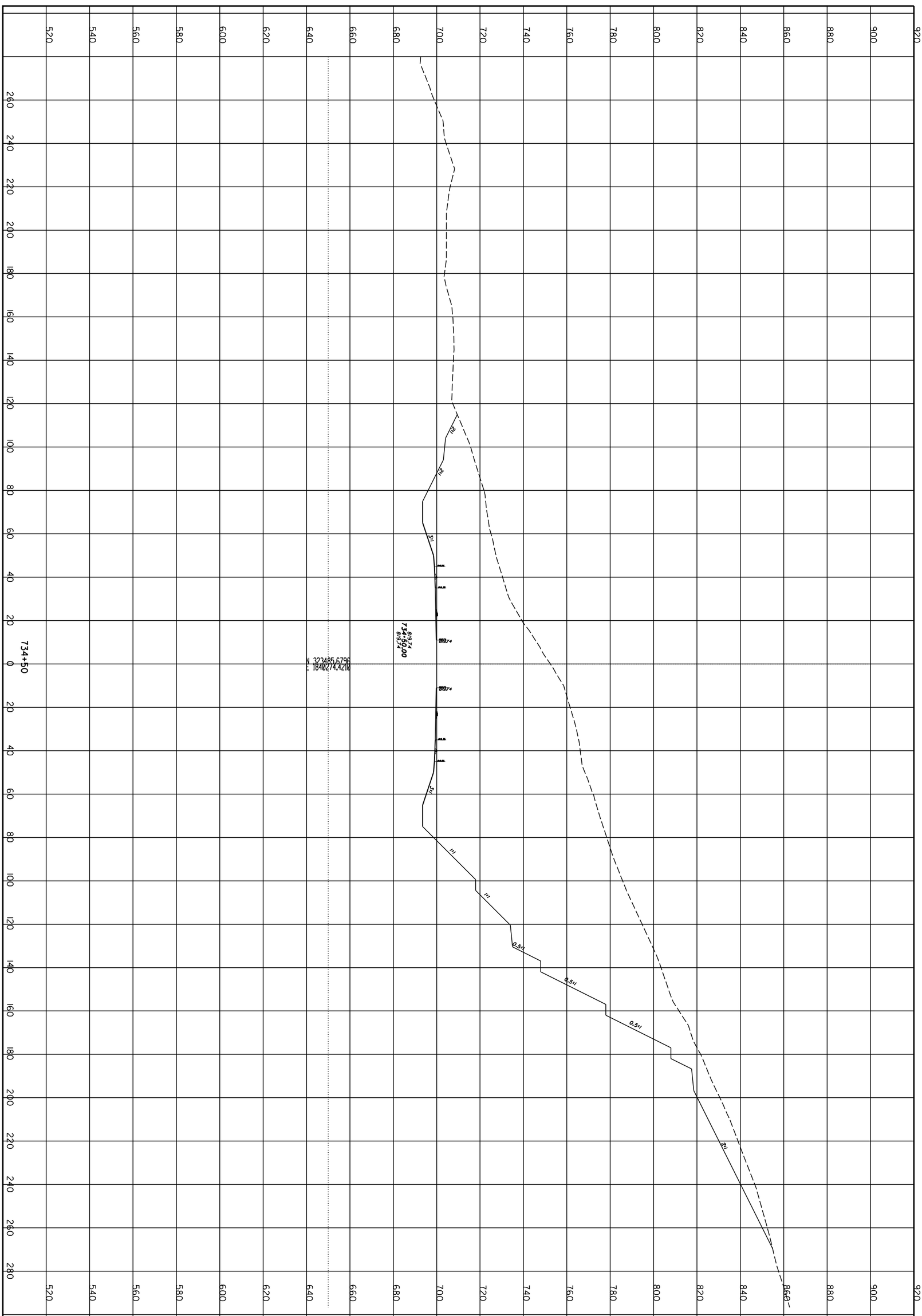
CUT SLOPE DESIGN - ROCK CUT 27
STA 734+00

817.44
734+00.00
817.44

N 1224438.926
E 1940242.144

734+00

SCI-823-10.13



20/42	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 27 STA 734+50
		CHECKED

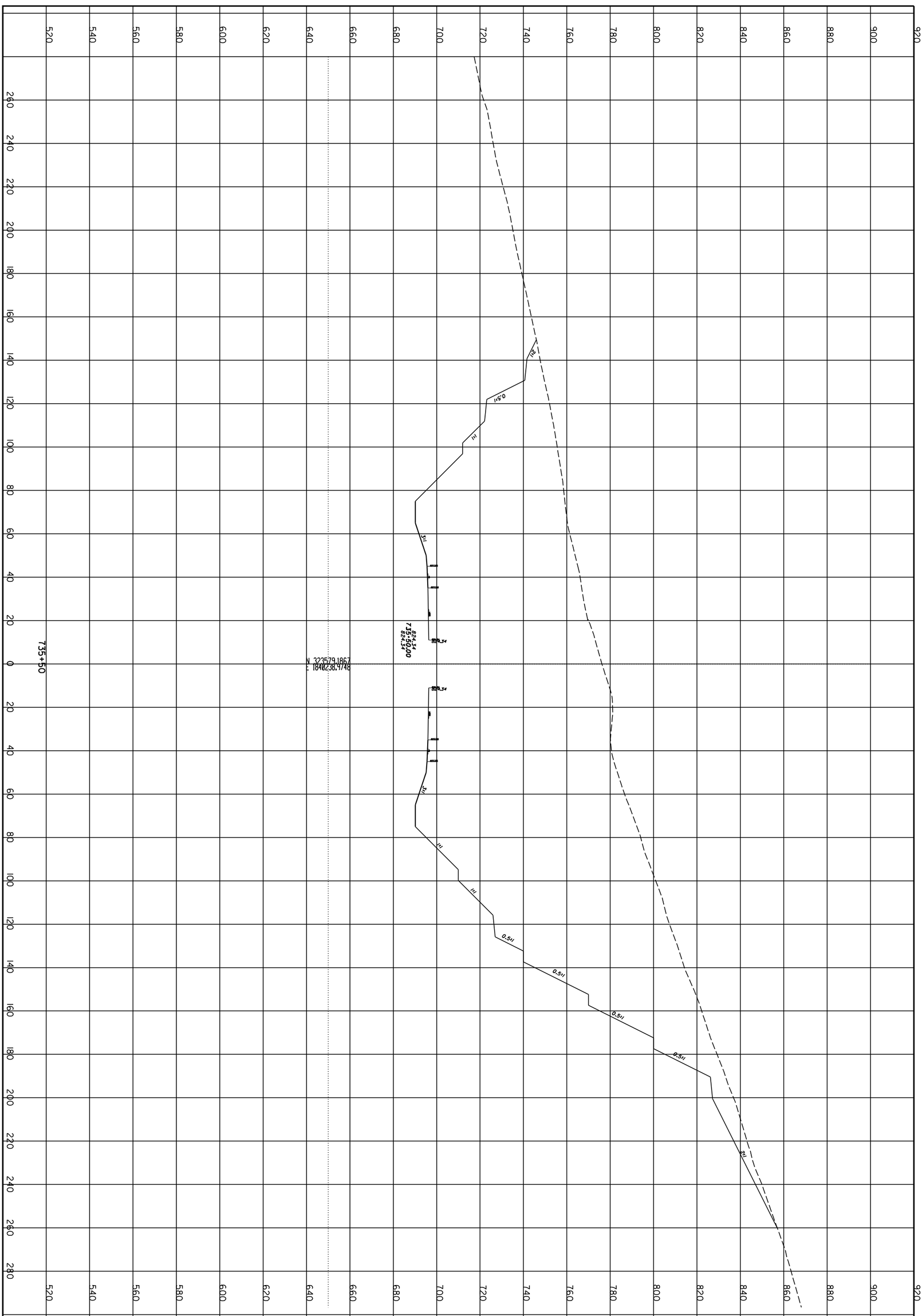
920
900
880
860
840
820
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520

2H
3H
1H
0.5H
822.04
735+00.00
822.04
N 3226132.4331
E 1840256.8974
735+00
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27 STA 735+00

SCI-823-10.13



22/42	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 27 STA 735+50	CHECKED

2H
0.5H
1H
3H
826.64
736+00.00
826.64
N 32625.9402
E 18402.2517
736+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 736+00

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 736+50

SCI-823-10.13

920
900
880
860
840
820
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
1:1
0.5:1
0.5:1
0.5:1
0.5:1
0.5:1
1:1
1:1
3:1
3:1
2:1

831.24
737+00.00
831.24

N 223719.4472
E 1640185.8058

737+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 737+00

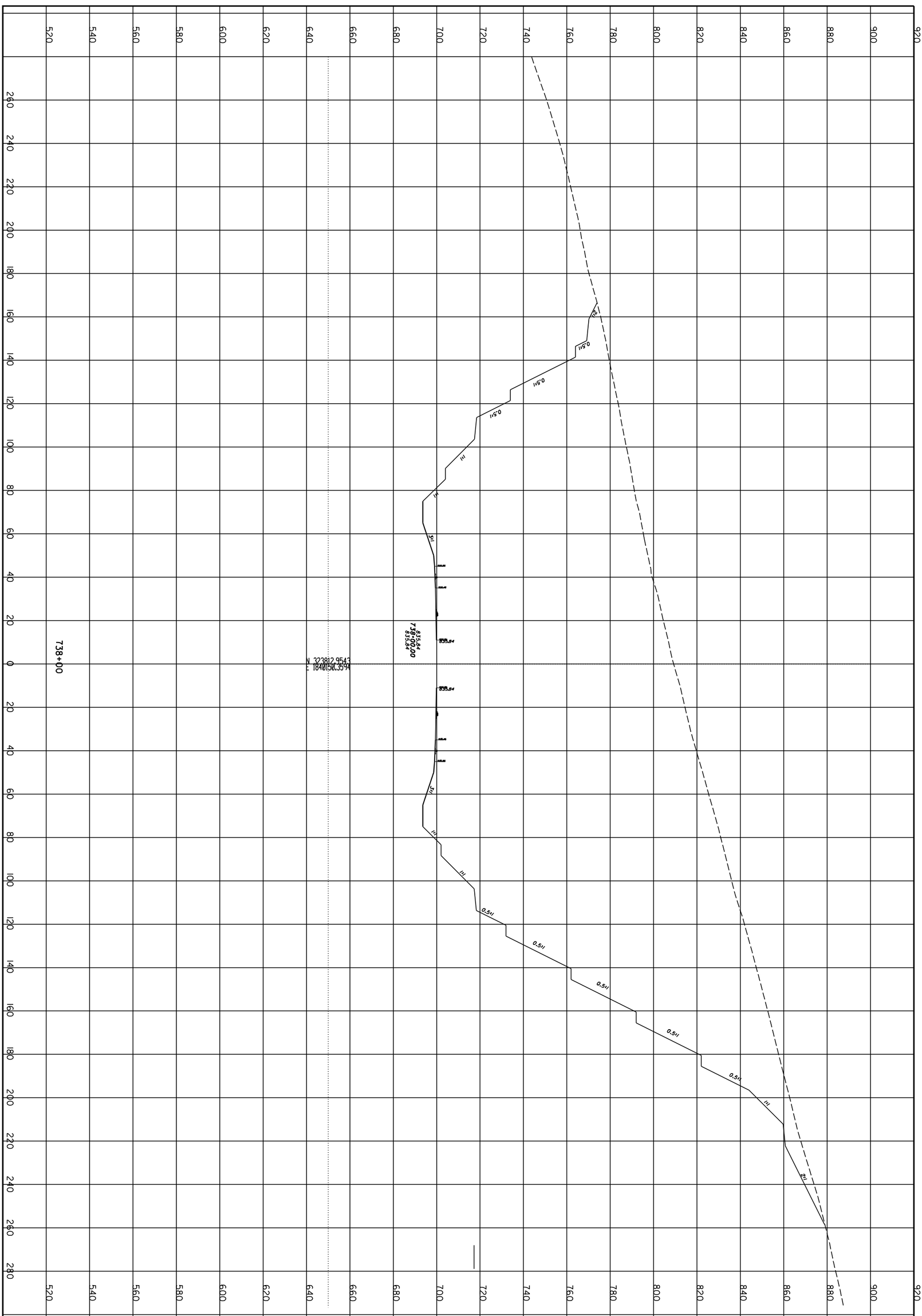
SCI-823-10.13

25
42

ROCK CUT SLOPE DESIGN - ROCK CUT 27 STA 737+50

CHECKED

SCI-823-10.13



27 / 42	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 27 STA 738+00
		CHECKED

CHECKED

CUT SLOPE DESIGN - ROCK CUT 27
STA 738+50

ROCK CUT

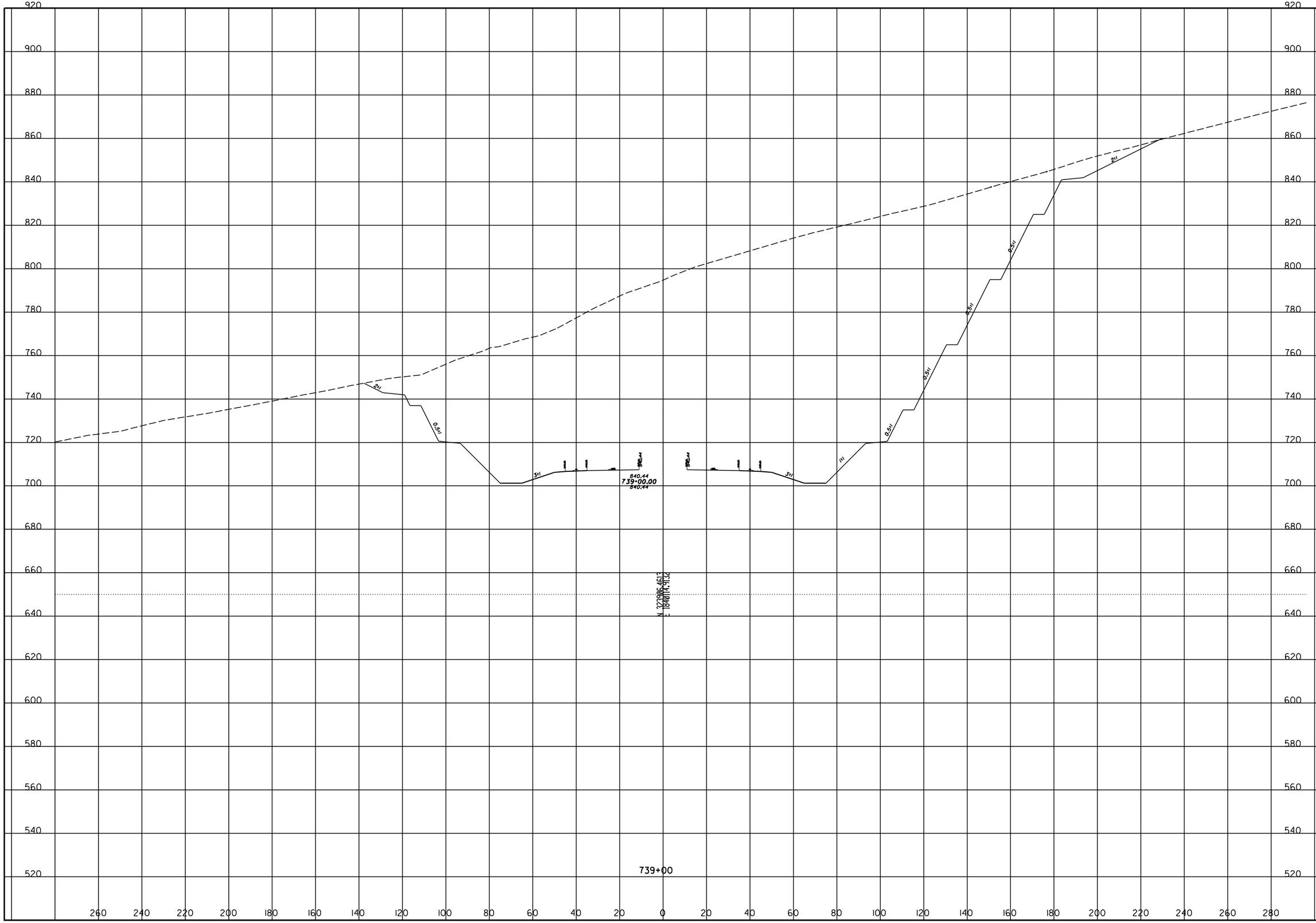
SCI-823-10.13

838.14
738+50.00
838.14

N 1938859.7078
E 1940132.8363

738+50

2:1
0.5:1
3:1
1:1



CHECKED

CUT SLOPE DESIGN - ROCK CUT 27
STA 739+00

ROCK CUT

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27 STA 739+50

842.74
739+50.00
842.74

739+50

SCI-823-10.13

920
900
880
860
840
820
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520

0.5H
1H
2H
3H

845.04
740+00.00
845.04

N 223899.9684
E 184007.4670

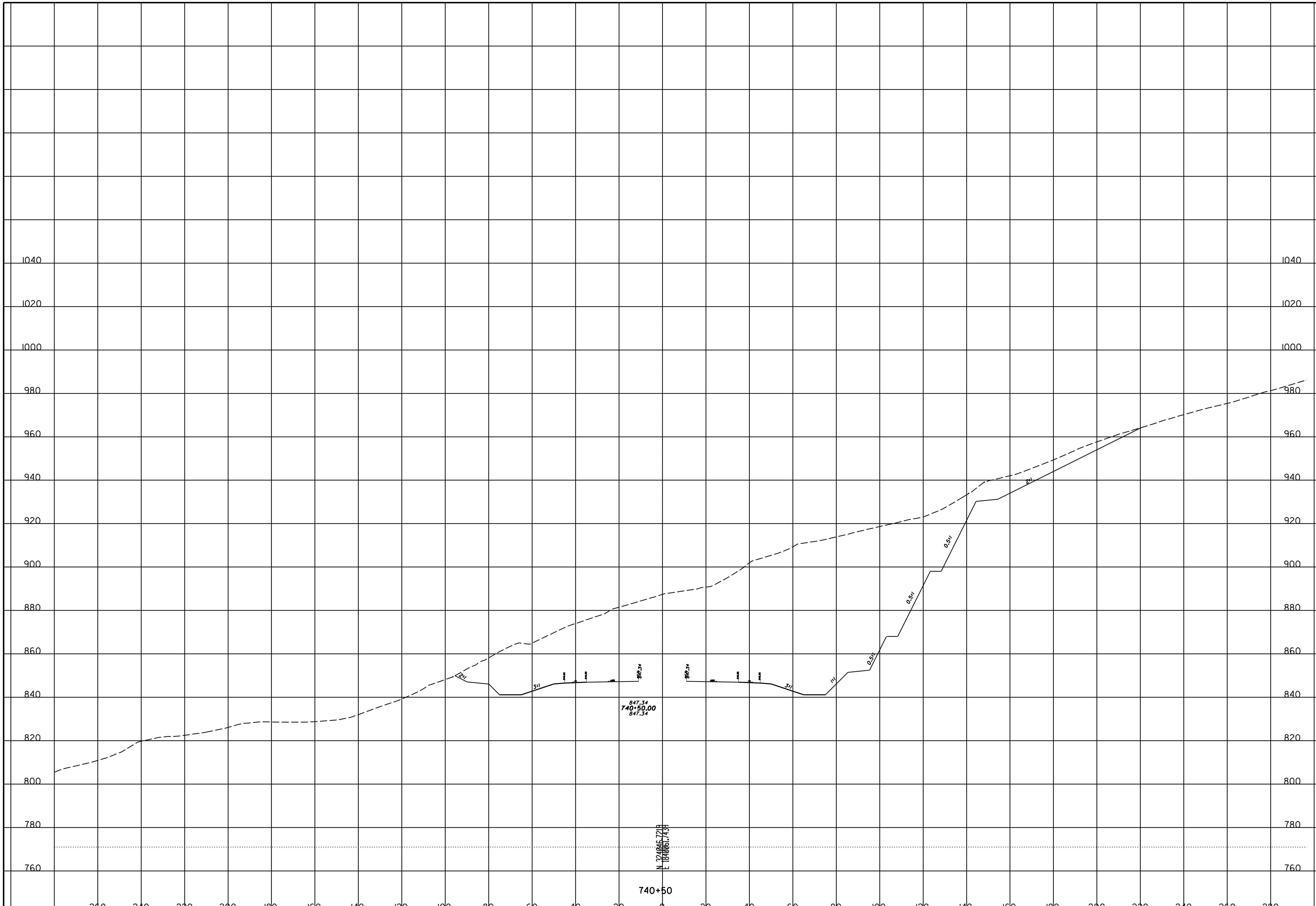
740+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27 STA 740+00

SCI-823-10.13



CHECKED

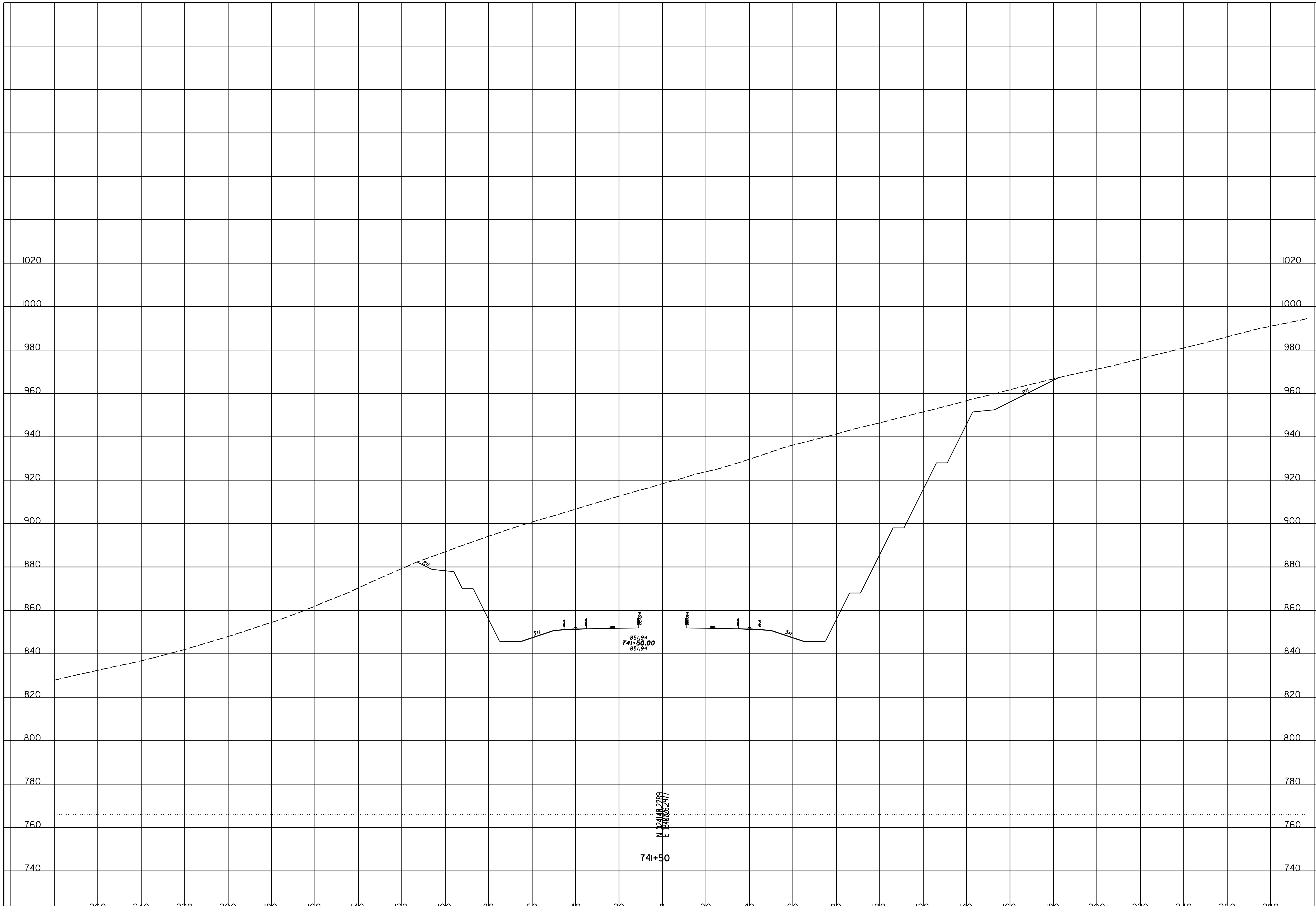
ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 740+50

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 741+00

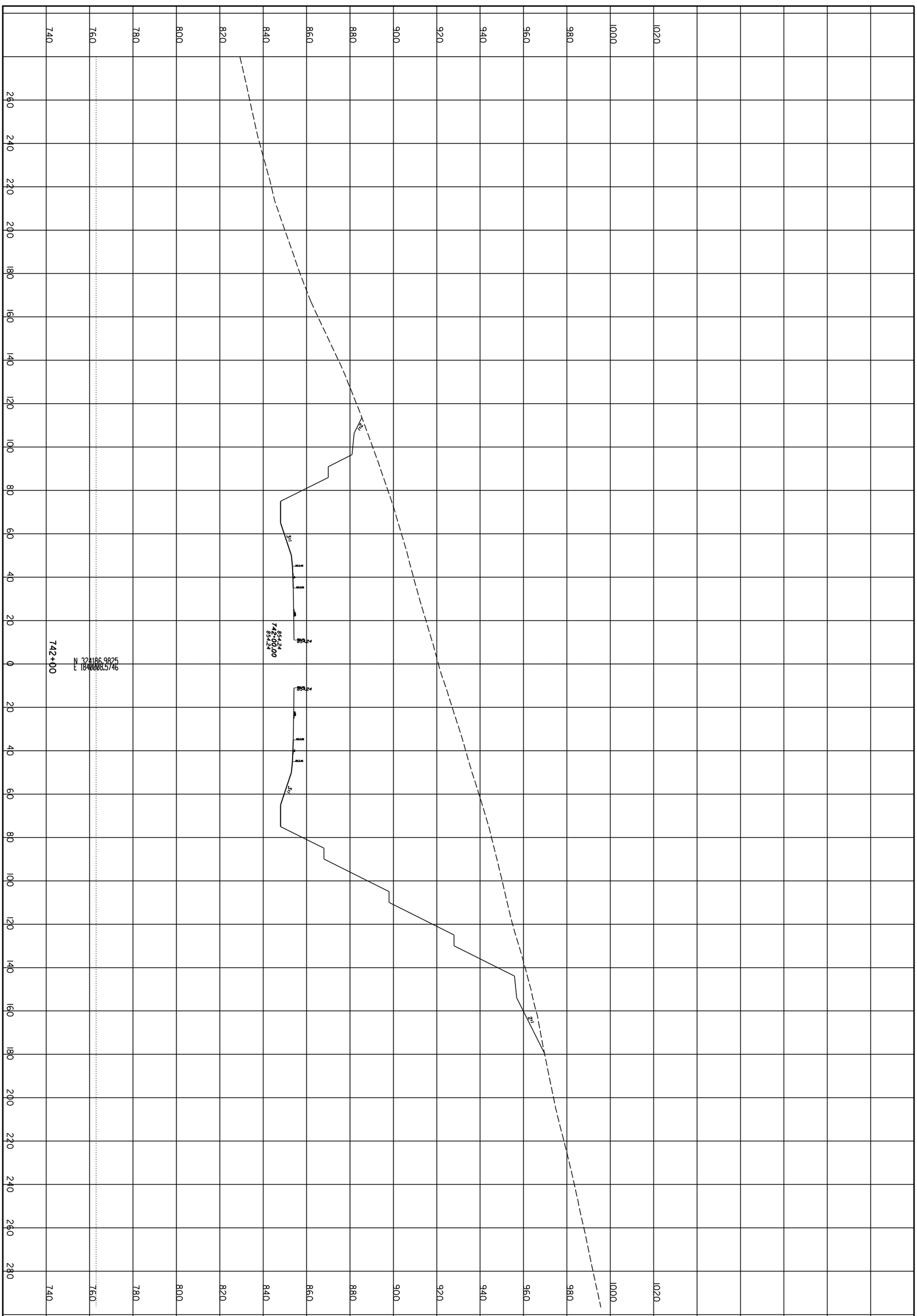
SCI-823-10.13



ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 741+50

SCI-823-10.13

CHECKED



35
42

SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 742+00

CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 742+50

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
2:1
3:1
3:1
856.54
742+50.00
856.54
N 1234733.7360
E 1834940.8515
742+50

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 743+00

858.84
743+00.00
858.84

N 324280.4895
E 183947.3128

743+00

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 743+50

SCI-823-10.13

861.14
743+50.00
861.14

N 2432722.439
E 1839653.405

743+50

900
880
860
840
820
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500

2:1
1:1
1:1
2:1

863.44
744+00.00
863.44

N 124373.9908
E 183937.6667

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

744+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27 STA 744+00

SCI-823-10.13

39
42

900
880
860
840
820
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500

865.74
744+50.00
865.74

N 1244201.7025
E 1834914.8356

744+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

CHECKED

CUT SLOPE DESIGN - ROCK CUT 27
STA 744+50

ROCK CUT

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 27
STA 745+00

SCI-823-10.13

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
3:1
2:1

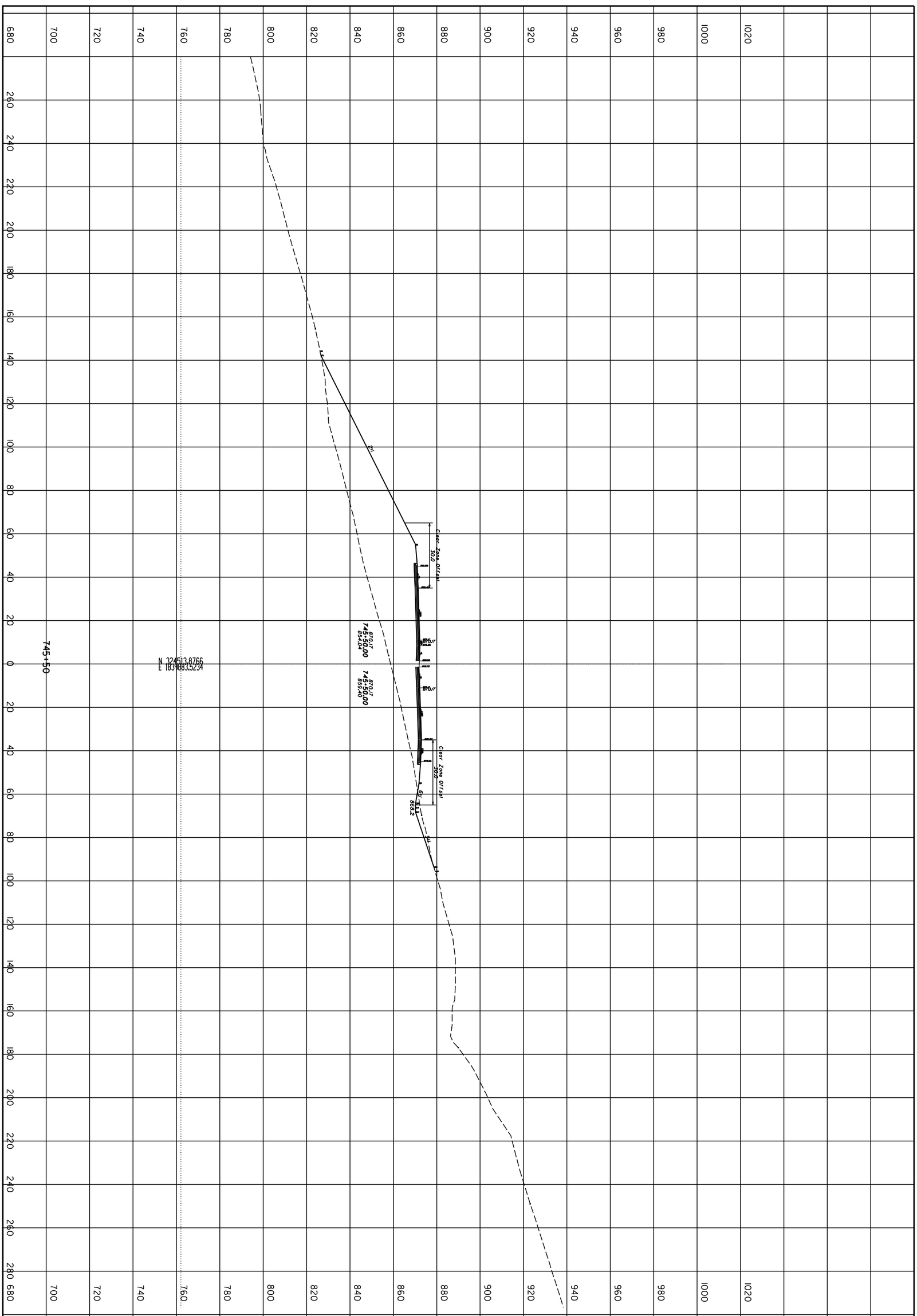
868.00
745+00.00
864.22

868.00
745+00.00
871.23

862.8

N 1234673438
E 183998138.00

745+00



42/42	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 27 STA 745+50	CHECKED

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

Clear Zone Offset 30.0
Clear Zone Offset 30.0
2:1
6:1
3:1
892.05
753+00.00
880.68
892.05
753+00.00
886.06
890.5
866.0
N 2201185.8695
E 1834552.3467
753+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28
STA 753+00

SCI-823-10.13

17

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28
STA 753+50

SCI-823-10.13

1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860

892.93
753+50.00
899.27

892.93
753+50.00
900.02

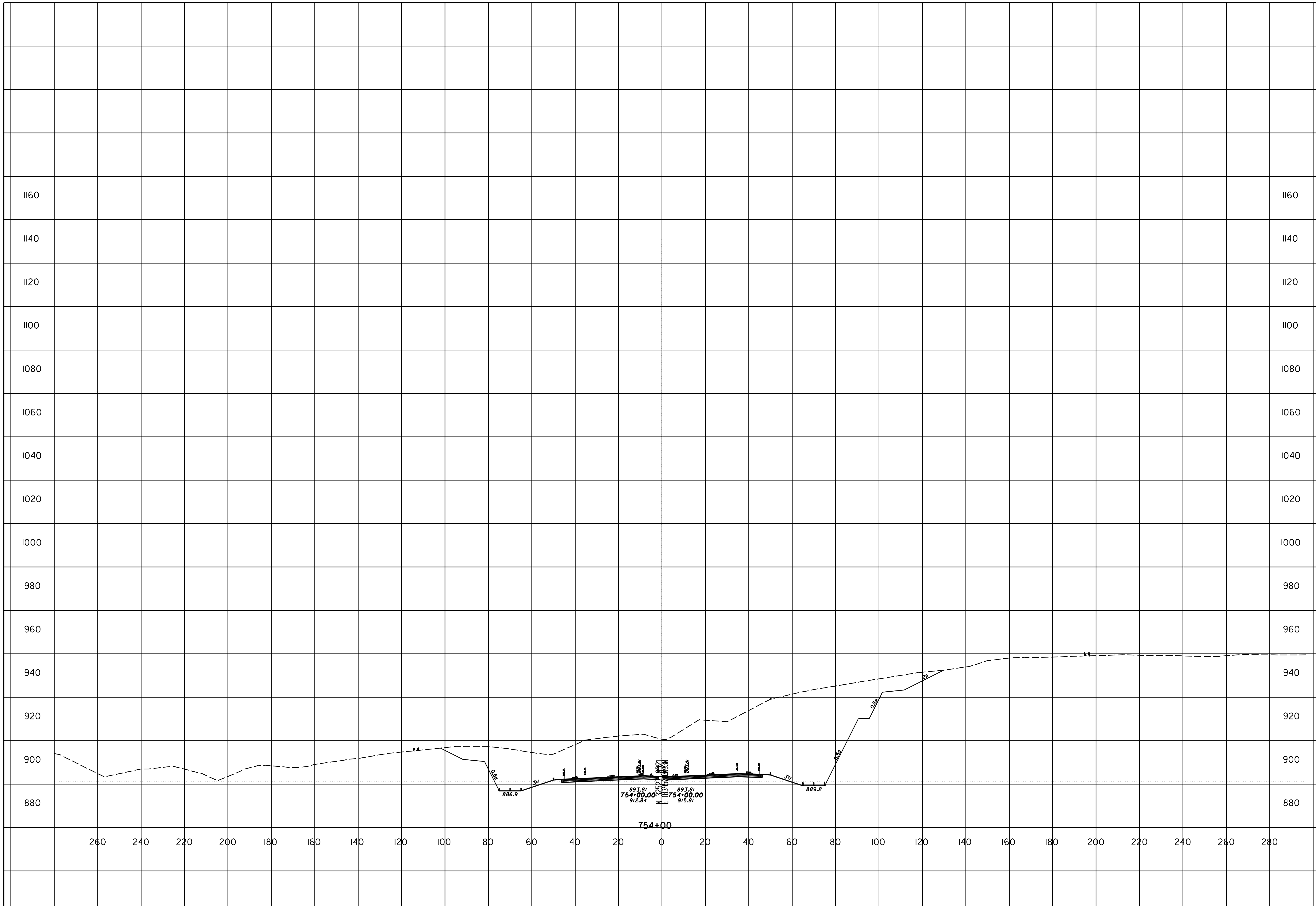
885.8

888.3

N 1225228.6235
E 1835626.4222

753+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28
STA 754+00

SCI-823-10.13

3
17

1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880

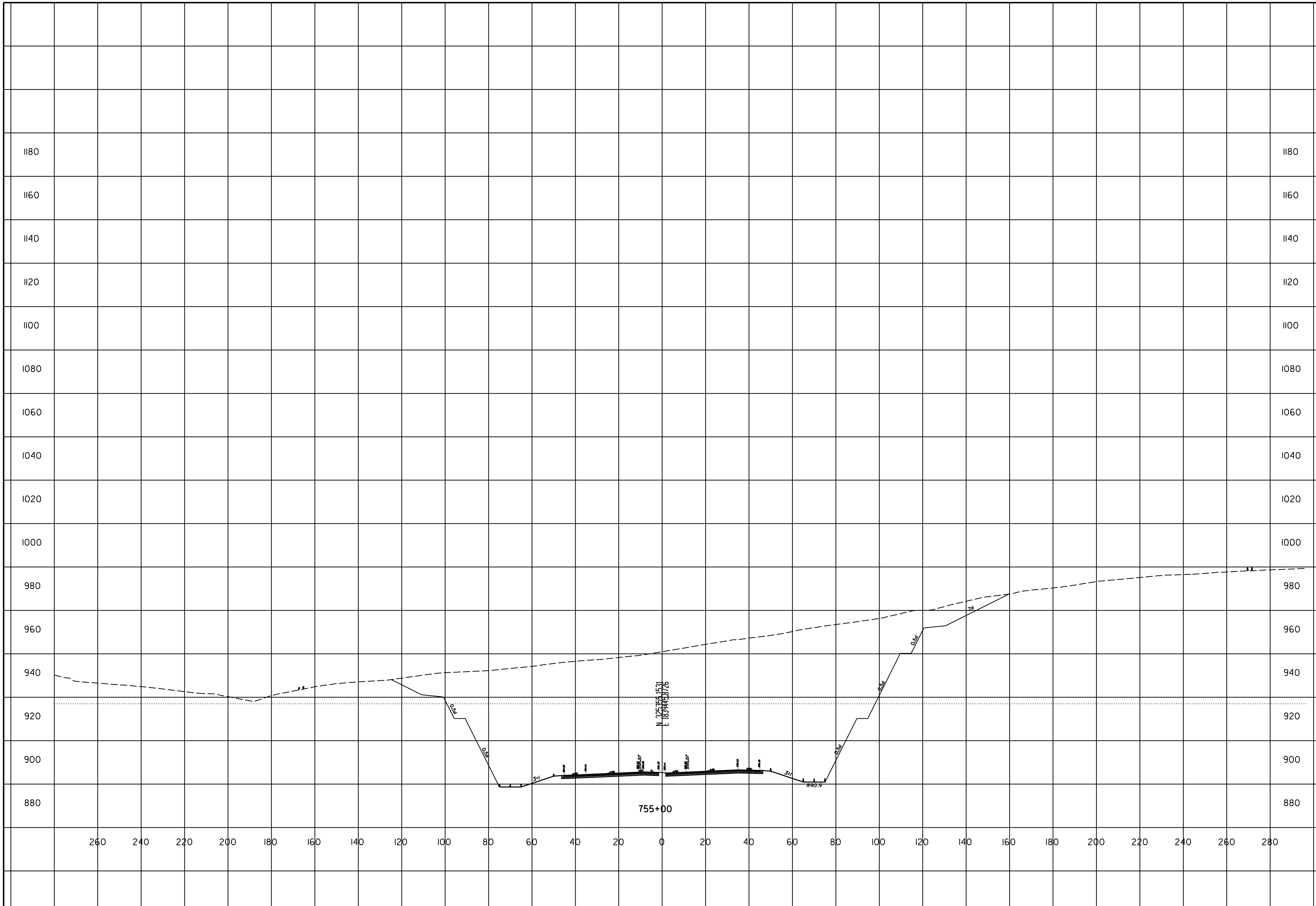
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

754+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28
STA 754+50

SCI-823-10.13



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28
STA 755+00

SCI-823-10.13

5
17

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28
STA 755+50

PSR823
755+50.00

N 1253186.7365
E 183948.1079

755+50

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28
STA 756+00

SCI-823-10.13

PSR823
756+00.00

N 325438.0126
E 1839380.8913

0.5H
0.5H
0.5H
3H
3H
0.5H
0.5H
0.5H
2H
892.7

1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

756+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28
STA 756+50

SCI-823-10.13

PSR823
756+50.00

N 325478.9794
E 183936.2268

0.5H
0.5H
0.5H
3H
3H
0.5H
0.5H
0.5H
2H
R9.1.6

1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

756+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28
STA 757+00

SCI-823-10.13

PSR823
757+00.00

N 3255196311
E 1829332115

0.5H
0.5H
0.5H
0.5H
0.5H
0.5H
2H
3:1
3:1
894.5

1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880

260 240 220 200 180 160 140 120 100 80 60 40 20 757+00 20 40 60 80 100 120 140 160 180 200 220 240 260 280

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28 STA 757+50

SCI-823-10.13

PSR823
757+50.00

N 225559.9629
E 1839307.2637

0.5H
0.5H
0.5H
0.5H
3:1
3:1
0.5H
0.5H
0.5H
2H
R95.3

757+30

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28 STA 758+00

SCI-823-10.13

1220
1200
1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880

260 240 220 200 180 160 140 120 100 80 60 40 20 758+00 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2H
0.5H
0.5H
0.5H
3H
900.84
758+00.00
900.84
758+00.00
R96.?
0.5H
0.5H
2H
N 1765189.9659
E 1834972.5734

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28
STA 758+50

SCI-823-10.13

1200
1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880

260 240 220 200 180 160 140 120 100 80 60 40 20 758+50 20 40 60 80 100 120 140 160 180 200 220 240 260 280

N 1256396.6474
E 1809242.1486

901.72
758+50.00

901.72
758+50.00

897.1

1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880

2:1
0.5:1
0.5:1
0.5:1
3:1
3:1
2:1
1:1
902.59
902.59
898.0
N 1226978.9867
E 1834211.2427
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280
759+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28
STA 759+00

SCI-823-10.13

13
17

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28
STA 759+50

SCI-823-10.13

1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

759+50

2H
0.5H
3H
5H
896.6
903.47
759+50.00
936.29
903.47
759+50.00
937.01
3H
898.9
2H

1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2d
0.5H
0.5H
3:1
897.4
904.35
760+00.00
919.18
904.35
760+00.00
913.10
4:1
N 1225766.6568
E 1839148.3028
760+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28
STA 760+00

SCI-823-10.13

15
17

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

760+50

2H
0.5H
898.3
3H
Clear Zone Offset
30.0
905.23
760+50.00
900.64
905.23
760+50.00
894.99
Clear Zone Offset
30.0
2H
862.8
N 325794.9584
E 183911.1762

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28
STA 760+50

SCI-823-10.13

16
17

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

Clear Zone Offset 30.0

6:1

2:1

898.2

906.11
761+00.00
872.37

N 3758132.9283
E 1839883.6336

761+00

Clear Zone Offset 30.0

906.11
761+00.00
875.19

2:1

2:1

869.8

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 28 STA 761+00

SCI-823-10.13

17
17

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

922.09
791+50.00
870.09

896.13

885.8

2H:1

4H:1

N 1227330.80034
E 1838491.21000

791+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 791+50

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 792+00

SCI-823-10.13

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

920.24
792+00.00
862.38

2:1
2:1
4:1
4:1

N 327340.0386
E 183642.0705

792+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 792+50

SCI-823-10.13

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
4:1
2:1
4:1

880.18
918.28
792+50.00
840.09
874.40

N 327348.7372
E 1836928.8333

792+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 793+00

SCI-823-10.13

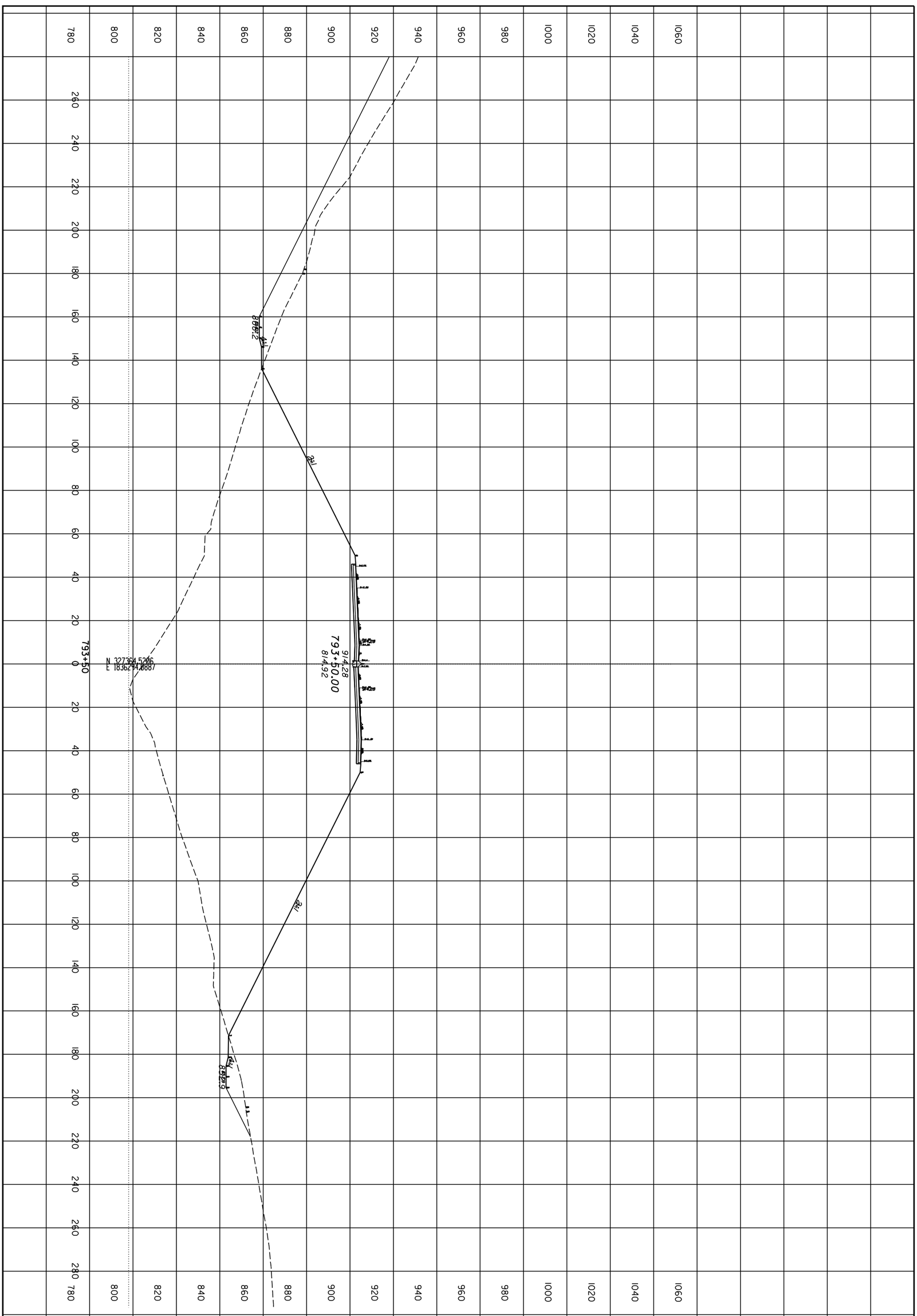
916.28
793+00.00
817.72

875.7

885.3

N 1273568982
E 1836335040

793+00



38 / 48	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 29 STA 793+50
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 794+00

SCI-823-10.13

912.28
794+00.00
819.40

2:1

2:1

4:1
858.7

4:1
841.18

N 3237316.035
E 1836244.5932

794+00

1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 794+50

SCI-823-10.13

910.28
794+50.00
819.13

2:1

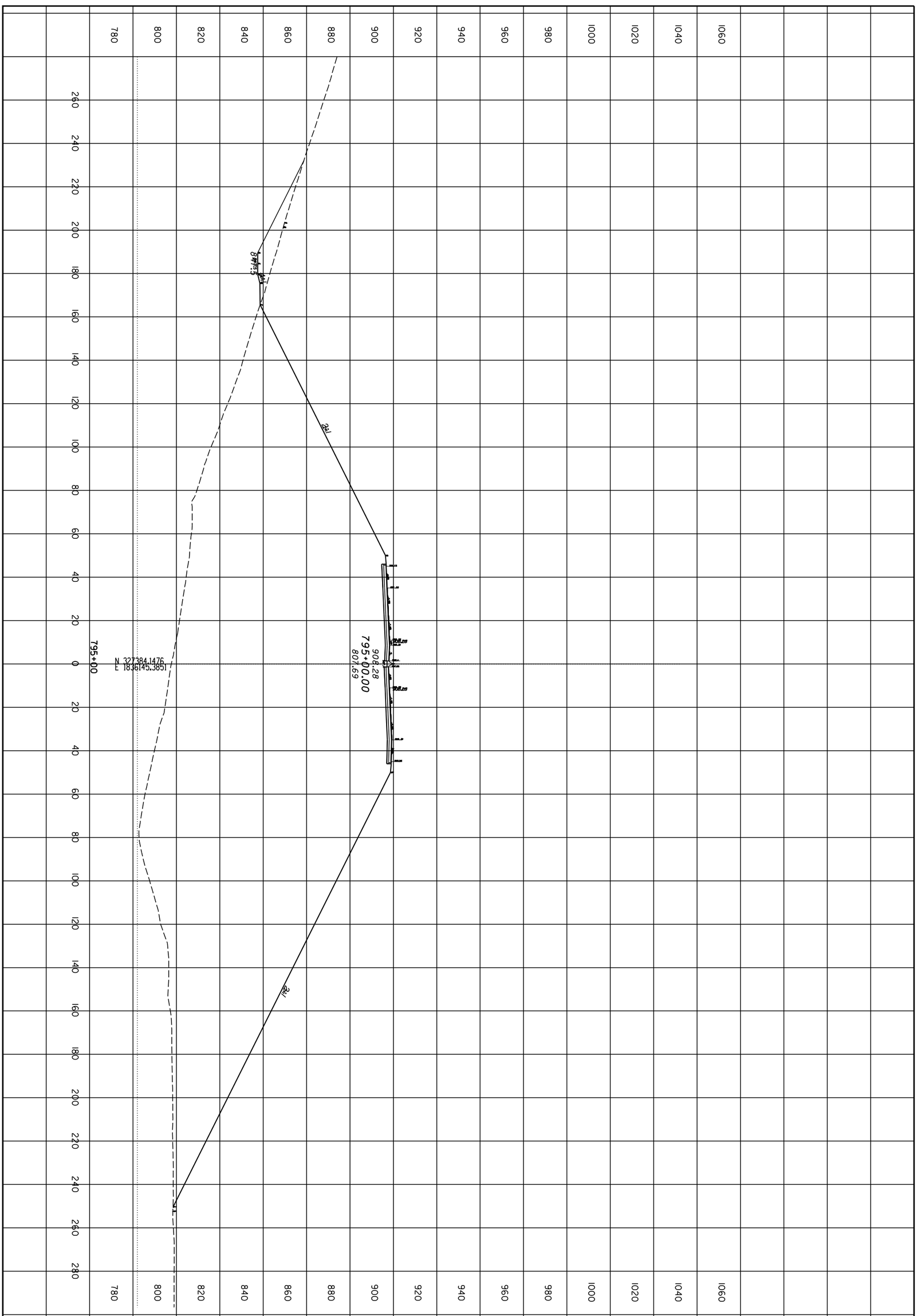
4:1

849.7

2:1

N 1327378.1461
E 1836195.0233

794+50



41
48

SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 795+00

CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 795+50

906.28
795+50.00
802.81

2H:1V

849.2

2H:1V

2H:1V

795.8

N 127389.6073
E 183695.6843

795+50

SCI-823-10.13

CHECKED

SLOPE DESIGN - ROCK CUT 29
STA 796+00

ROCK CUT SLOPE

SCI-823-10.13

904.28
796+00.00
805.71

2H:1V

2H:1V

2H:1V

841.16

N 1327304.5245
E 1838045.2269

796+00

CHECKED

SLOPE DESIGN - ROCK CUT 29
STA 796+50

ROCK CUT SLOPE

SCI-823-10.13

902.28
796+50.00
820.65

842.7

2:1
4:1
2:1
2:1

N 32738.8887
E 18359416.1189

796+50

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 797+00

SCI-823-10.13

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

900.28
797+00.00
835.81

846.5

2H:1

N 327402.7293
E 1835946.2661

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

797+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 797+50

SCI-823-10.13

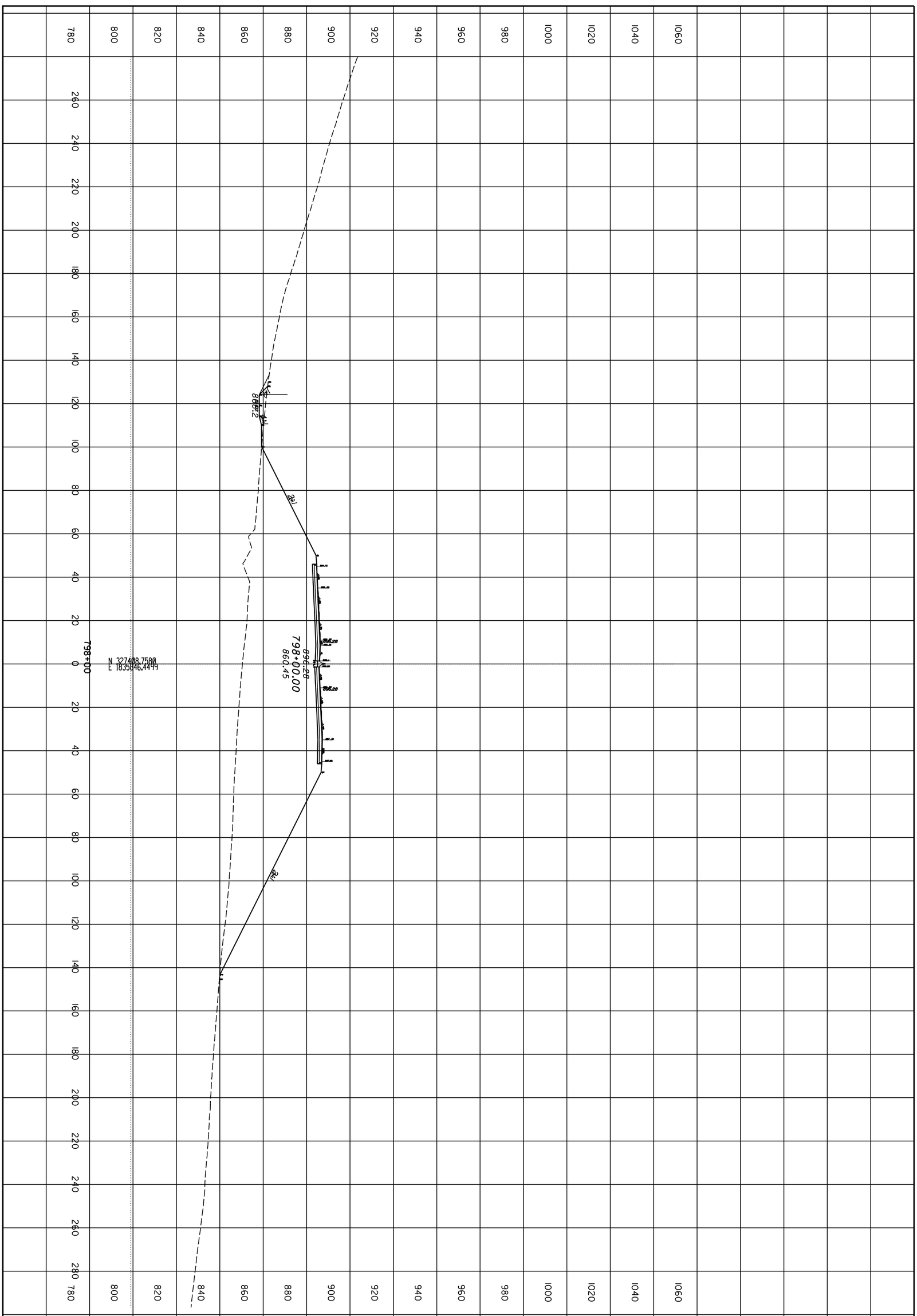
898.28
797+50.00
847.45

856.2

2H:1V

N 3277406.0158
E 1835896.3744

797+50

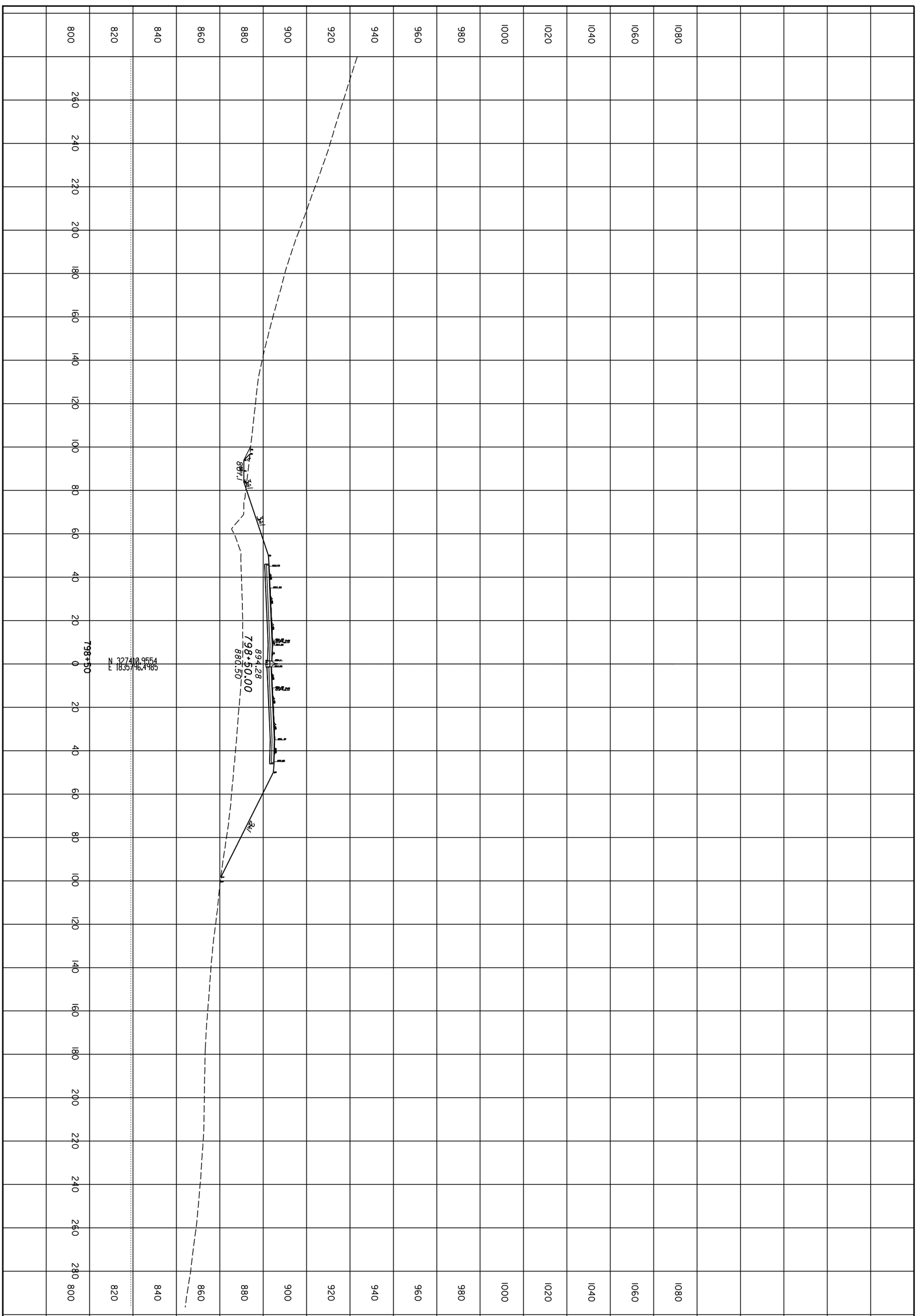


47
48

SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 798+00

CHECKED



48 / 48	SCI-823-10.13	ROCK CUT SLOPE DESIGN - ROCK CUT 29 STA 798+50	CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 775+00

SCI-823-10.13

1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920

PSR823
775+50.00

937.59
775+50.00

937.59
775+50.00

927.0

775+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29 STA 775+50

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 776+00

SCI-823-10.13

PSR823
776+00.00

N 3256786.9381
E 1837934.8622

0.5H
0.5H
3H
3H
0.5H
RB
932.47
932.47
977.8

776+00

1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 776+50

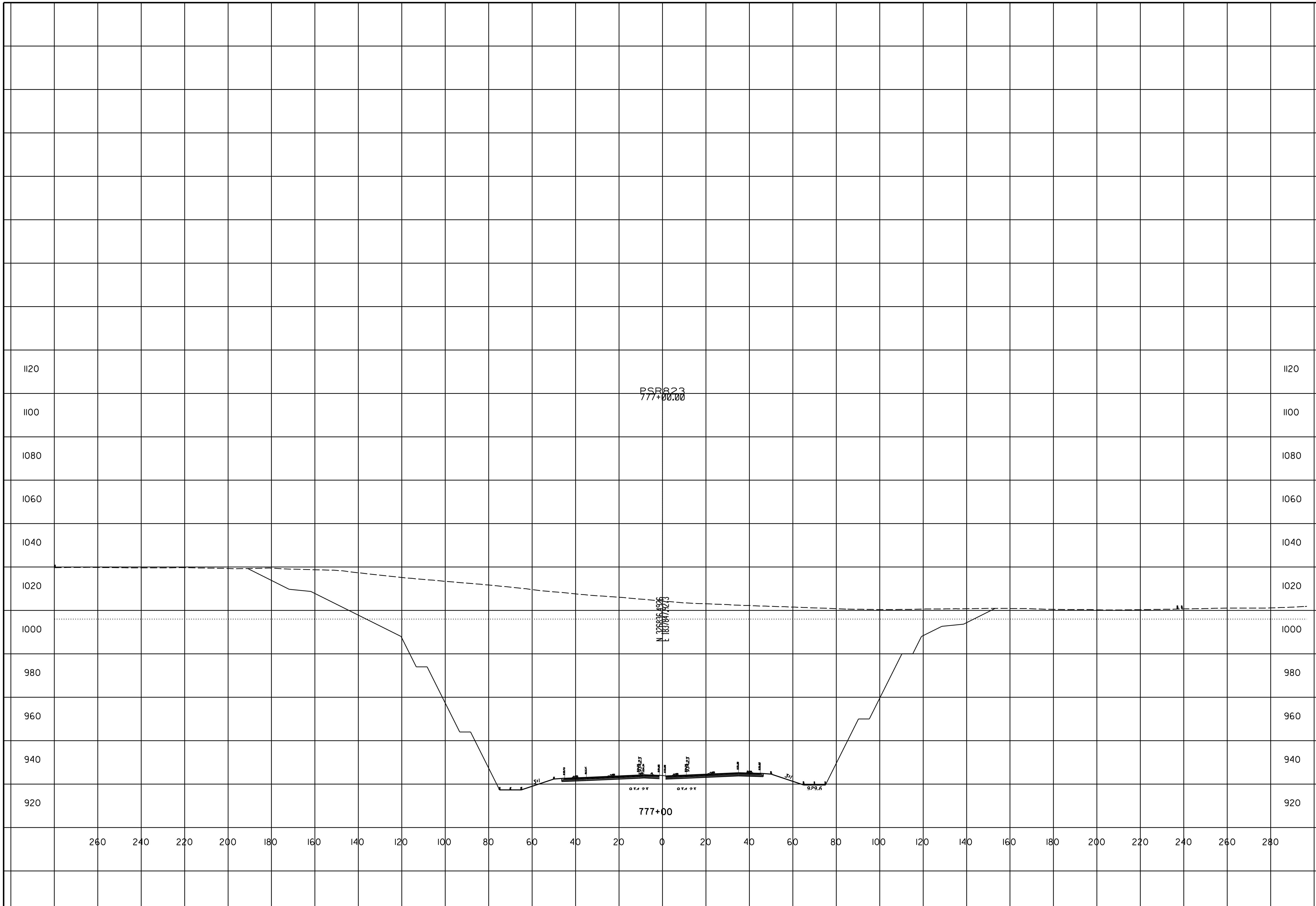
SCI-823-10.13

PSR823
776+50.00

N 32881.9822
E 18378.1.4804

933.35
933.35
978.7

776+50

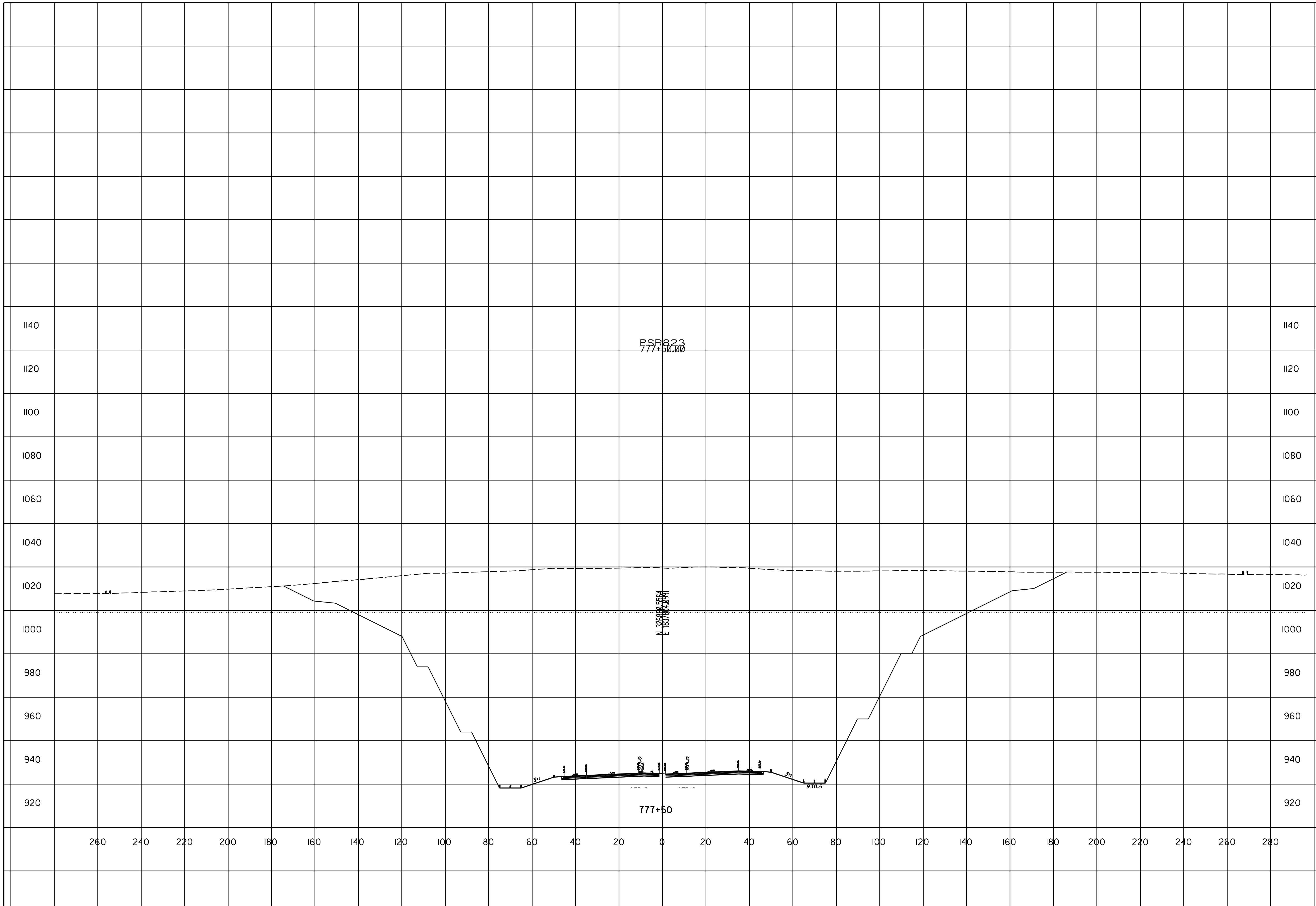


CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 777+00

SCI-823-10.13

5
48



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 777+50

SCI-823-10.13

6
48

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 778+00

SCI-823-10.13

PSR823
778+00.00

N 3268841.1406
E 1837760.0112

778+00

PSR823
778+50.00

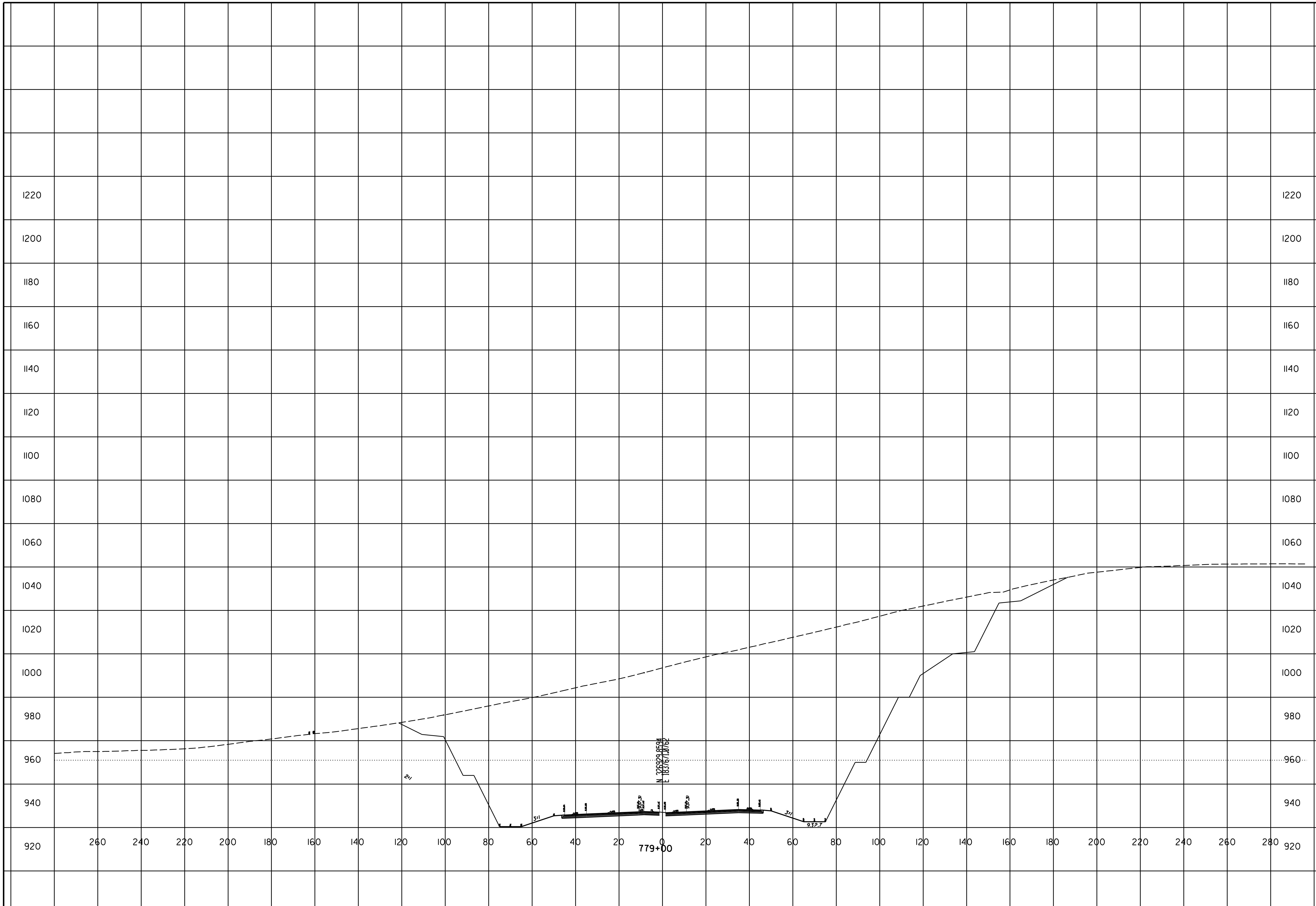
N 3269017.2445
E 1837715.6883

778+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29 STA 778+50

SCI-823-10.13



ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 779+00

SCI-823-10.13

CHECKED

1200
1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

930.9
933.2
3:1
3:1
779+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 779+50

SCI-823-10.13

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 780+00

SCI-823-10.13

II
48

1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

938.30
780+00.00
980.29

938.30
780+00.00
988.13

N 1269726.6272
E 1837981.0653

780+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 780+50

SCI-823-10.13

1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2H
1V
931.7
938.65
780+50.00
974.18
938.65
780+50.00
982.52
1V
934.0

N 326394.7729
E 183755.8571

780+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 781+00

SCI-823-10.13

1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
932.0
3:1
938.90
781+00.00
971.72
938.90
781+00.00
980.66
3:1
934.3

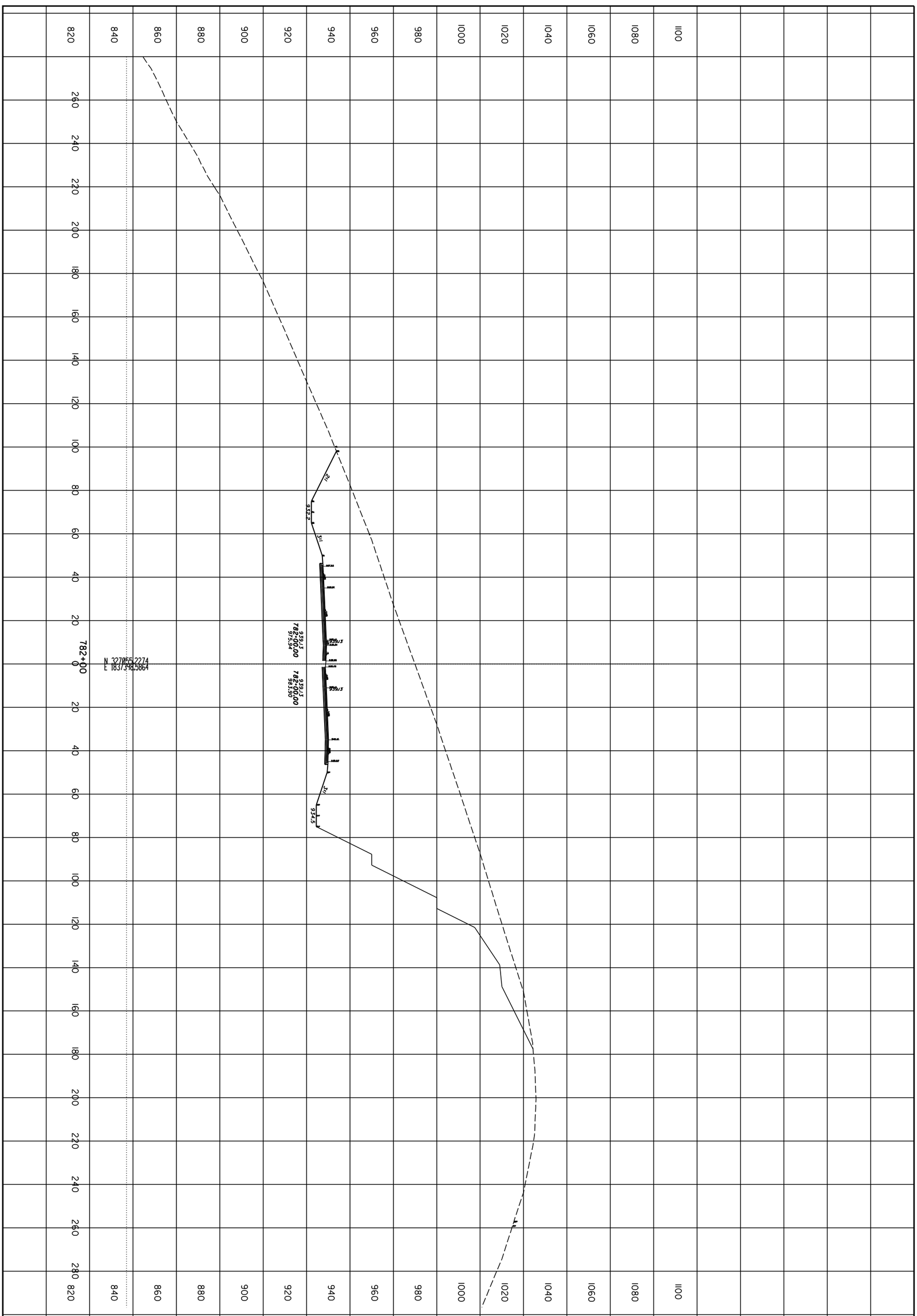
N 1627065.4232
E 1837490.3265

781+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 781+50

SCI-823-10.13



SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 782+00

CHECKED

15
48

CHECKED

SLOPE DESIGN - ROCK CUT 29
STA 782+50

ROCK CUT SLOPE

SCI-823-10.13

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

932.2
3:1
939.09
782+50.00
978.75
939.09
782+50.00
986.69
3:1
934.5

N 1270174.3787
E 1837562.3869

782+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 783+00

SCI-823-10.13

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

932.1
938.96
783+00.00
977.91
938.96
783+00.00
985.76
934.3
3:1
3:1

N 1277833.0211
E 1837965.0653

783+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 783+50

SCI-823-10.13

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 **783+50** 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
931.8
3:1
938.74
783+50.00
974.02
938.74
783+50.00
982.68
3:1
934.1

N 3271411532
E 1837295412

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 784+00

SCI-823-10.13

2:1
5:1
931.5
938.42
784+00.00
969.93
938.42
784+00.00
979.15
5:1
933.8
N 1321128.7860
E 1831212.8219
784+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 784+50

SCI-823-10.13

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2H
931.1
3H
938.00
784+50.00
970.23
938.00
784+50.00
978.21
3H
933.4

N 327145.9024
E 183765.6431

784+50

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
930.6
3:1
937.49
785+00.00
971.31
937.49
785+00.00
979.68
3:1
932.9

N 3271625.0054
E 1837184.8865

785+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 785+00

SCI-823-10.13

21
48

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 785+50

SCI-823-10.13

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

785+50

N 32778.5923
E 183701.395

930.0

3:1

936.88
785+50.00
974.57

936.88
785+50.00
983.77

3:1

932.5

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 786+00

SCI-823-10.13

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

786+00

N 327194.1630
E 1837023.5258

929.3

3:1

936.18
786+00.00
983.82

936.18
786+00.00
991.31

931.6

3:1

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 786+50

928.5

3:1

935.37
786+50.00
992.89

935.37
786+50.00
999.81

3:1

930.8

N 3272013.2139
E 1863715.5452

786+50

SCI-823-10.13

CHECKED

SLOPE DESIGN - ROCK CUT 29
STA 787+00

ROCK CUT SLOPE

SCI-823-10.13

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 787+50

SCI-823-10.13

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

926.6
311
933.49
787+50.00
1004.92
955.49
933.49
787+50.00
1006.64
955.49
311
928.9

N 1227237.7510
E 1836882.0255

787+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 788+00

SCI-823-10.13

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

2:1
3:1
925.5
932.40
788+00.00
997.76
932.40
788+00.00
995.72
927.8
N 327261.2338
E 1836831.9580
788+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 788+50

SCI-823-10.13

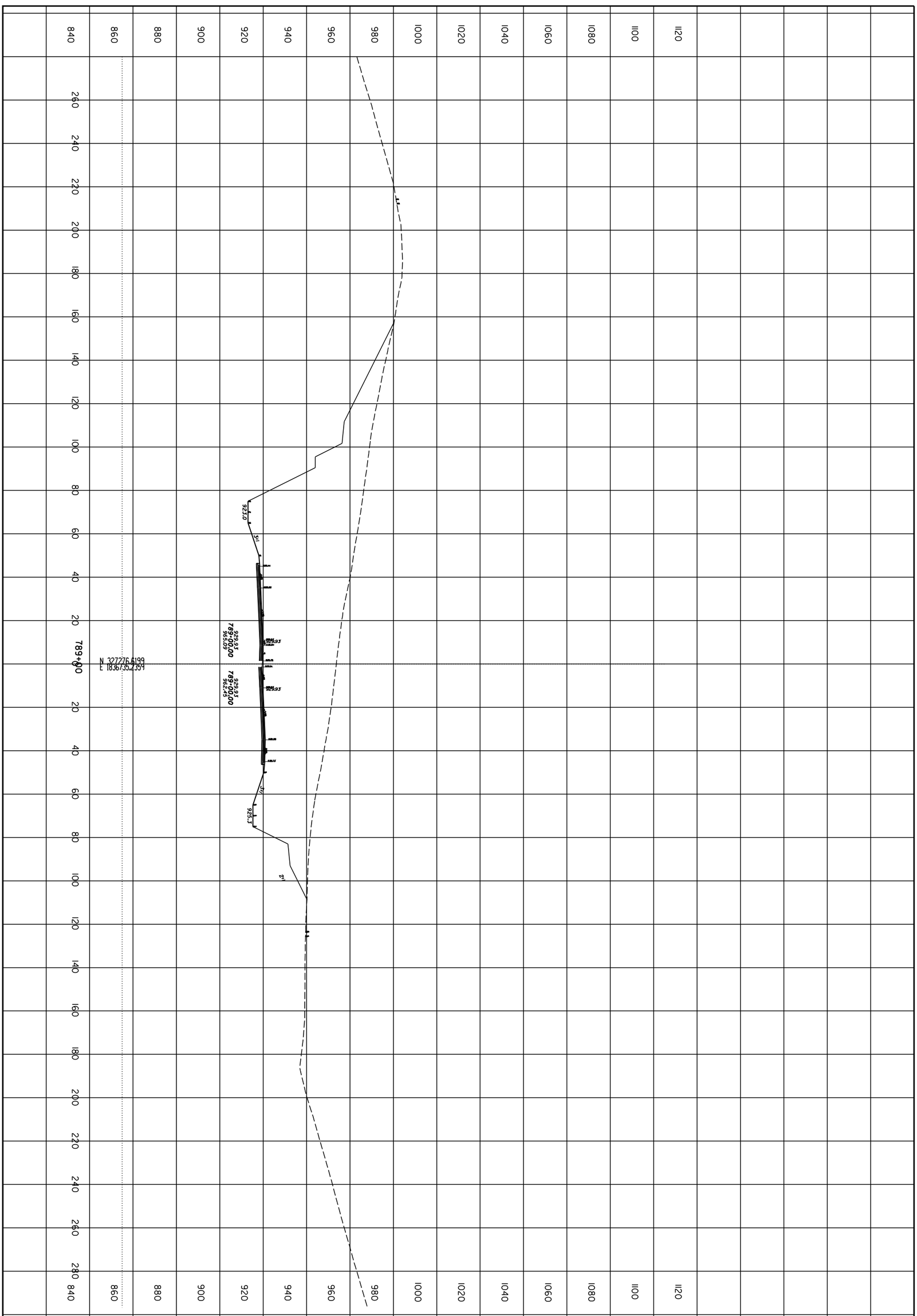
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

924.3
931.21
788+50.00
979.89
931.21
788+50.00
977.33
926.6

N 1272564.1906
E 1836783.8862

788+50

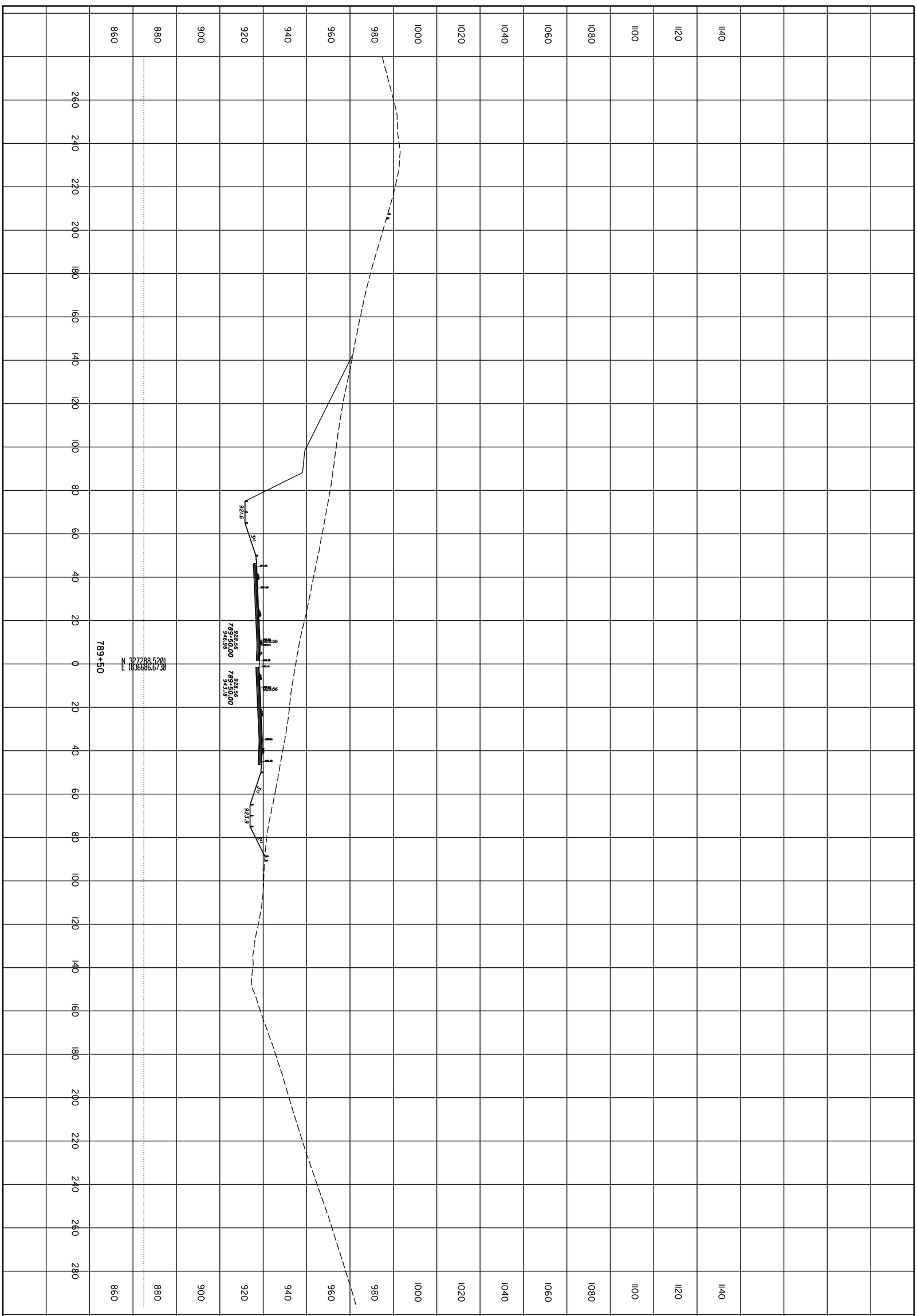


29
48

SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 789+00

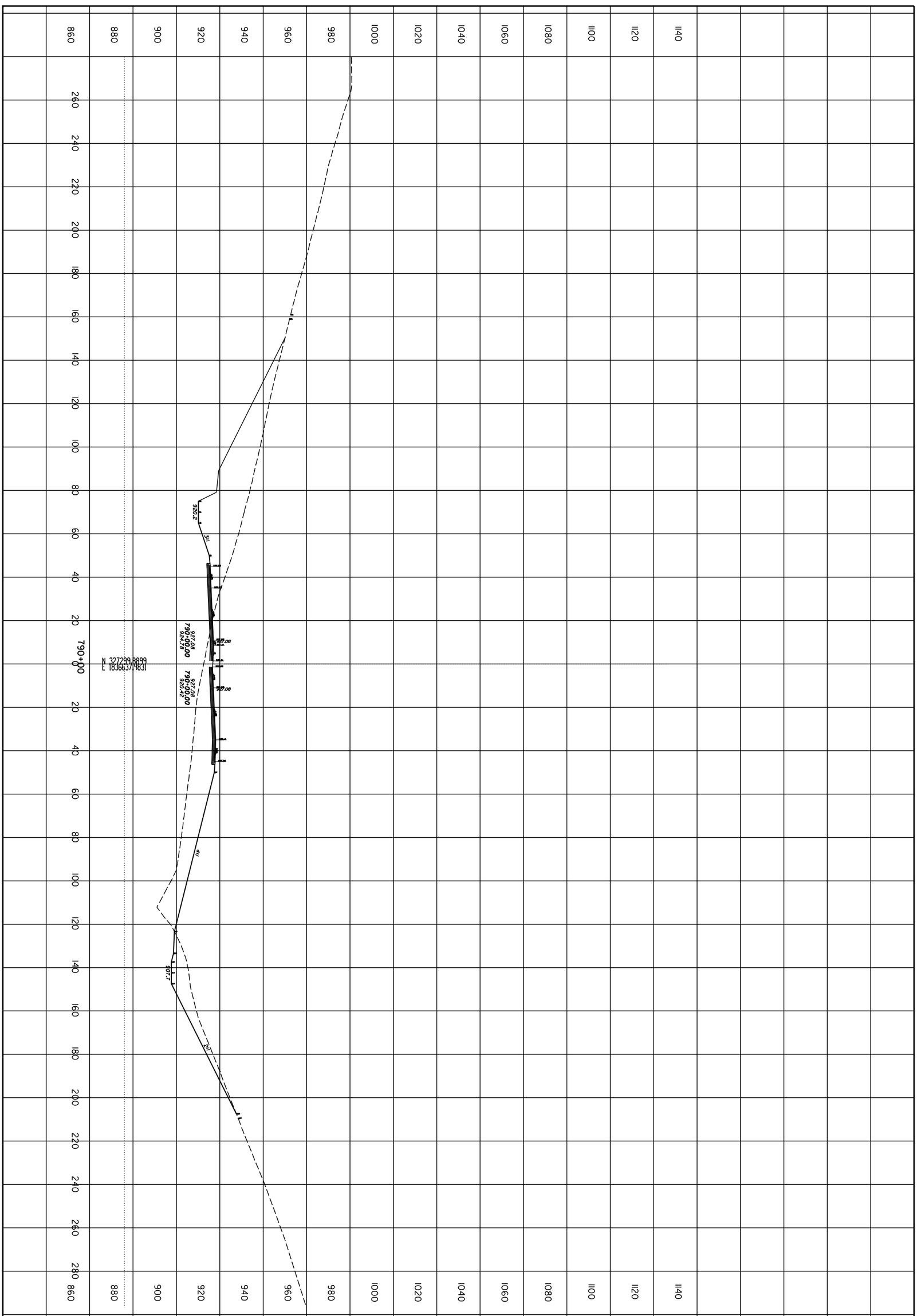
CHECKED



SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 789+50

CHECKED



31/48	**SCI-823-10.13**	**ROCK CUT SLOPE DESIGN - ROCK CUT 29** **STA 790+00**
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 790+50

SCI-823-10.13

1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280

790+50

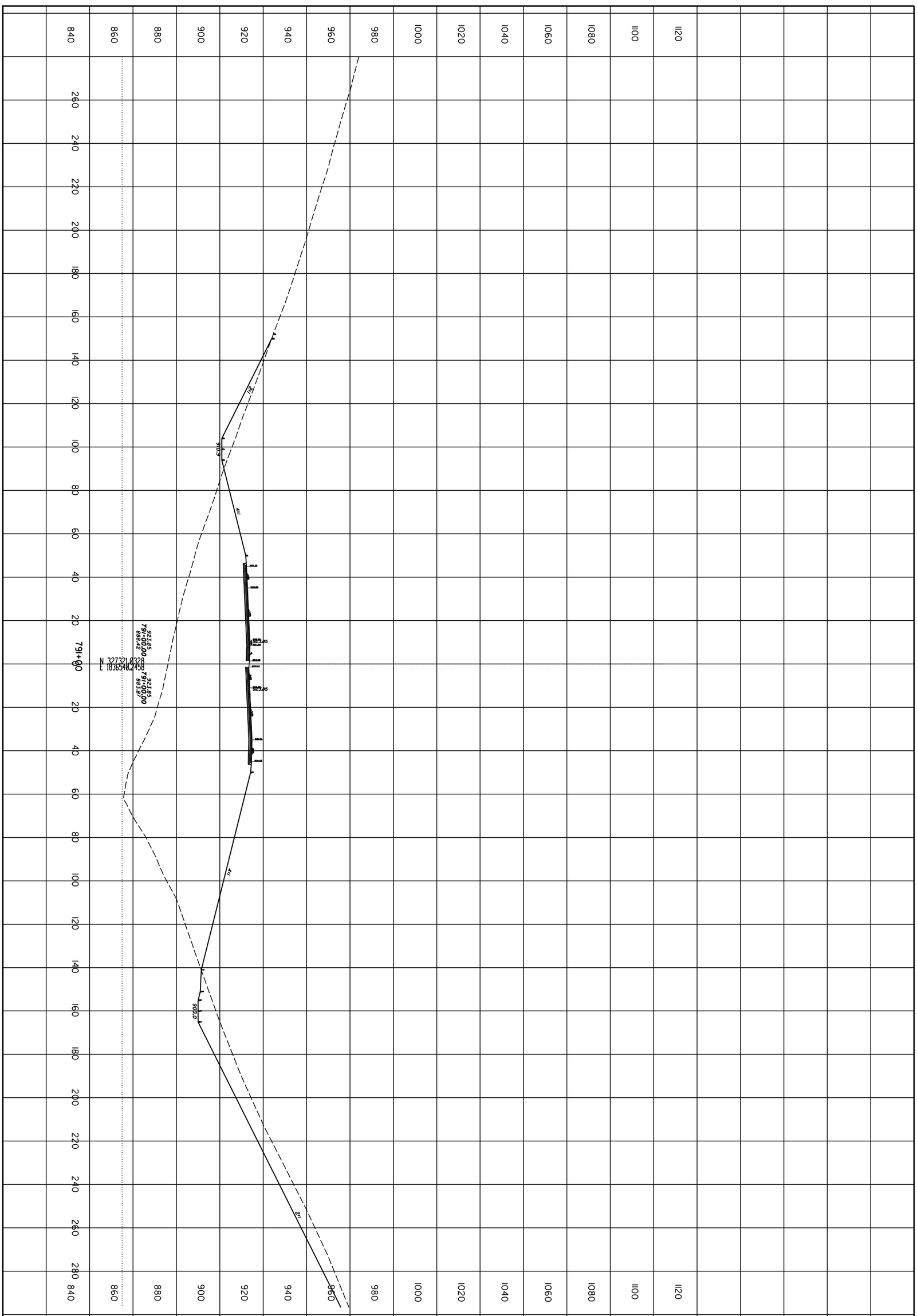
2:1
3:1
4:1
2:1

918.6
901.8

925.52
790+50.00
904.80

925.52
790+50.00
901.56

N 327310.7229
E 1836594.1721



SCI-823-10.13

ROCK CUT SLOPE DESIGN - ROCK CUT 29
STA 791+00

CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 799+00

SCI-823-6.81

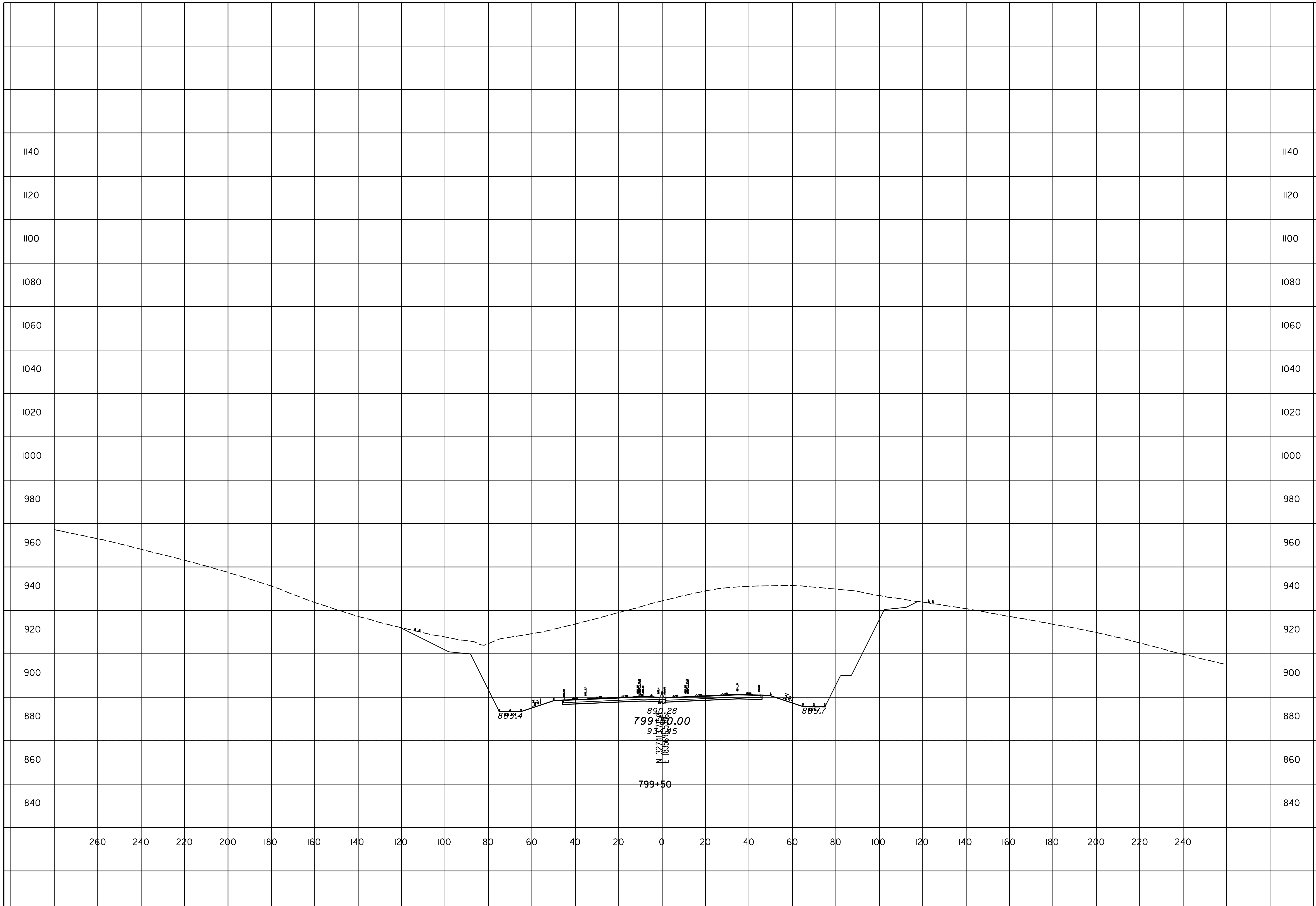
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

892.28
799+00.00
908.18

N 3274126078
E 1835746.3261

799+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 799+50

SCI-823-6.81

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 800+00

SCI-823-6.81

1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

N 327414.2763
E 183646.5420

800+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 800+50

SCI-823-6.81

CLPS823
800+50.00

N 127414.2934
E 18355.96.5422

800+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 801+00

SCI-823-6.81

CLPS823
801+00.00

N 327413.7644
E 1835546.5453

801+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30 STA 801+50

SCI-823-6.81

CLPS823
801+50.00

N 32412.6902
E 18354.9571

801+50

CLPS823
802+00.00

N 3274111.0707
E 1835146.5635

802+00

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 802+00

CHECKED

SCI-823-6.81

1220
1200
1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

N 327488.3962
E 183536.6307

802+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 802+50

SCI-823-6.81

1220
1200
1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860

N 1274961.963
E 1835346.7044

803+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 803+00

SCI-823-6.81

1220
1200
1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

N 1274092.9432
E 1835246.8106

803+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 803+50

SCI-823-6.81

10
39

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 804+00

SCI-823-6.81

1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

N 1273948041
E 1835191.1444

804+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 804+50

SCI-823-6.81

12
39

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 805+00

SCI-823-6.81

1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

805+00

N 327389.9196
E 1835147.3838

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 805+50

SCI-823-6.81

1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

3:1
3:1
859.4
867.7
805+50.00
805+50

1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

3:1
3:1
859.4
859.1
806+00.00
806+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 806+00

SCI-823-6.81

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 806+50

SCI-823-6.81

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

3:1
3:1
855.4
851.1
862.28
806+50.00
1012.06
N 1273720.139
E 1834986.530
806+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 807+00

SCI-823-6.81

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

3x1
3x1
855.4
855.7
860.28
807+00.00
992.24
N 3277619.9636
E 1834988.9624
807+00

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

3:1
3:1
851.4
858.28
807+50.00
969.54
853.7
N 3273578737
E 1834894525
807+50

CHECKED

SLOPE DESIGN - ROCK CUT 30
STA 807+50

ROCK CUT SLOPE

SCI-823-6.81

18
39

1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800

3:1
3:1
849.4
856.28
808+00.00
946.47
857.7
N 1327349.2453
E 1834850.2074
808+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

SLOPE DESIGN - ROCK CUT 30
STA 808+00

ROCK CUT SLOPE

SCI-823-6.81

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 808+50

SCI-823-6.81

1060
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

841.4
854.28
808+50.00
919.38
849.7

N 1273405.791
E 1834800.649

808+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 809+00

SCI-823-6.81

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

852.28
809+00.00
890.51

845.4
847.7

N 32731.1763
E 18347518.1094

809+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 809+50

SCI-823-6.81

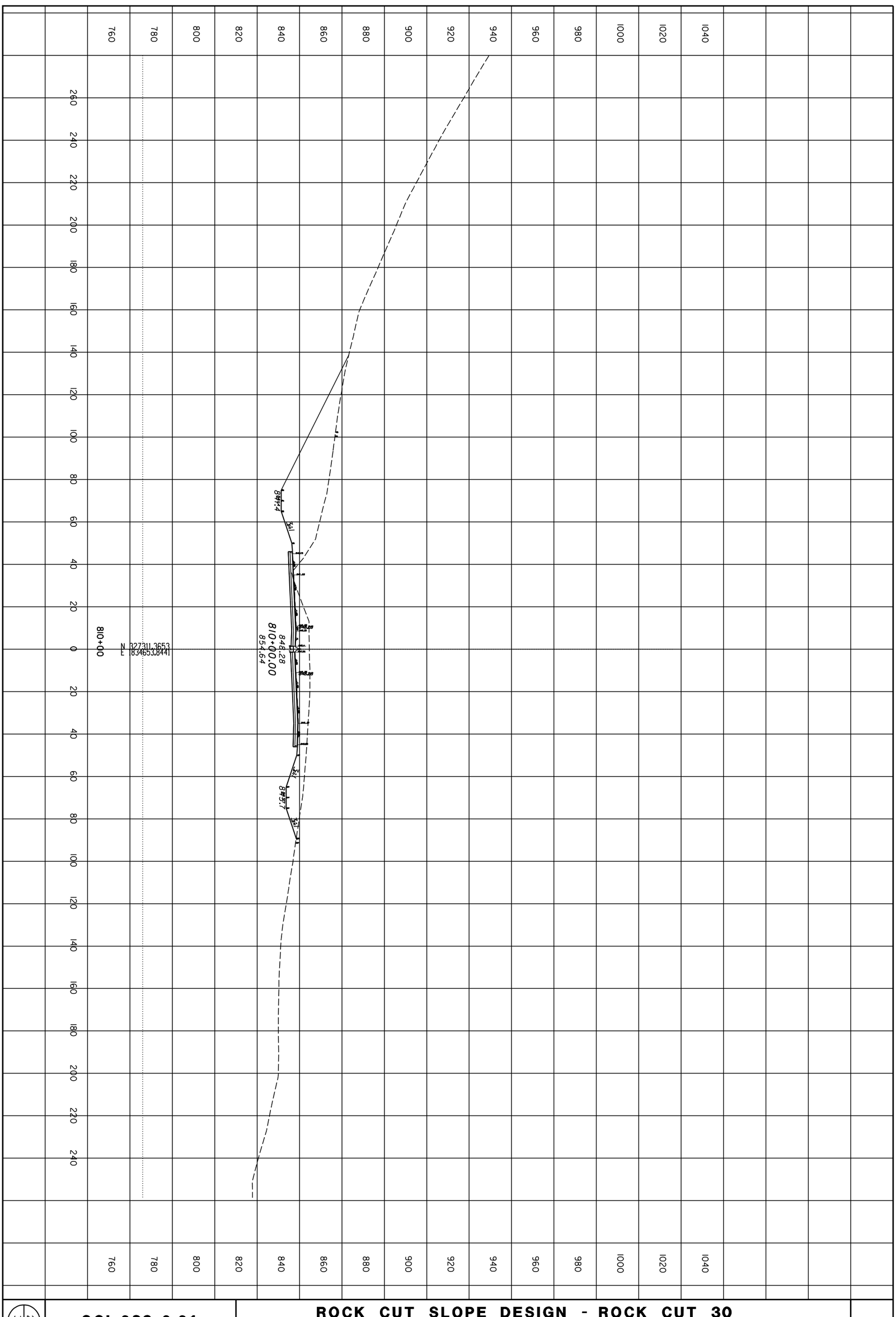
1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

845.4
3:1
850.28
809+50.00
869.65
3:1
845.7

N 12732163.80
E 1834027.72

809+50



23 / 39	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 30 STA 810+00
		CHECKED

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

3:1
3:1
899.4
846.28
810+50.00
834.46
N 327300.5595
E 1834605.0260
810+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 810+50

SCI-823-6.81

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 811+00

SCI-823-6.81

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

856.4
844.28
811+00.00
816.52
2:1
2:1
N 3227289.2218
E 1834596.3286
811+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 811+50

SCI-823-6.81

842.28
811+50.00
807.28

N 1327277.3635
E 1834587.5578

811+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 812+00

SCI-823-6.81

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

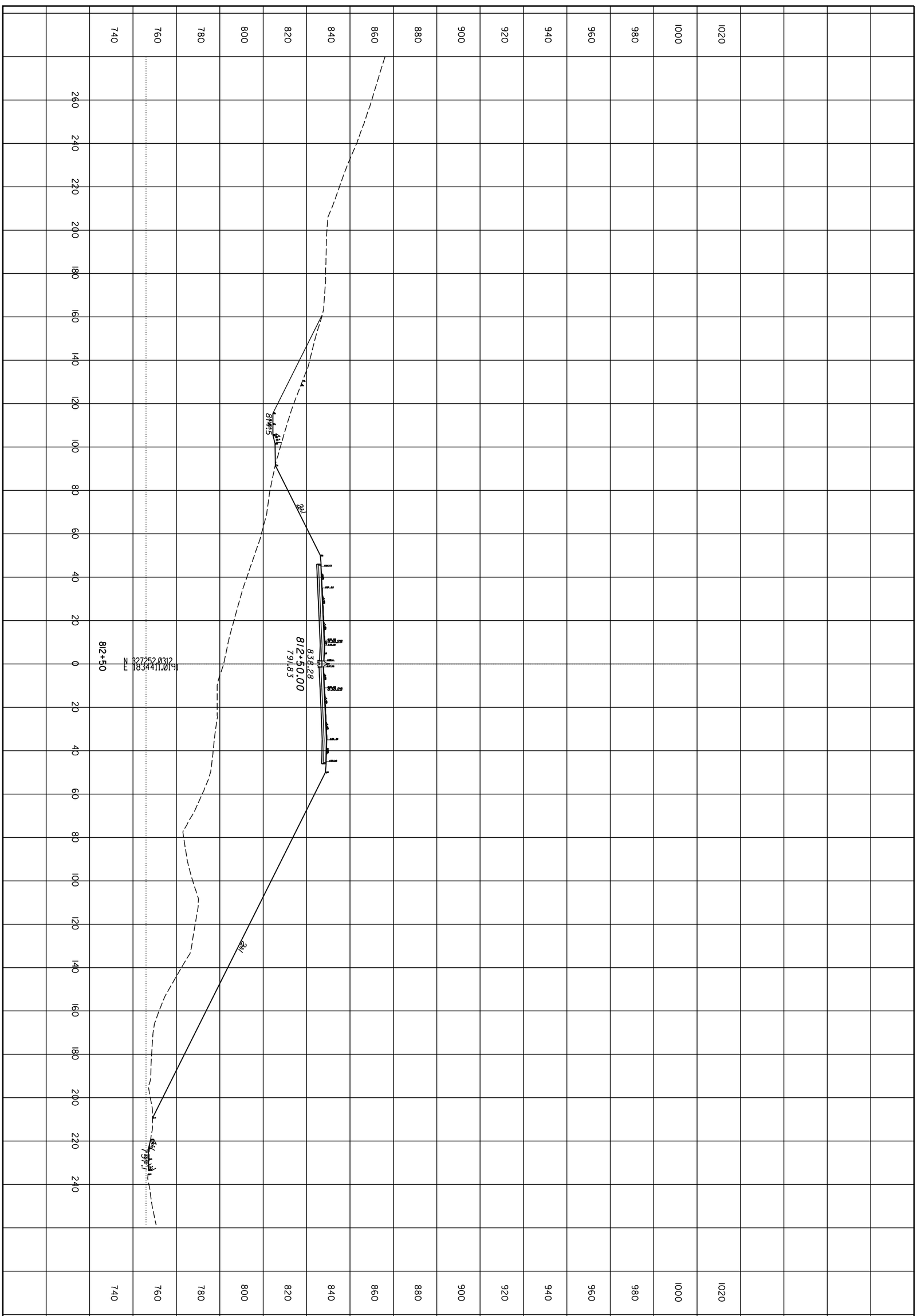
3:1
3:1
3:1

825.9
840.28
812+00.00
802.43

N 327264.9562
E 1834454.3114

812+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240



SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 812+50

CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 813+00

SCI-823-6.81

1020
1000
980
960
940
920
900
880
860
840
820
800
780
760
740

836.28
813+00.00
781.92

2H:1V

N 327238.5801
E 1834362.8626

813+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 813+50

SCI-823-6.81

1000
980
960
940
920
900
880
860
840
820
800
780
760
740
720

834.28
813+50.00
774.01

798.7

755.3

2H:1

4H:1

N 32724.6045
E 18434.8558

813+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 814+00

SCI-823-6.81

832.28
814+00.00
761.87

2:1

4:1

788.1

780.9

N 32720.1061
E 18342.0042

814+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 814+50

SCI-823-6.81

830.28
814+50.00
744.65

2:1

4:1

781.4

766.0

N 3271954.0866
E 1834219.3137

814+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 815+00

SCI-823-6.81

828.28
815+00.00
742.97

2H:1V

4H:1V

774.8

N 3271795.5478
E 1834171.7898

815+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 815+50

SCI-823-6.81

826.28
815+50.00
741.19

764.4

769.9

N 1327163.4915
E 1834124.3382

815+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 816+00

SCI-823-6.81

824.28
816+00.00
748.01

2:1

2:1

4:1
785.6

4:1
785.2

N 327146.9197
E 1834077.2646

816+00

1000
980
960
940
920
900
880
860
840
820
800
780
760
740
720

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 816+50

SCI-823-6.81

822.28
816+50.00
753.78

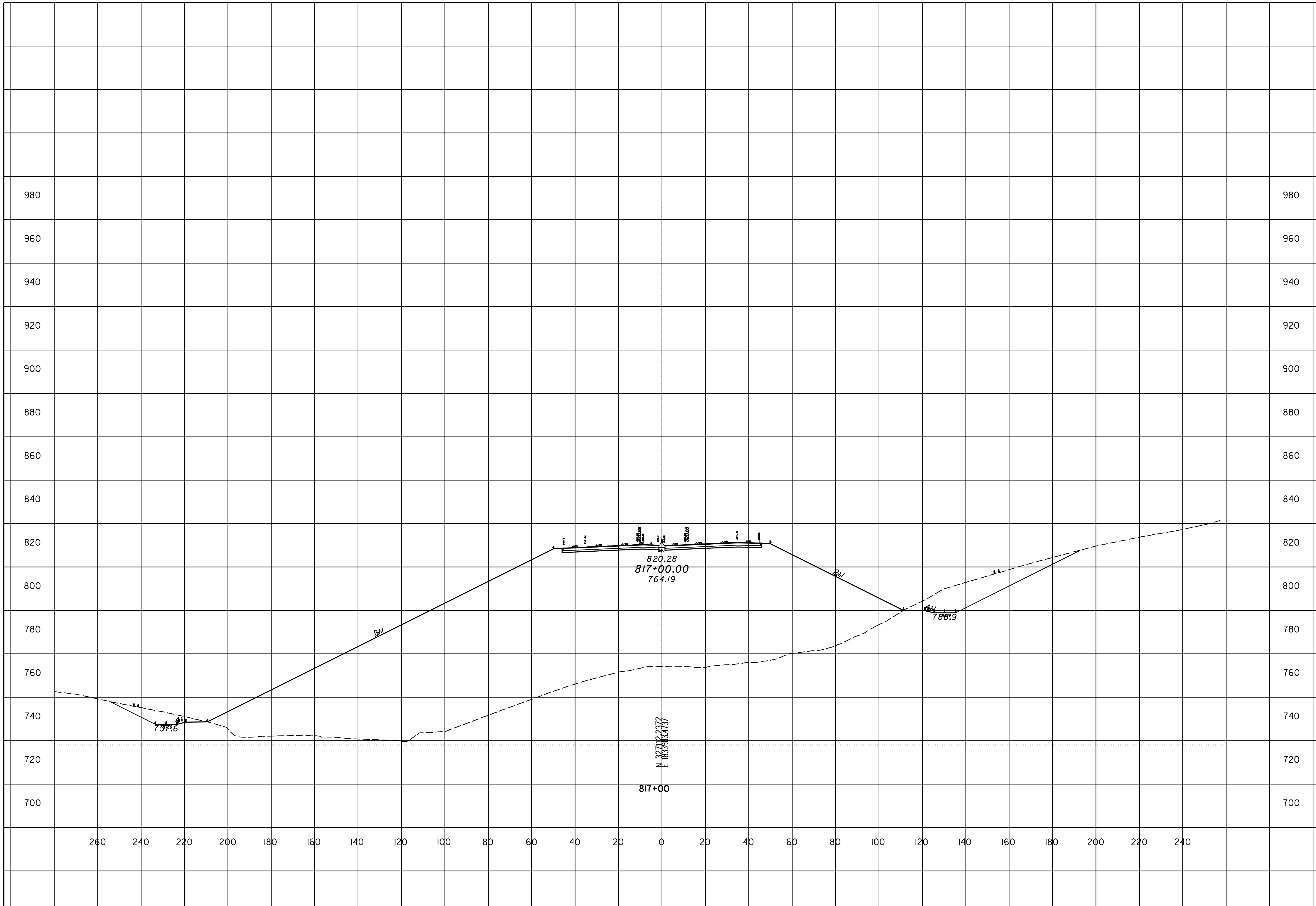
2H:1

775.2

788.8

N 3271729.8342
E 1834630.2746

816+50



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 817+00

SCI-823-6.81

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 817+50

SCI-823-6.81

980
960
940
920
900
880
860
840
820
800
780
760
740
720
700

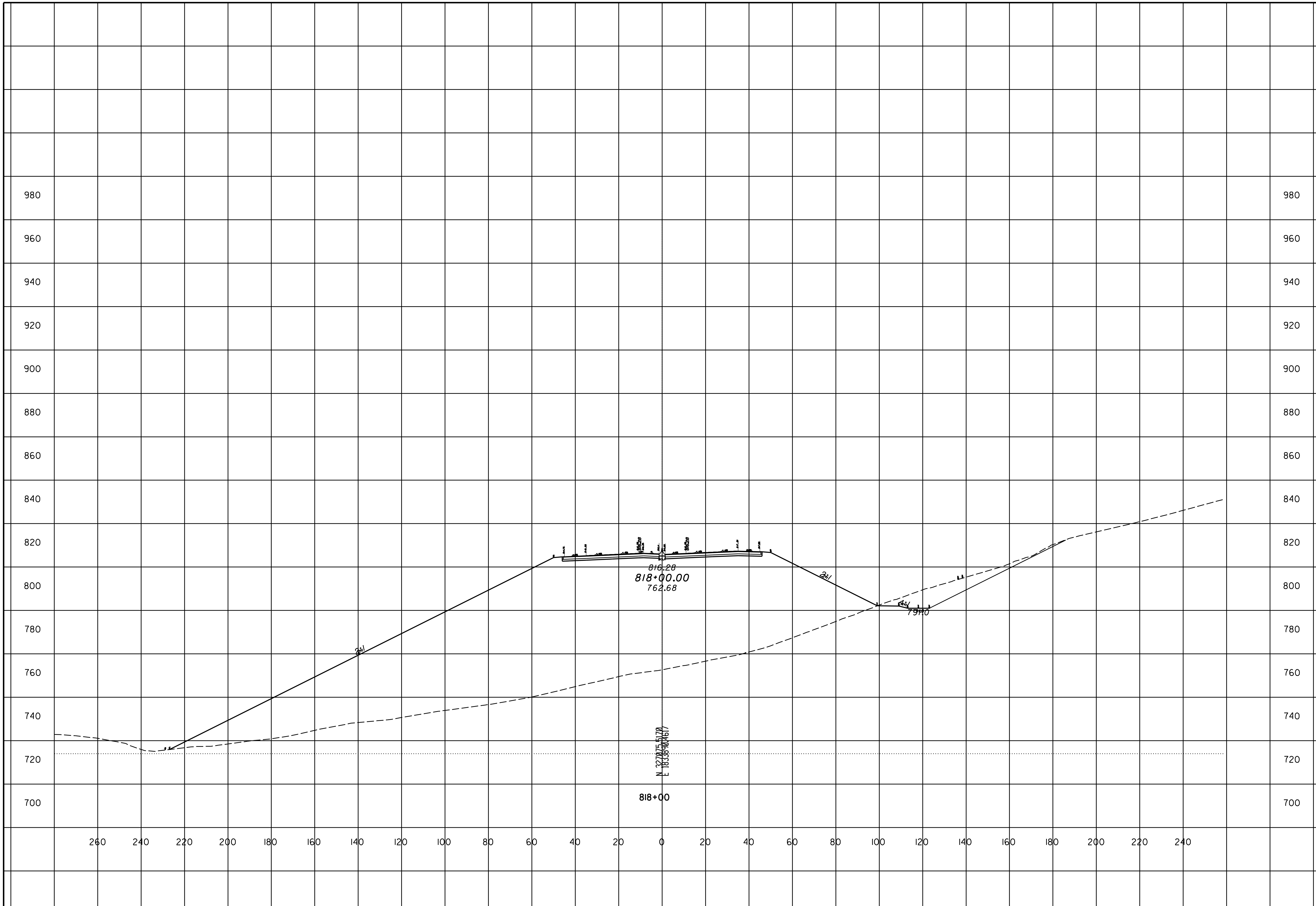
260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

2H:1V
4H:1V
2H:1V
4H:1V
2H:1V

728.8
818.28
817+50.00
760.82
794.0

N 1270941307
E 1833936867.6

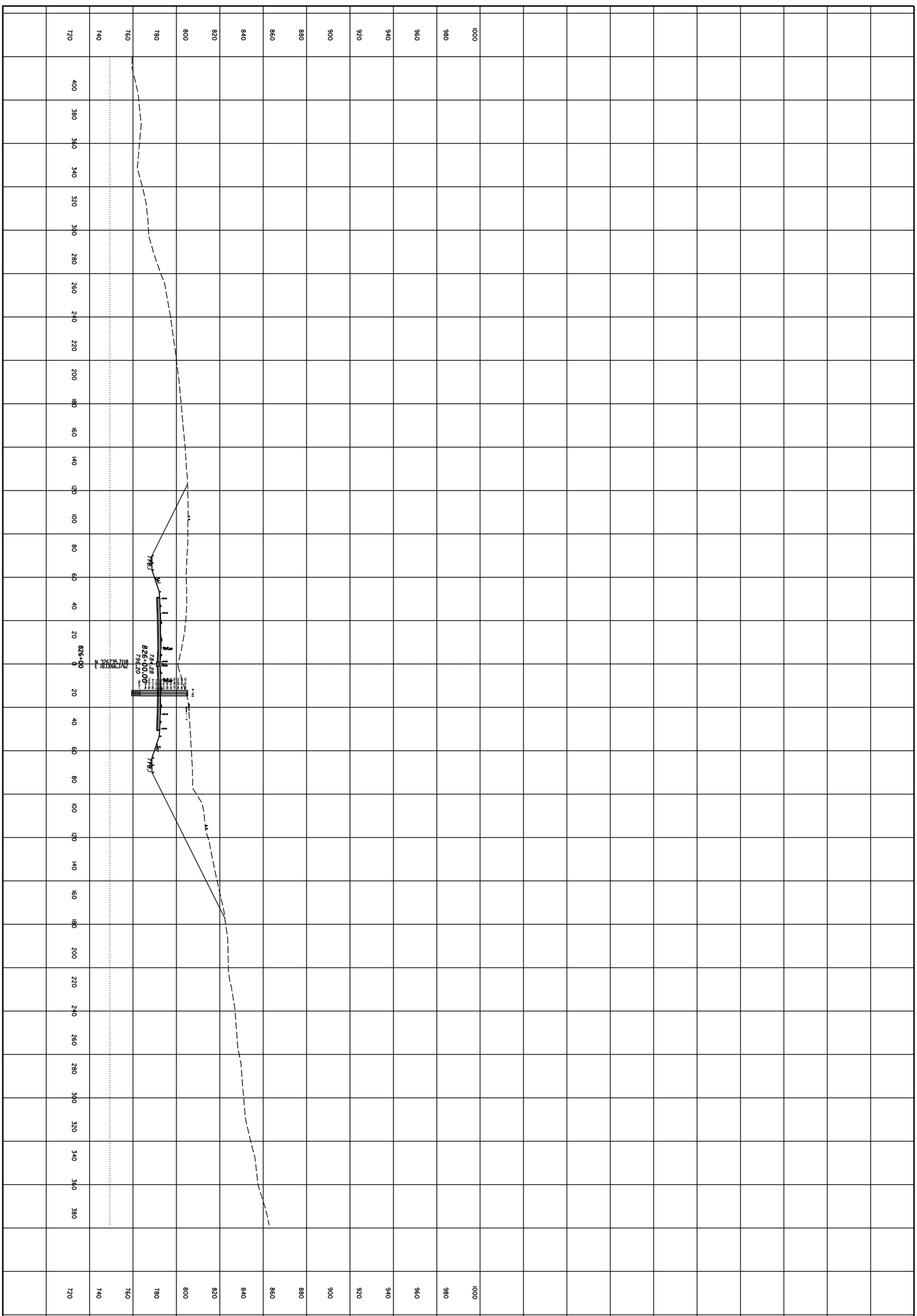
817+50



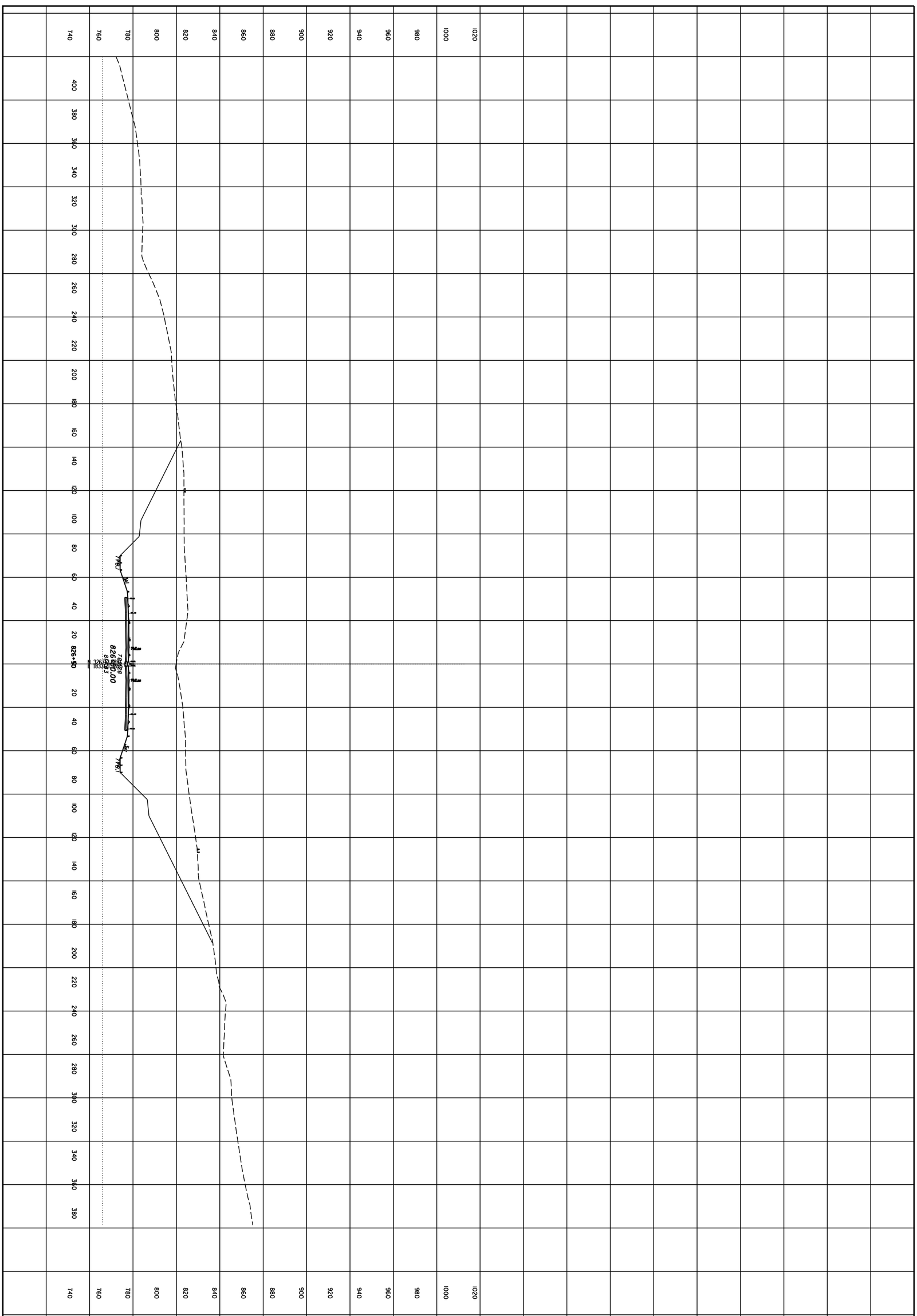
ROCK CUT SLOPE DESIGN - ROCK CUT 30
STA 818+00

SCI-823-6.81

CHECKED



43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 826+00
		CHECKED



2 / 43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 826+50
		CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 827+00

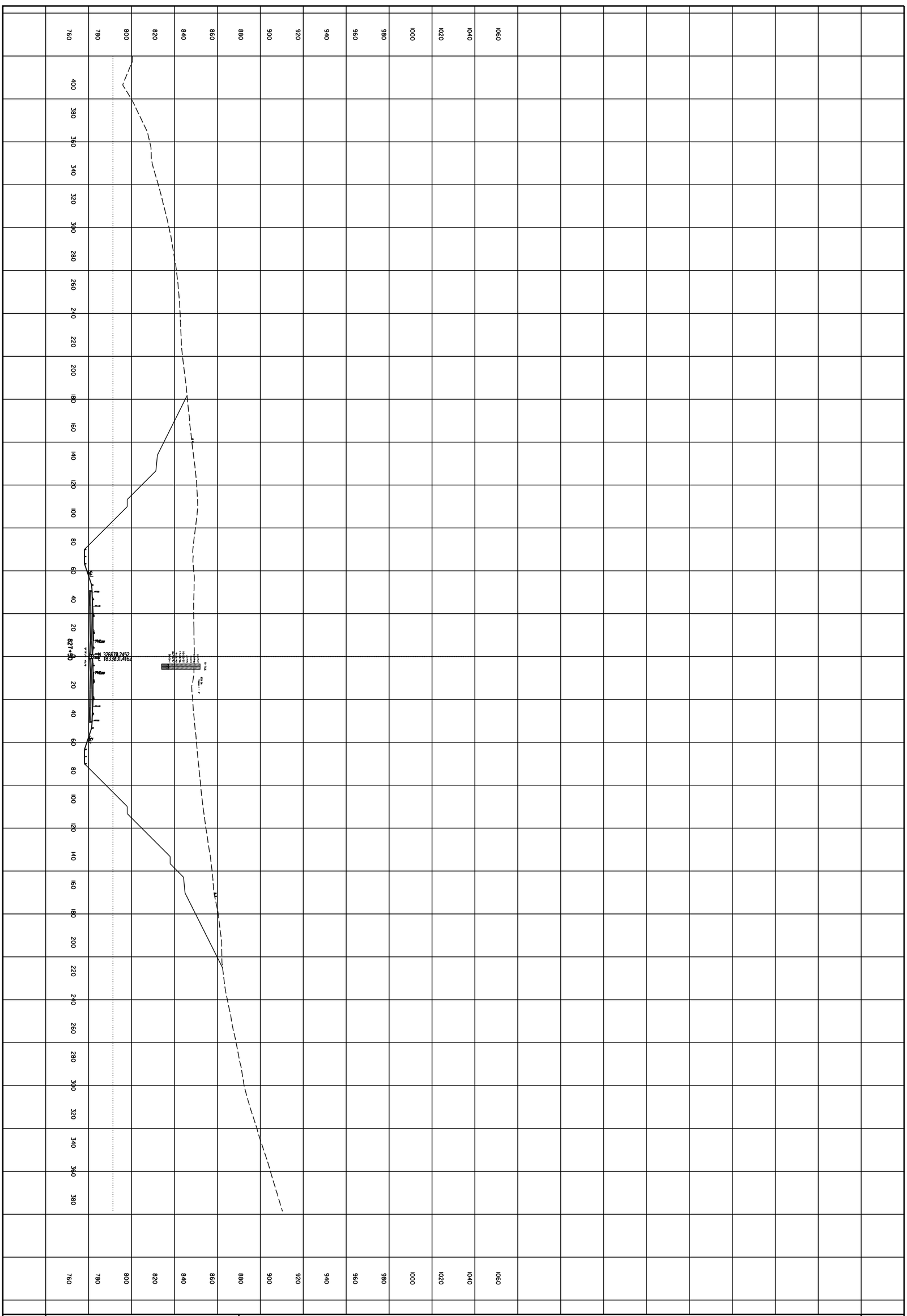
SCI-823-6.81

1040
1020
1000
980
960
940
920
900
880
860
840
820
800
780
760

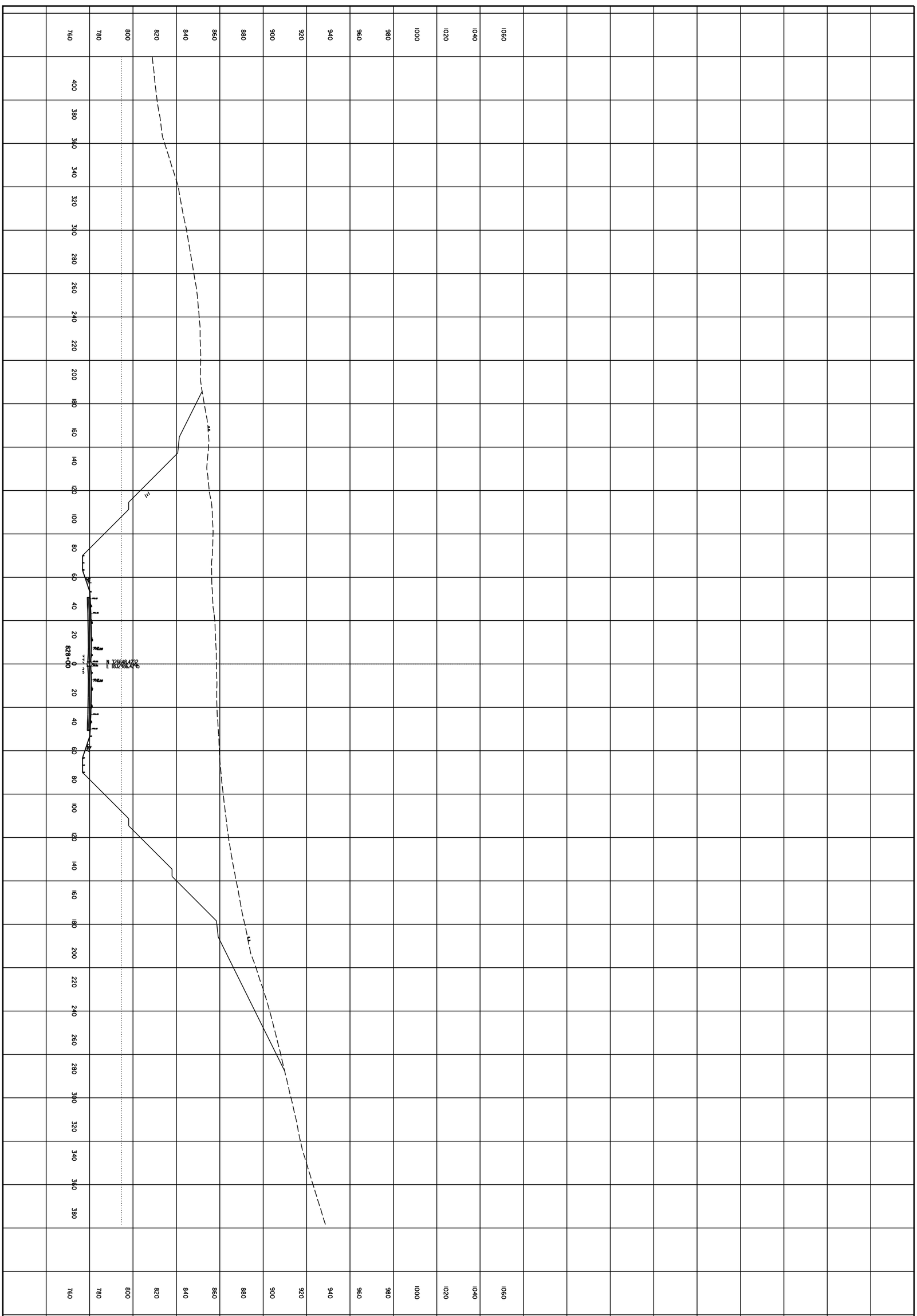
400 380 360 340 320 300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380

827+00.00

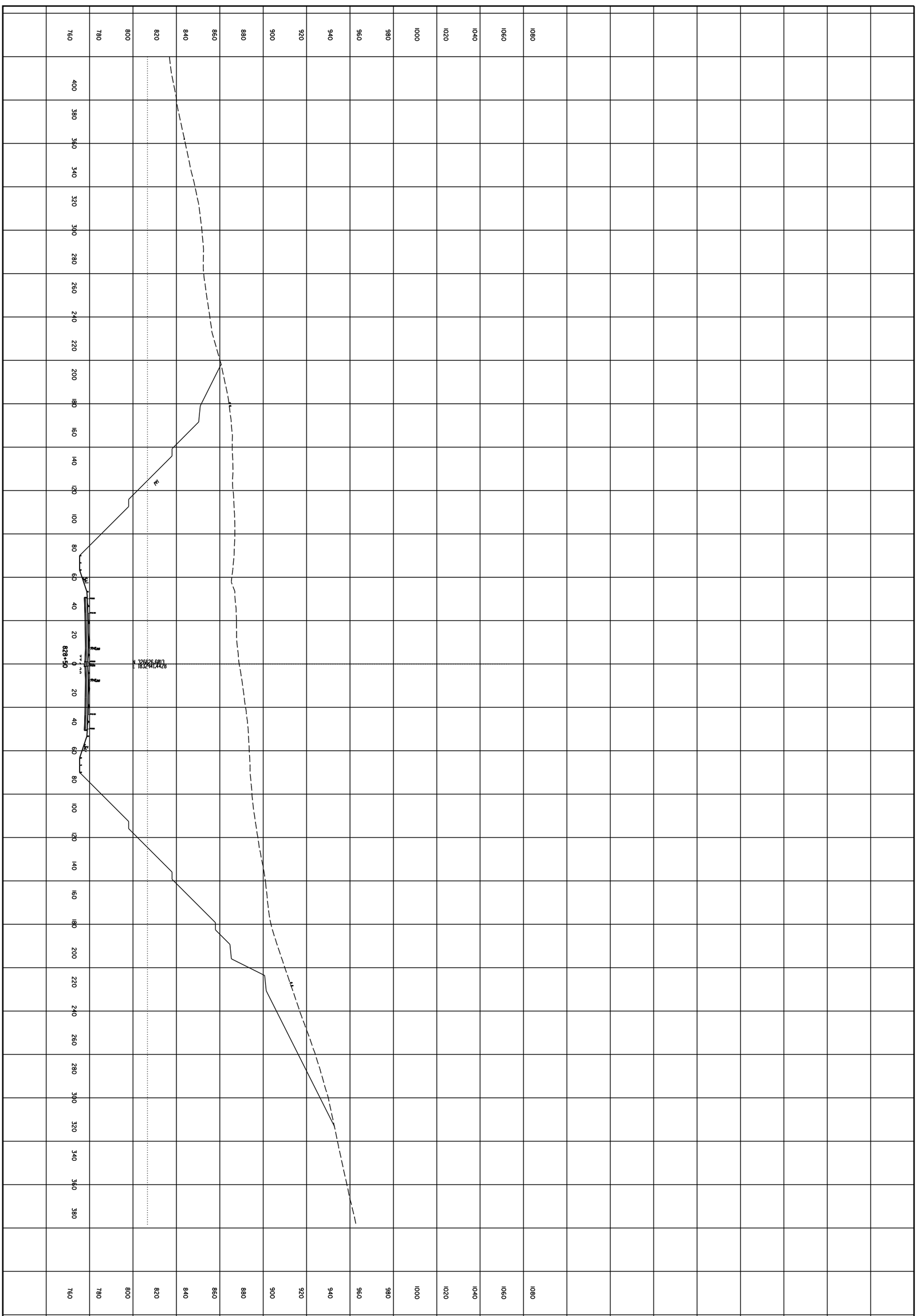
827+00



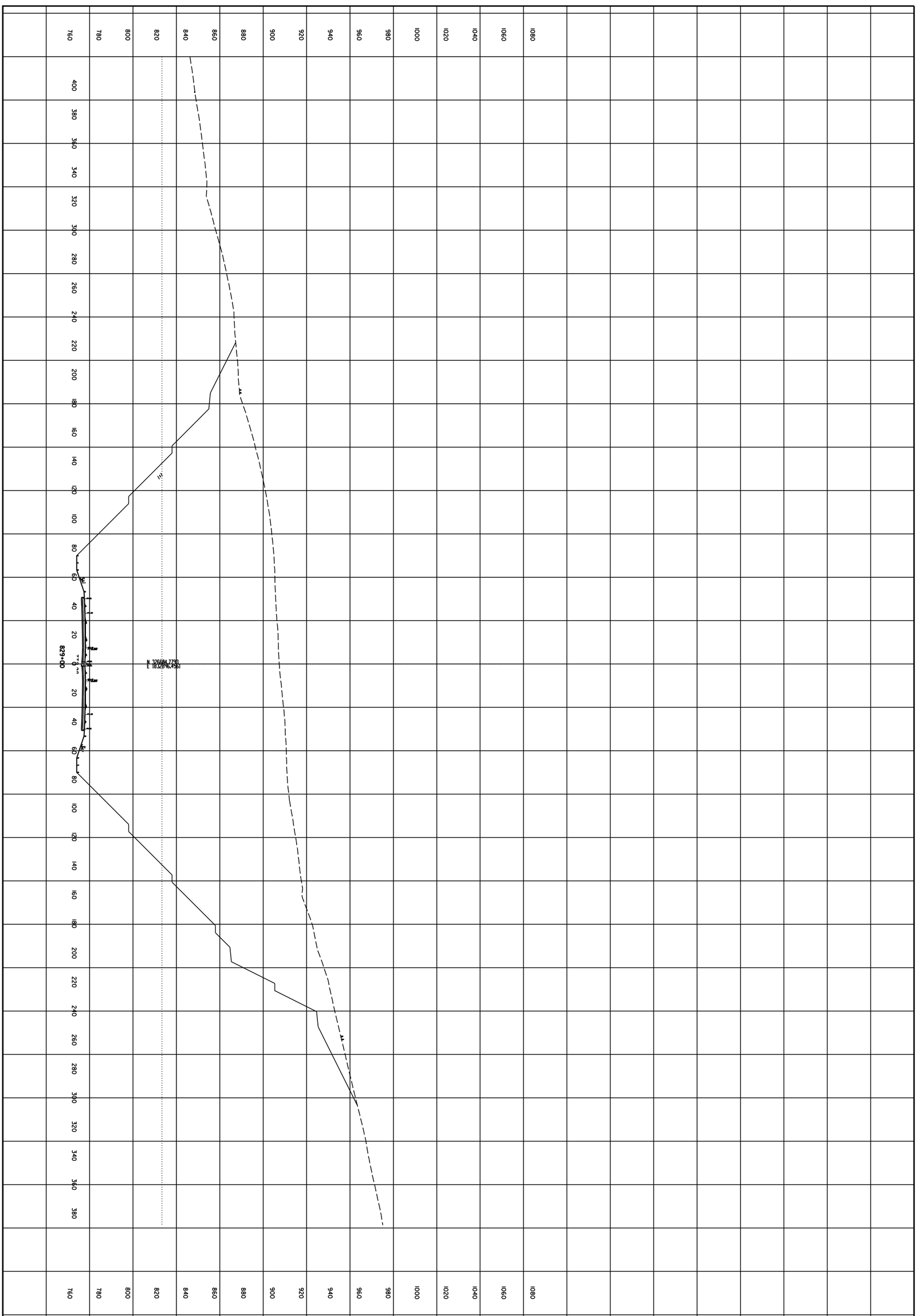
4 / 43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 827+50
		CHECKED



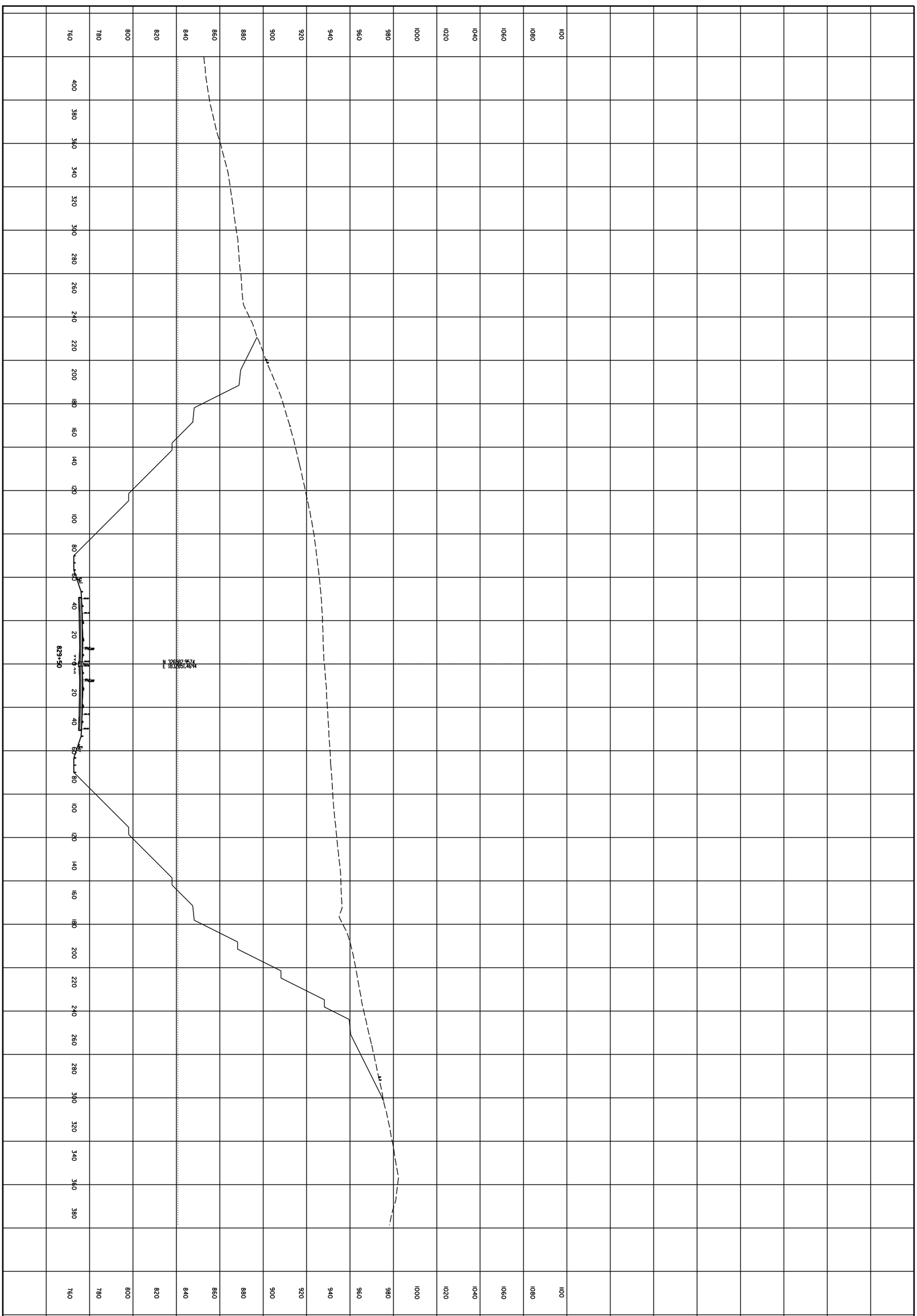
5 / 43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 828+00
		CHECKED



6 / 43	**SCI-823-6.81**	**ROCK CUT SLOPE DESIGN - ROCK CUT 31** **STA 828+50**
		CHECKED



7/43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 829+00
		CHECKED

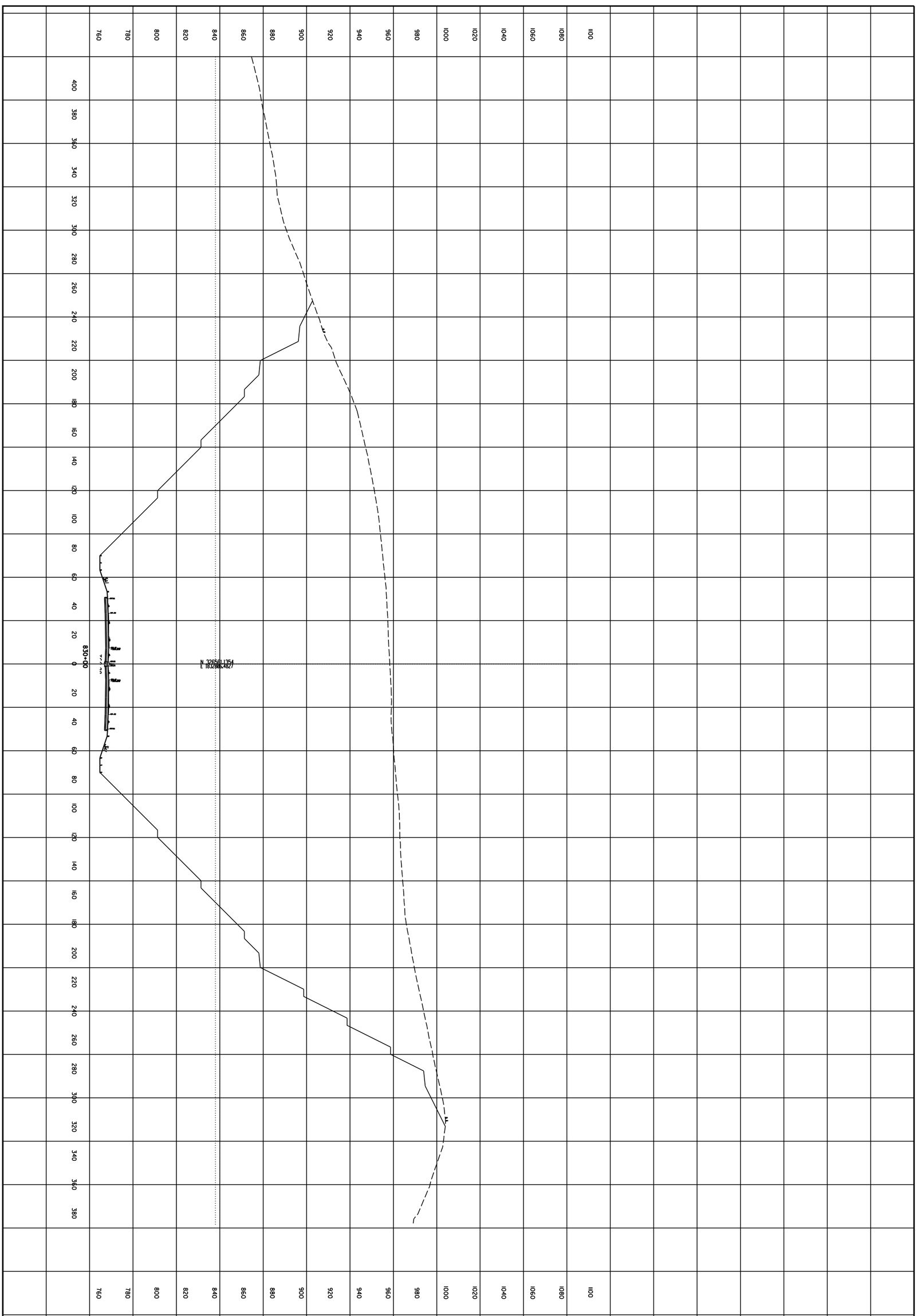


8
43

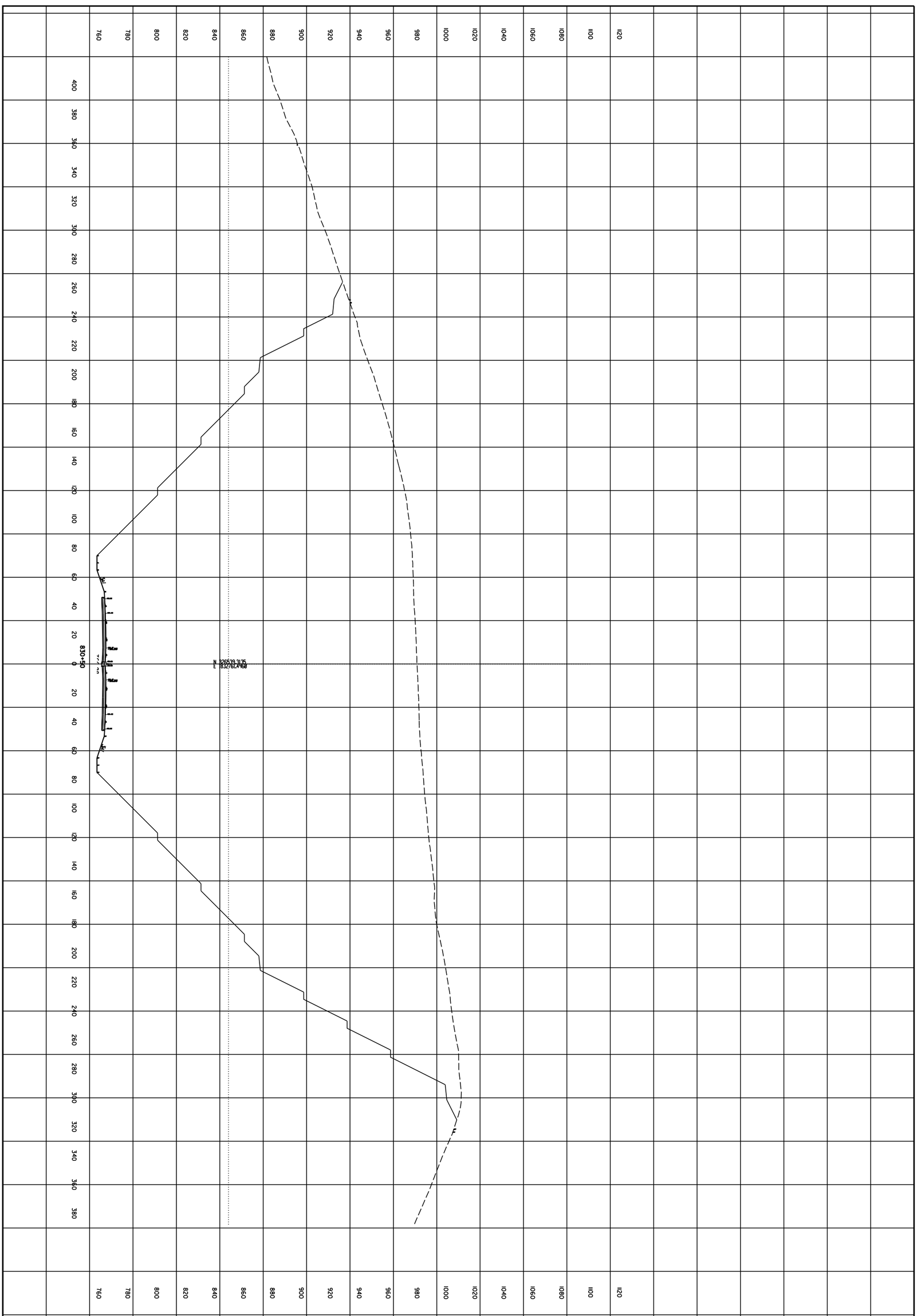
SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 829+50

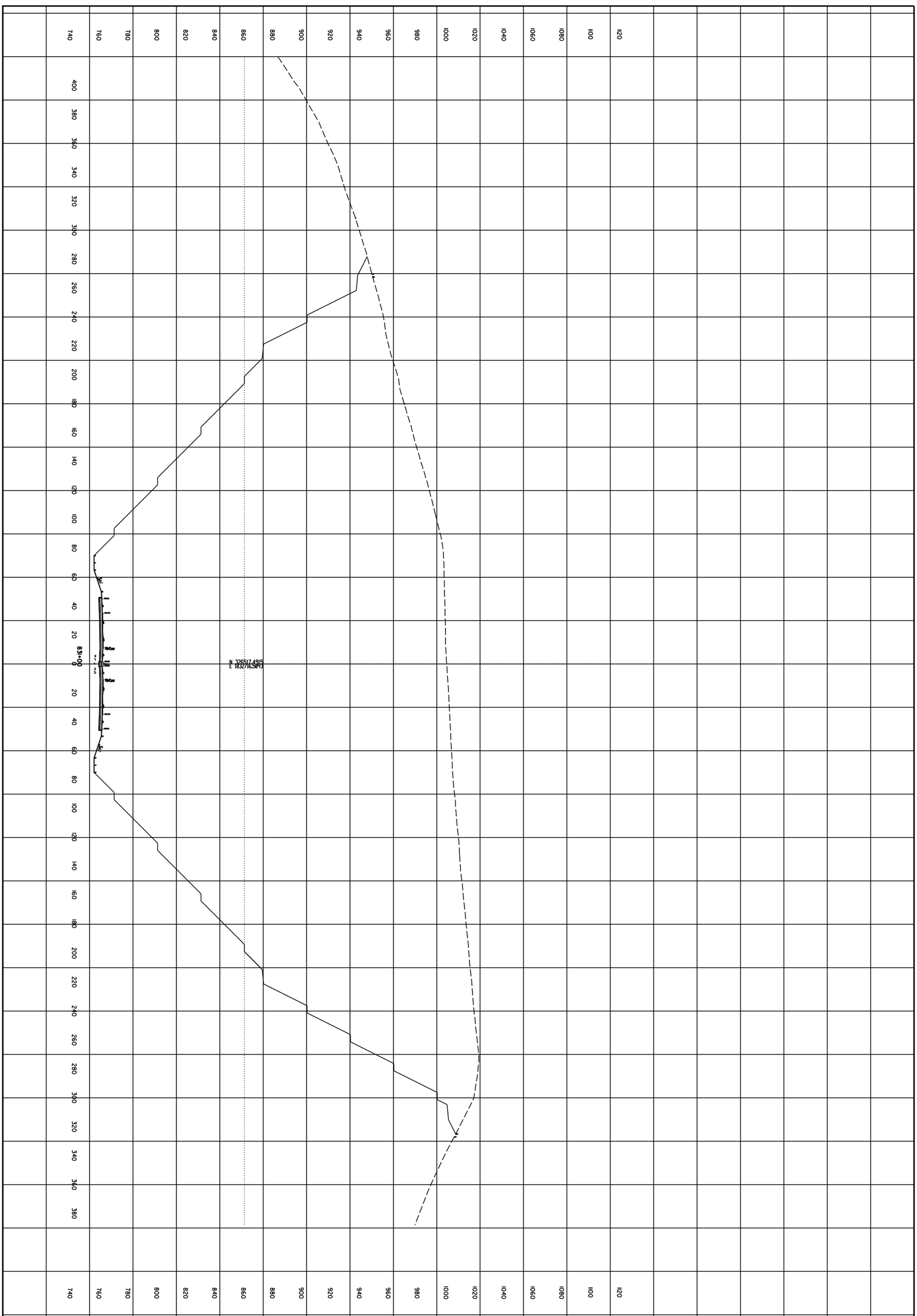
CHECKED



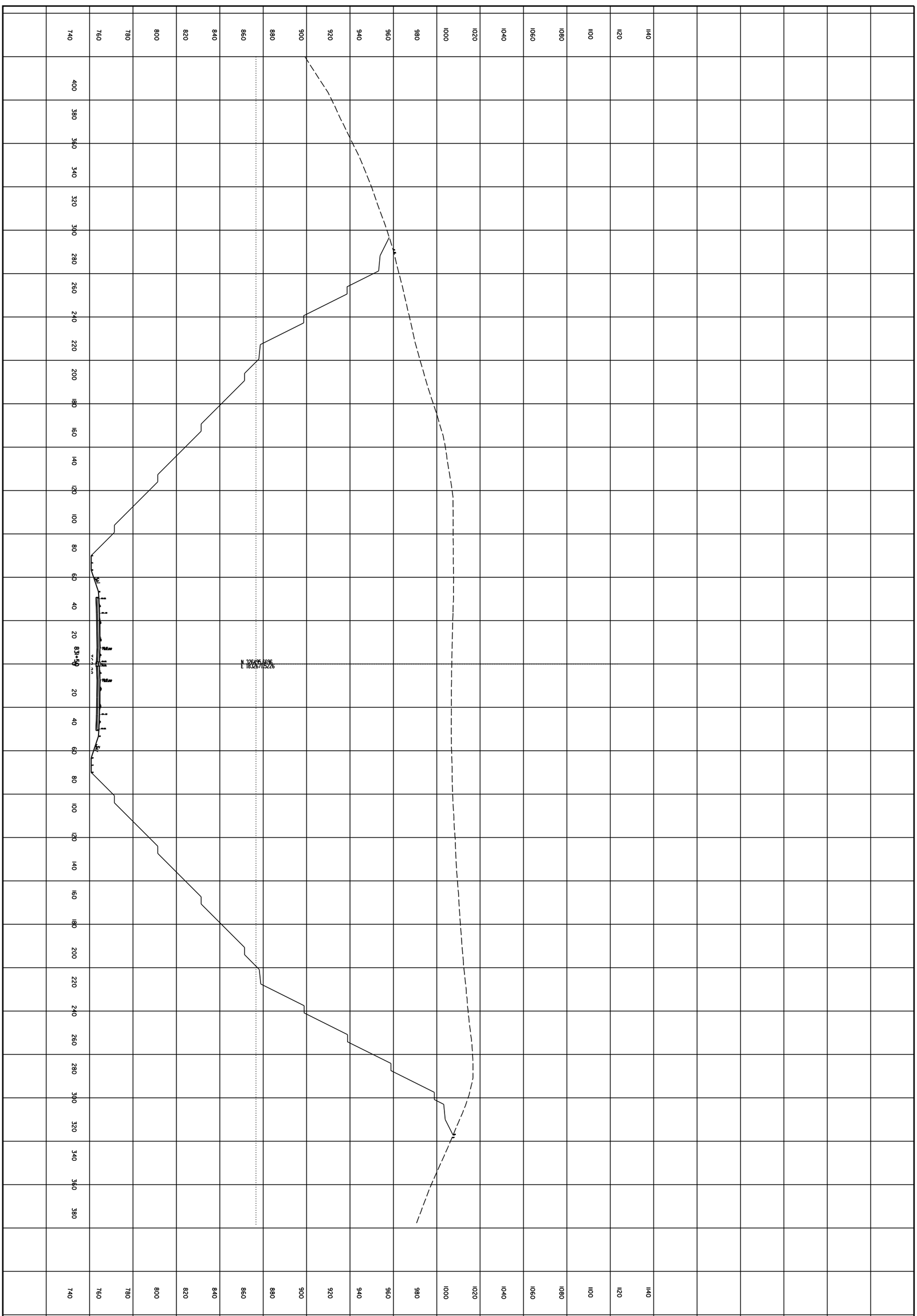
9 / 43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 830+00
		CHECKED



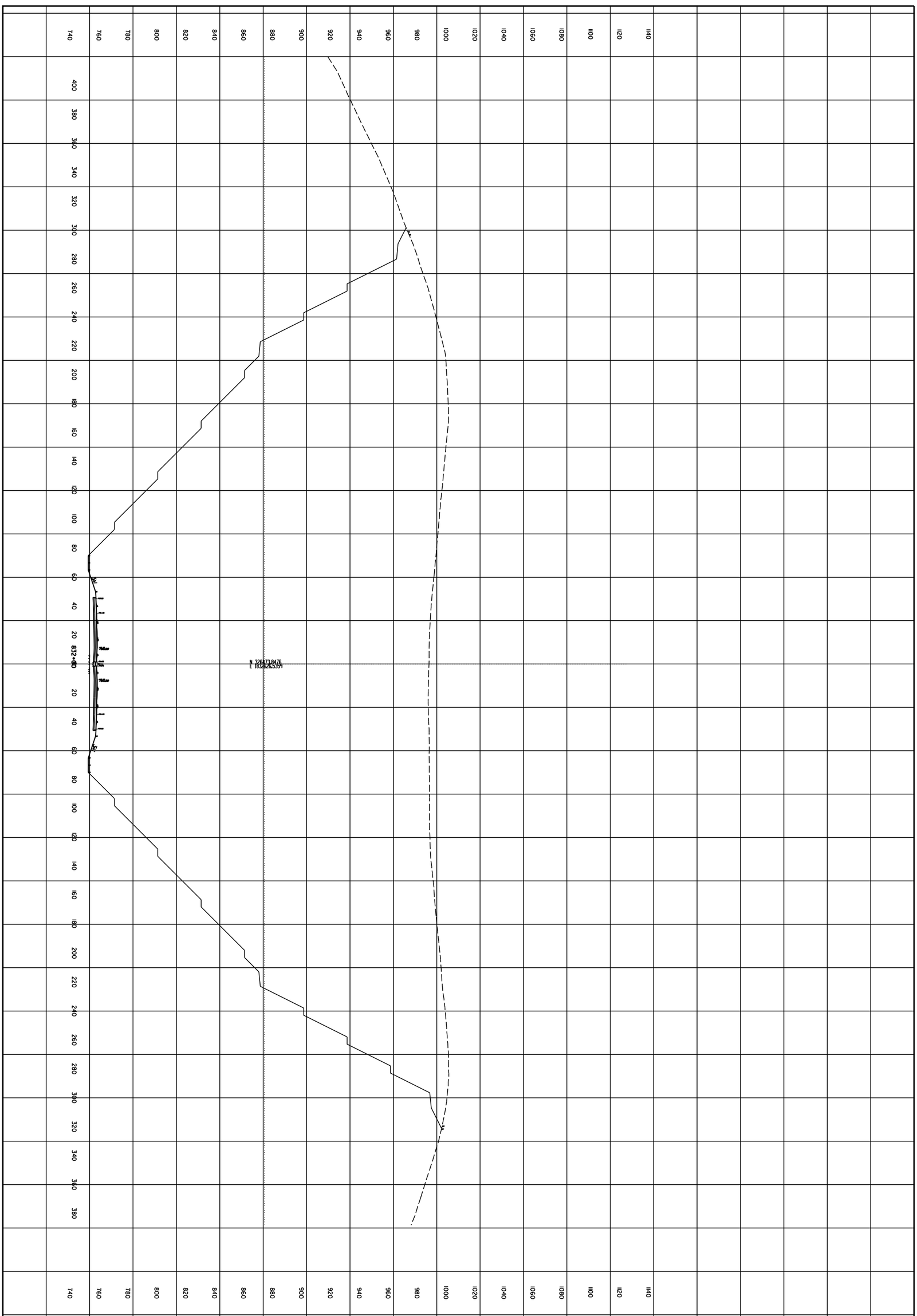
10/43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 830+50
		CHECKED



11 / 43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 831+00
		CHECKED



12 / 43	**SCI-823-6.81**	**ROCK CUT SLOPE DESIGN - ROCK CUT 31** **STA 831+50**
		CHECKED

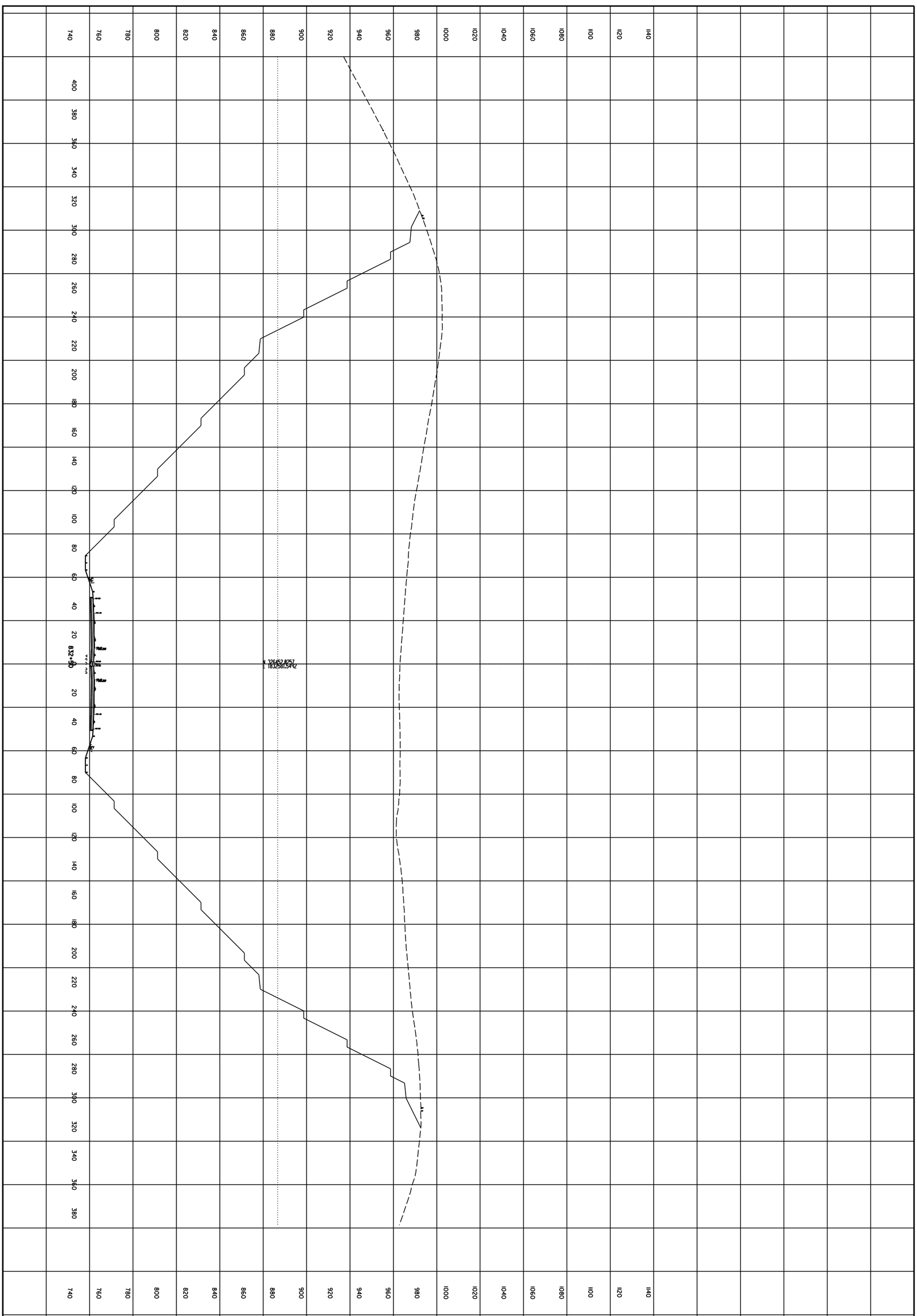


13
43

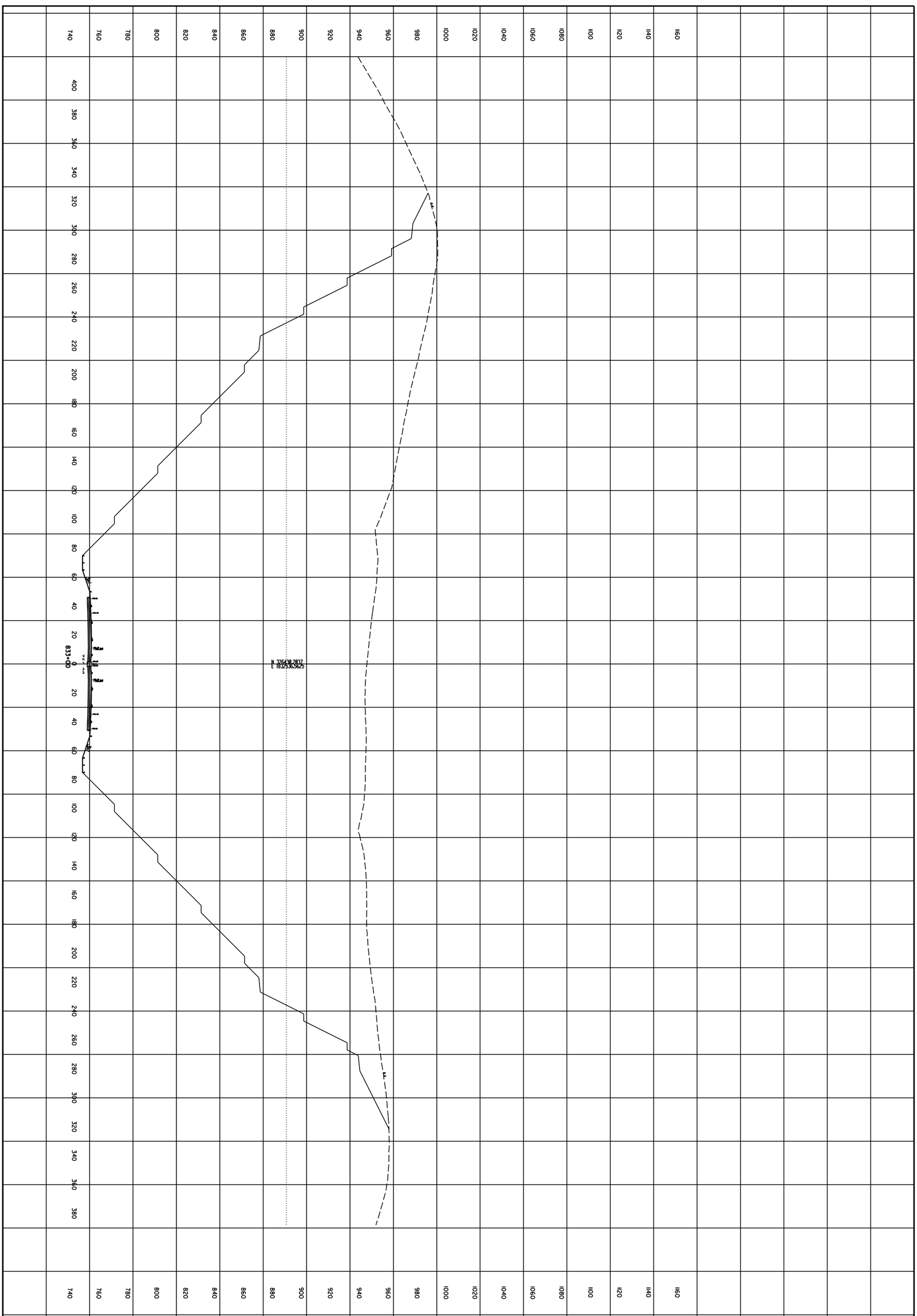
SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 832+00

CHECKED



14/43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 832+50
		CHECKED

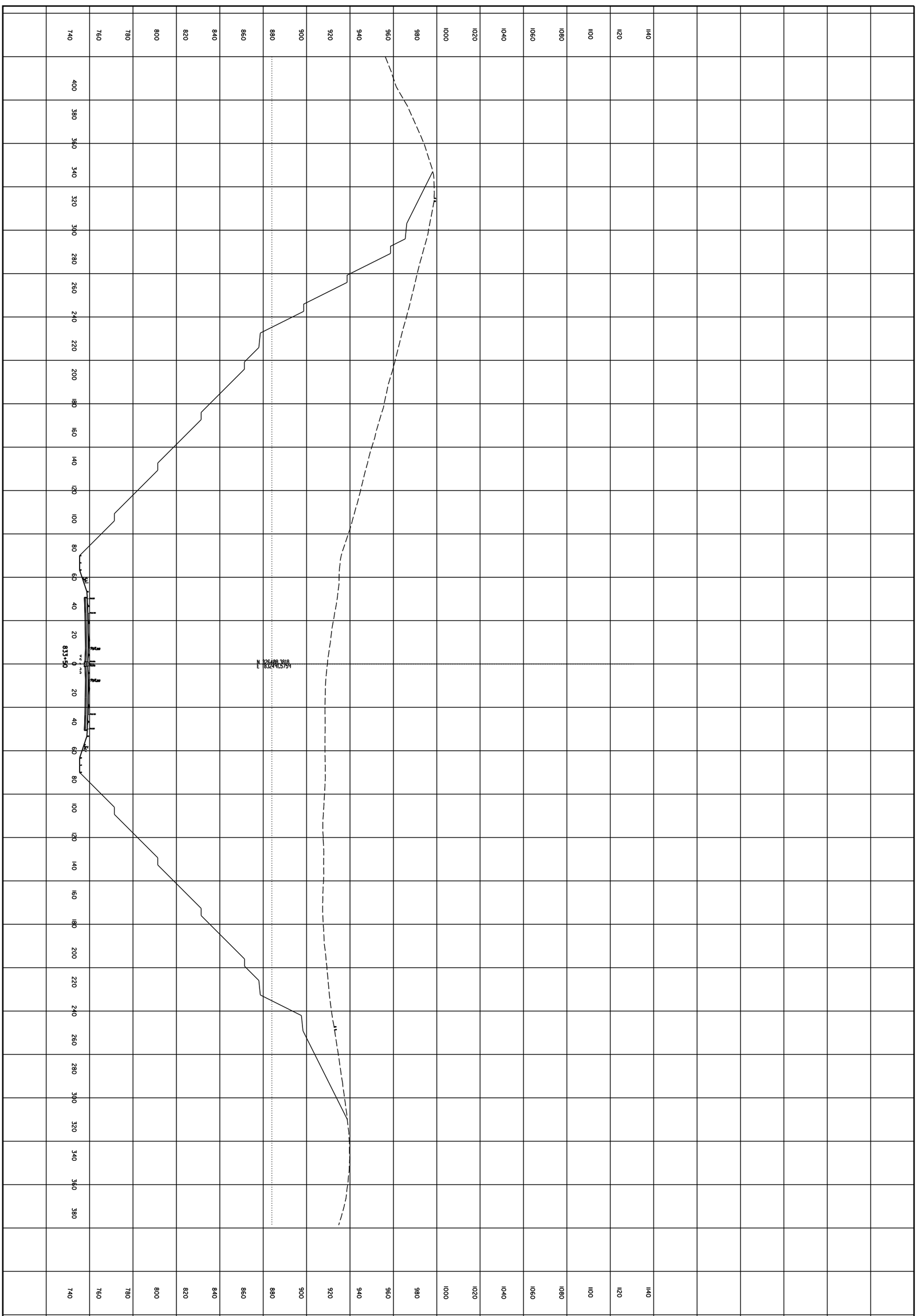


15
43

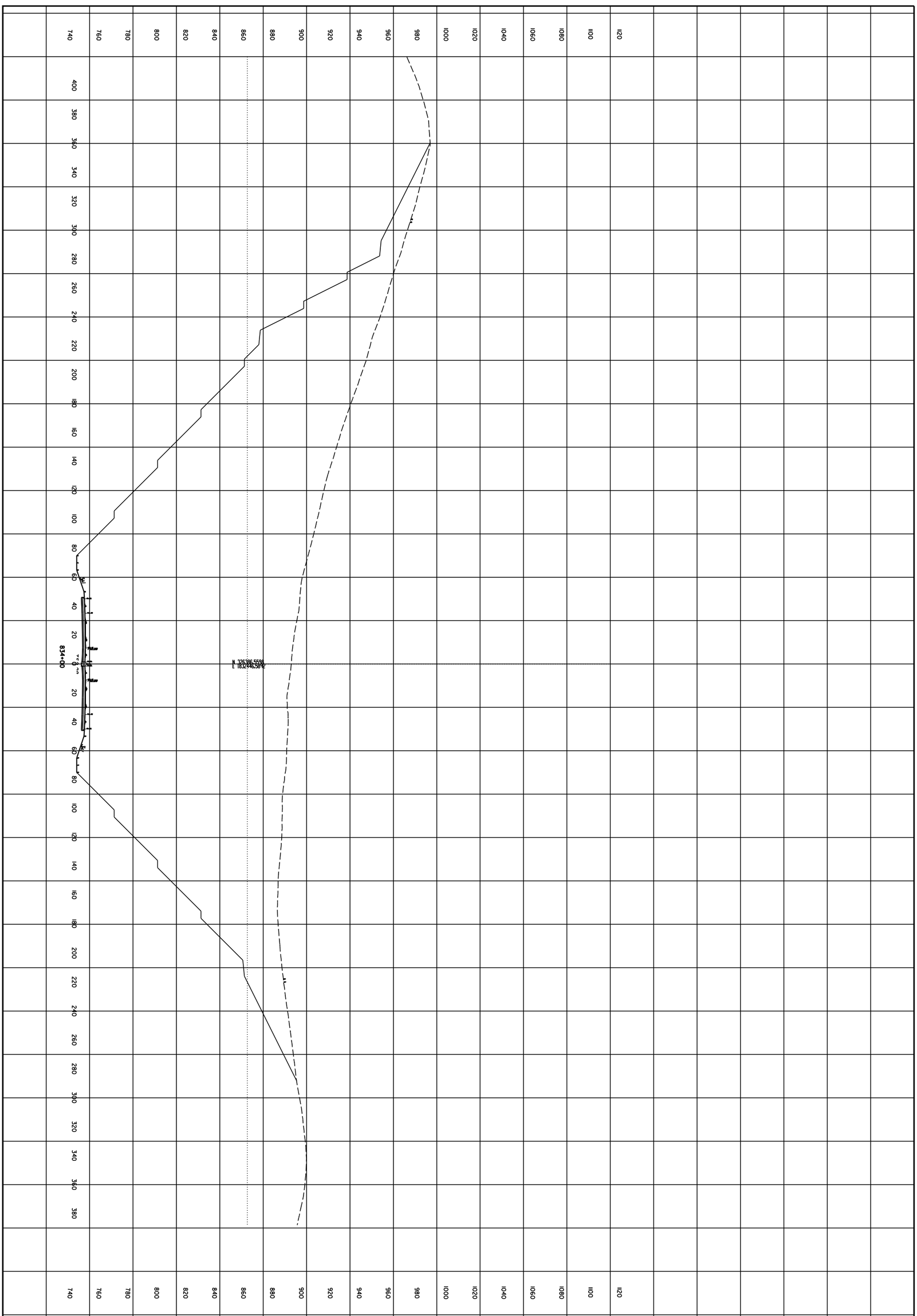
SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 833+00

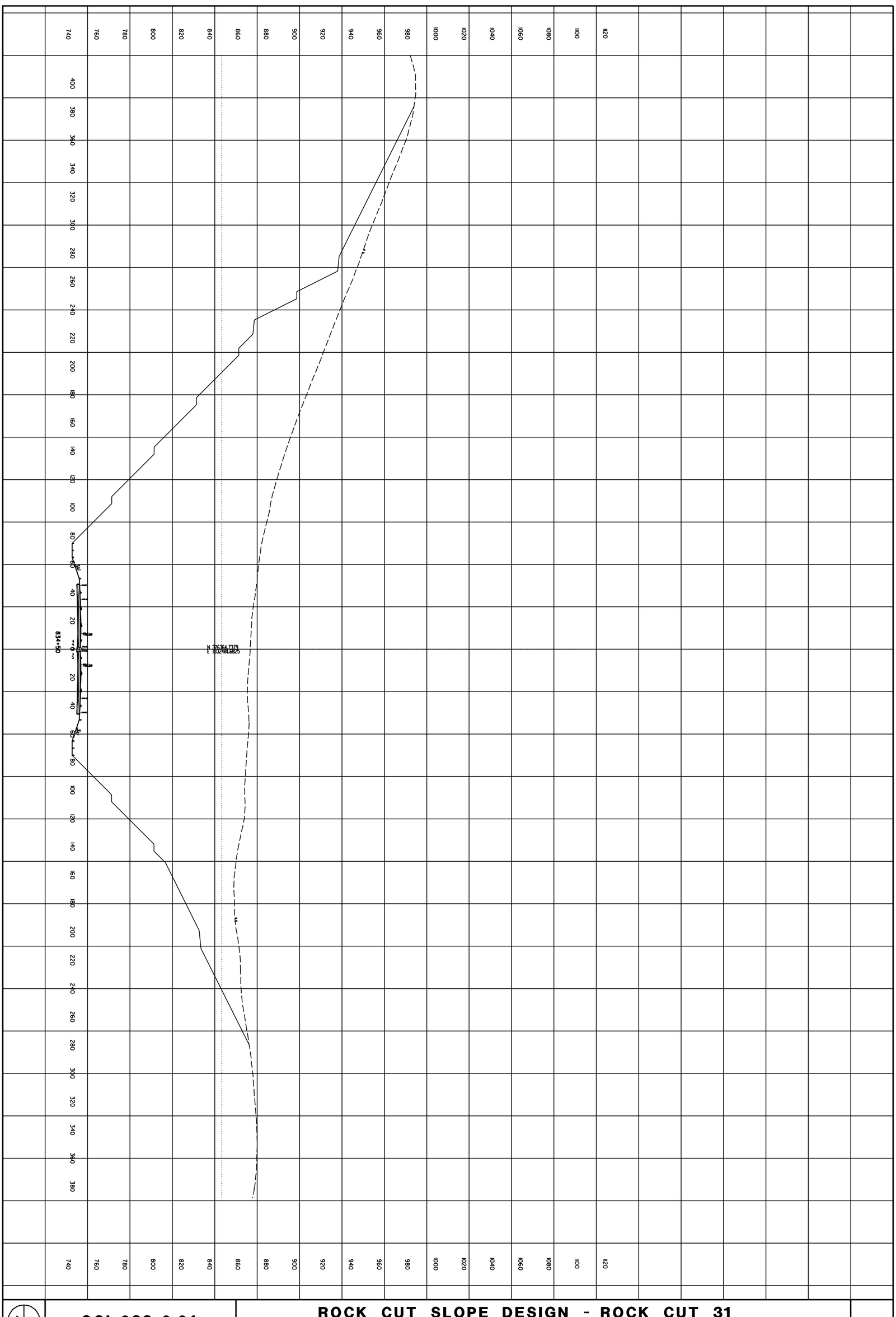
CHECKED



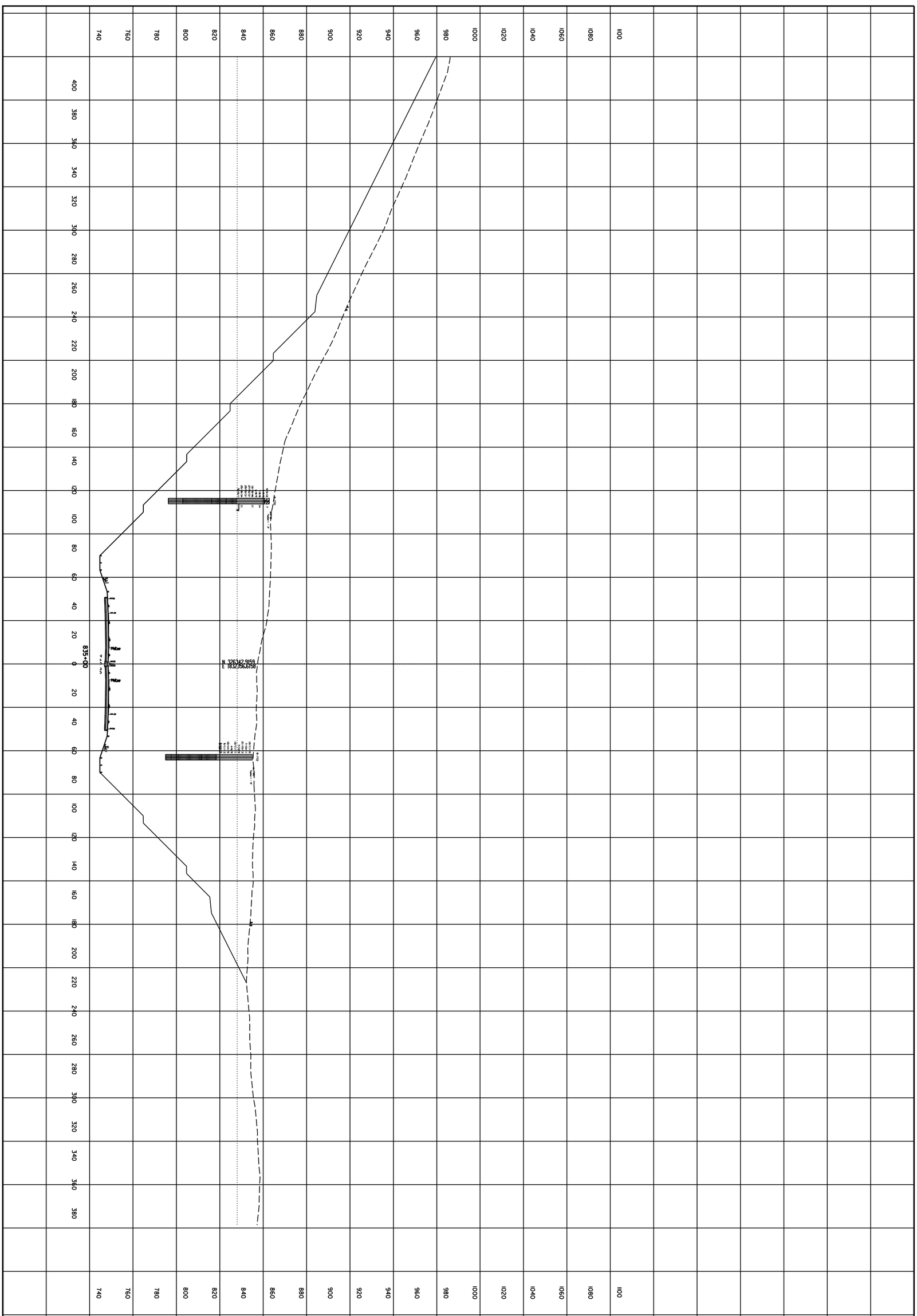
16 / 43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 833+50
		CHECKED



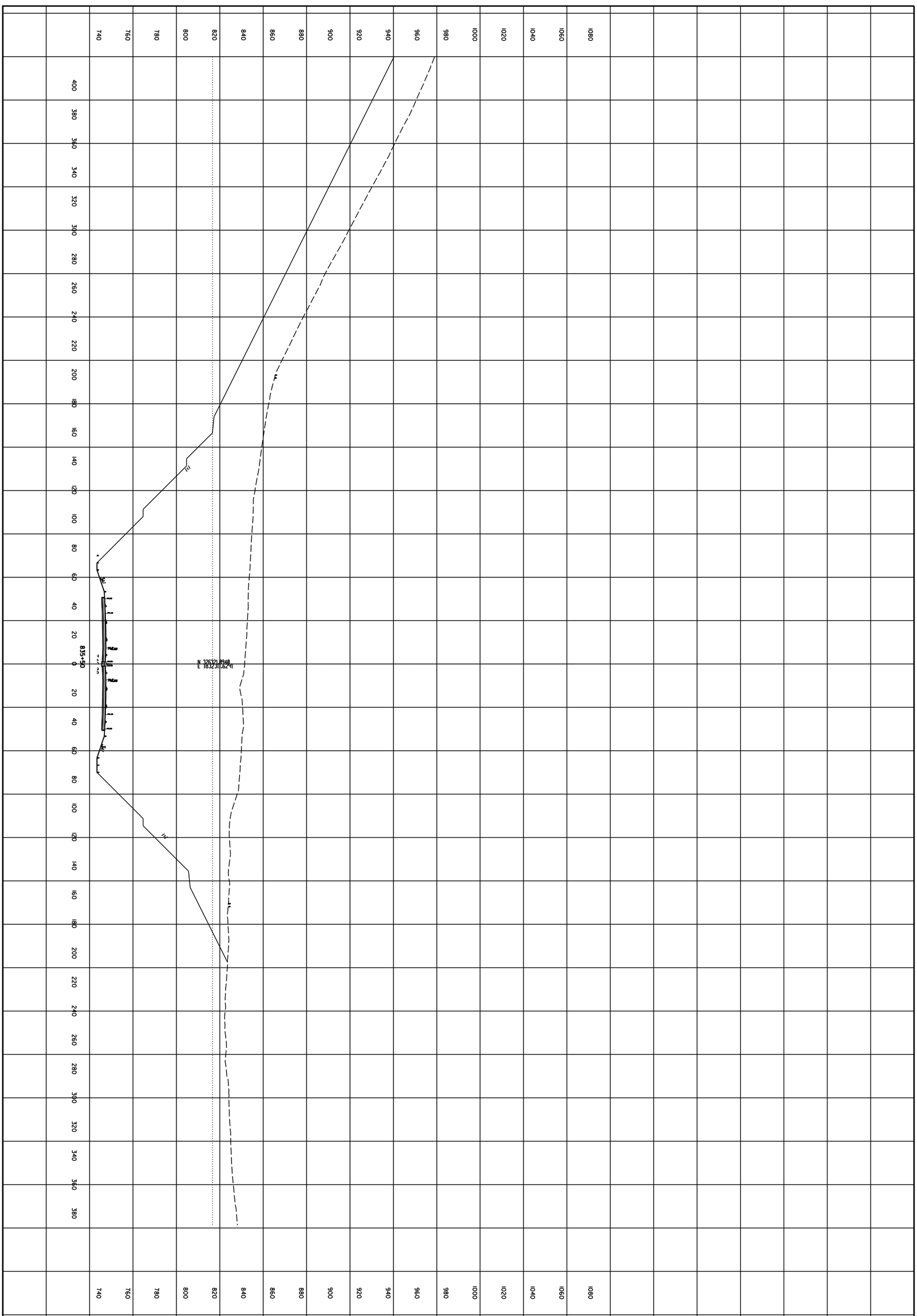
17 / 43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 834+00
		CHECKED



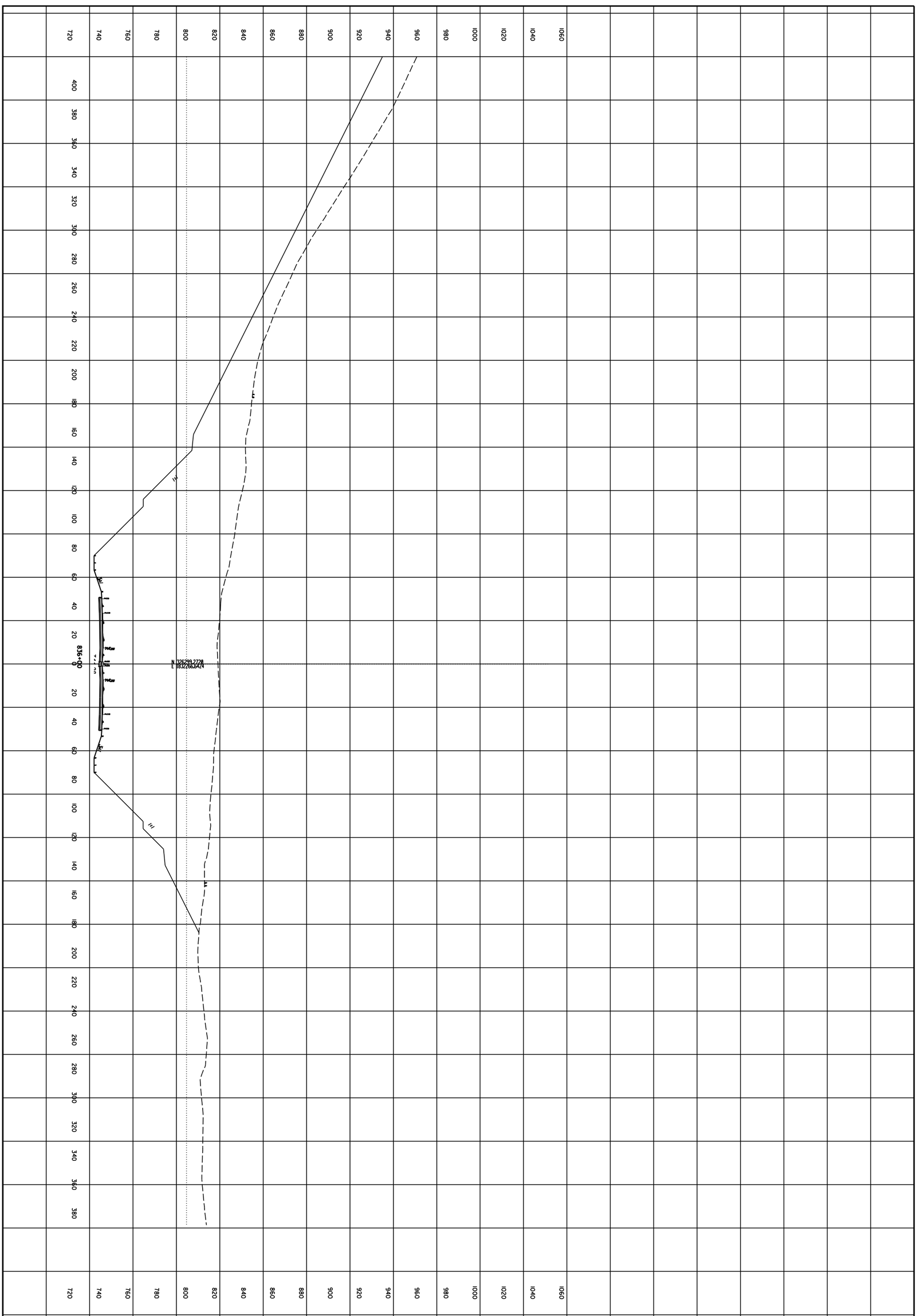
18/43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 834+50
		CHECKED



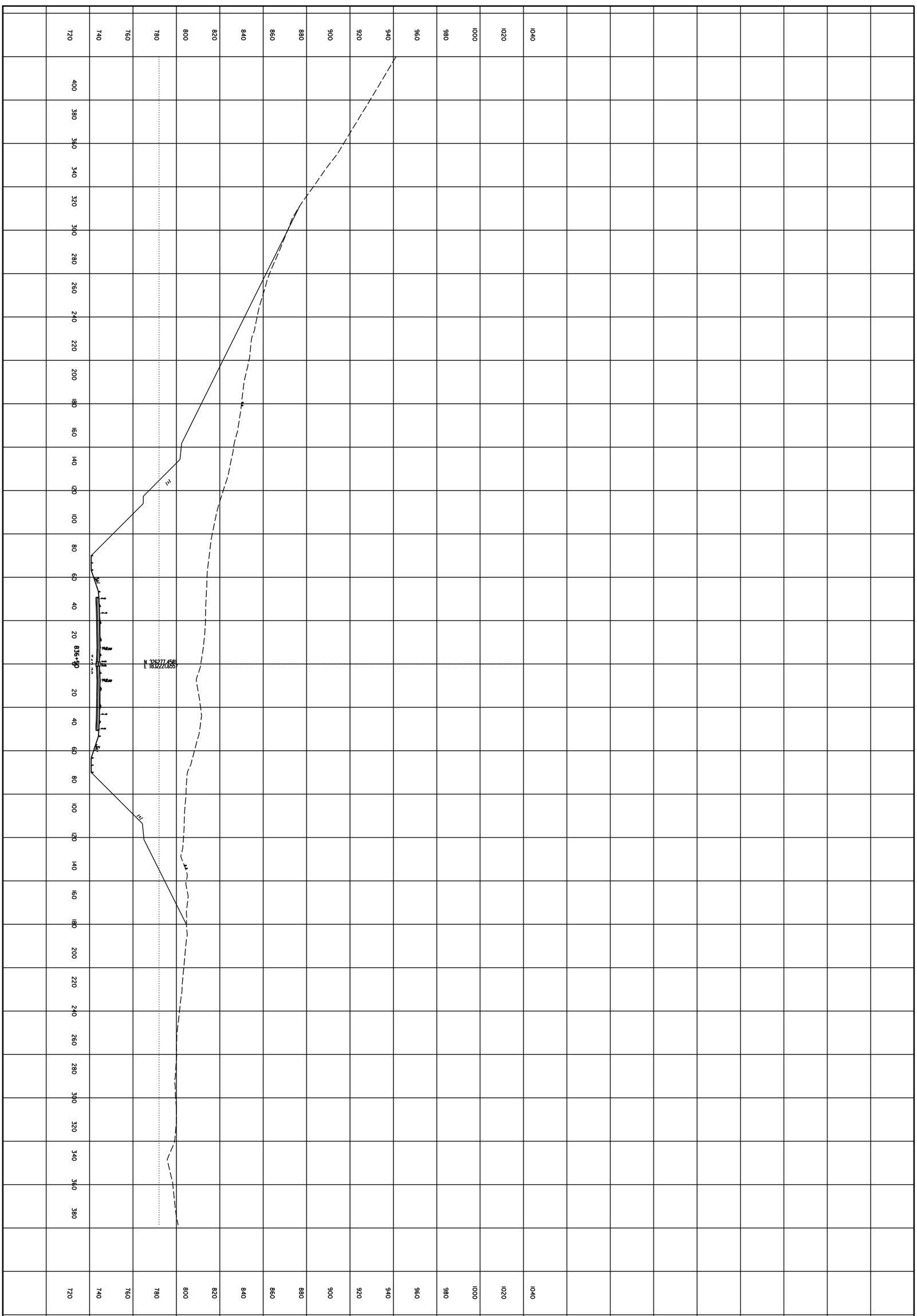
19/43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 835+00
		CHECKED



20/43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 835+50
		CHECKED



21/43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 836+00	CHECKED

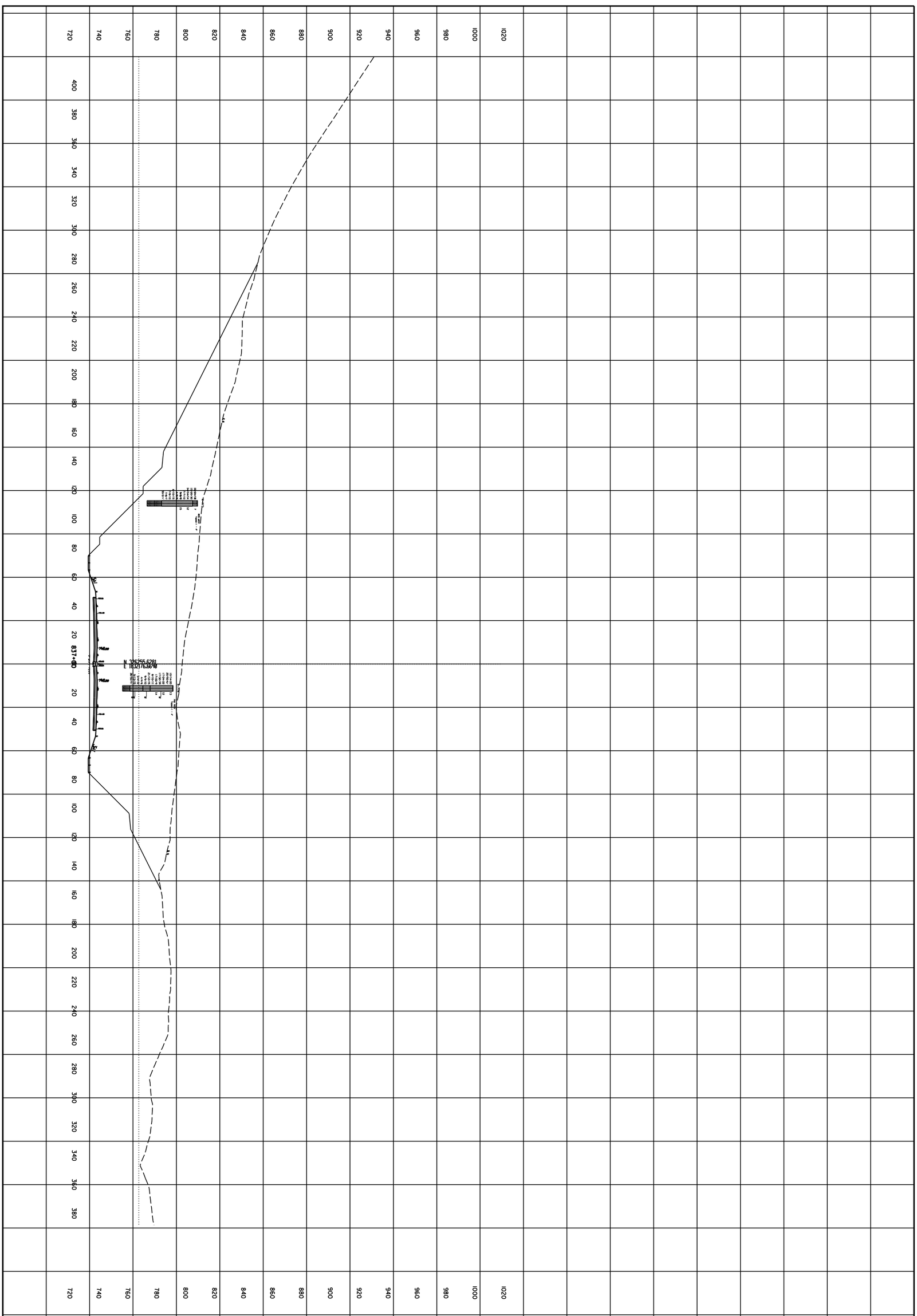


22
43

SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 836+50

CHECKED

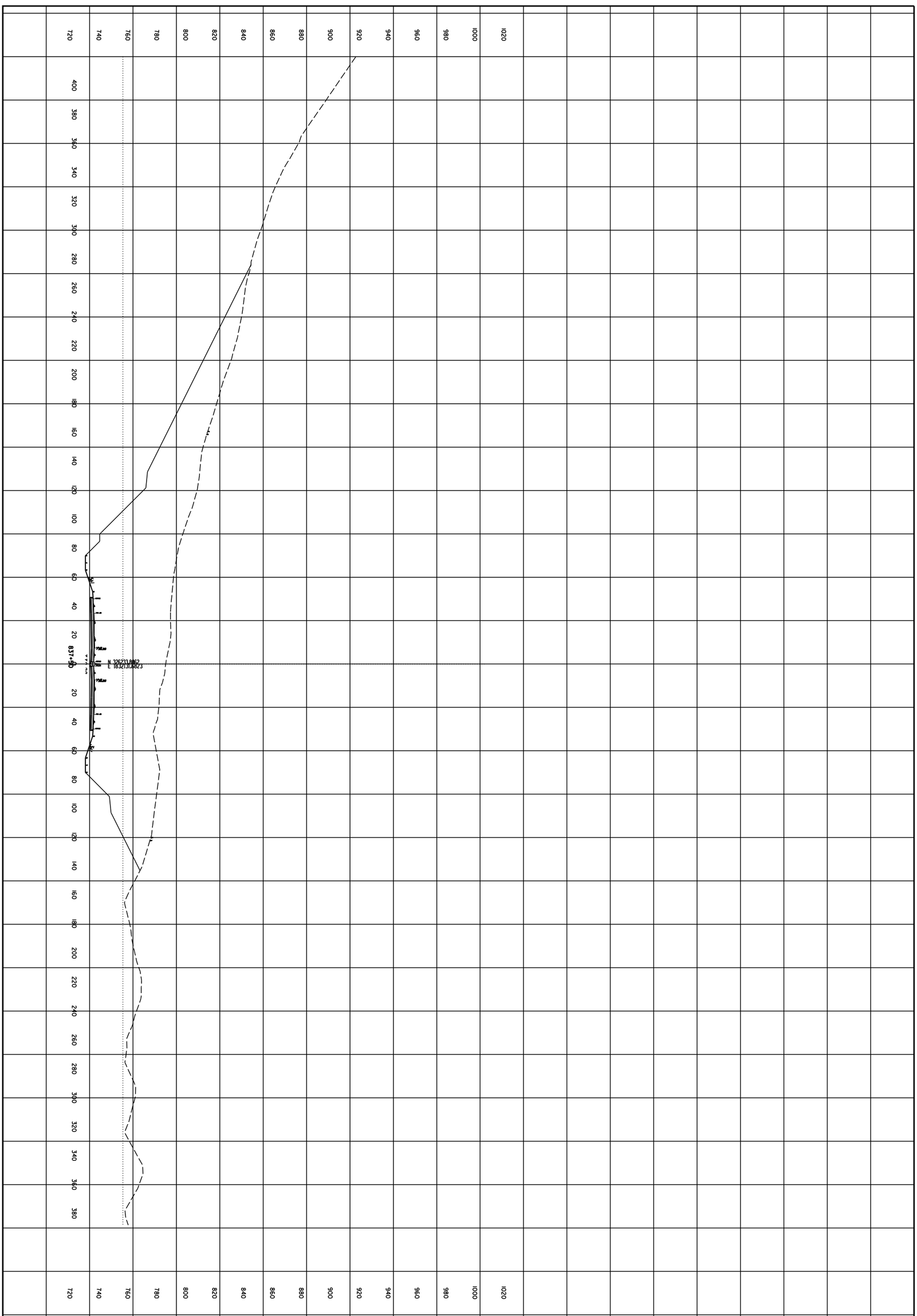


23
43

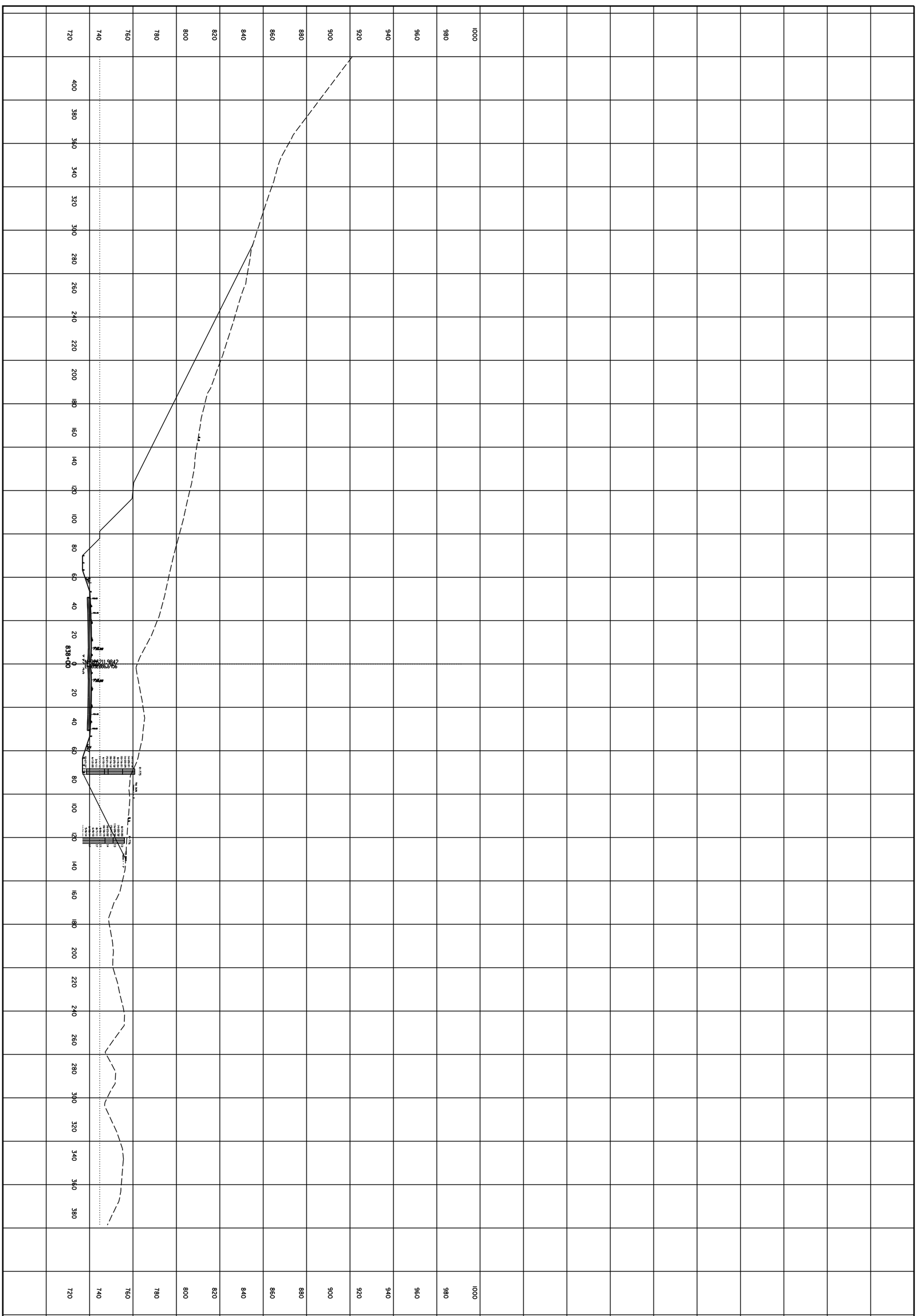
SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 837+00

CHECKED



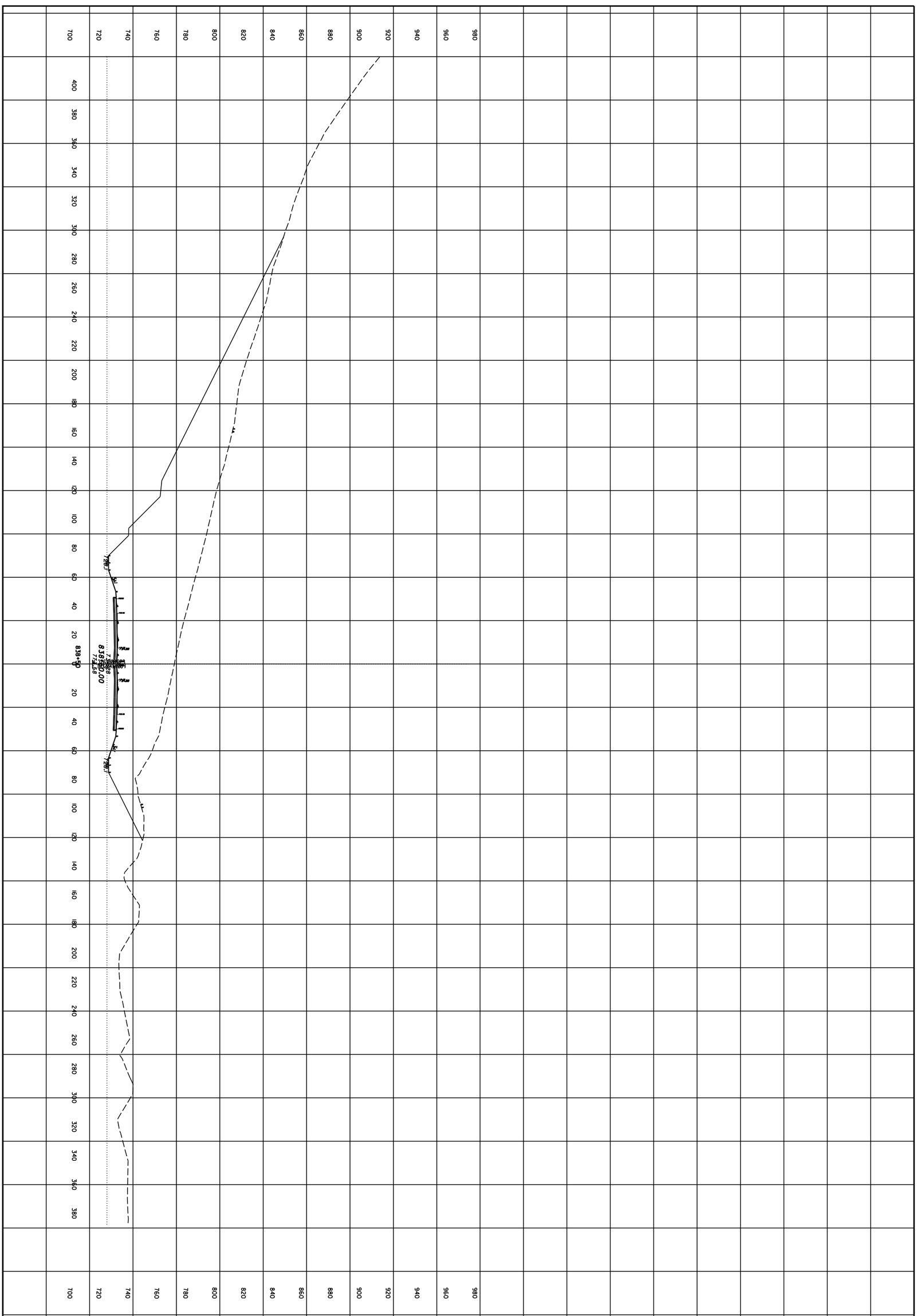
24 / 43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 837+50	CHECKED



SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 838+00

CHECKED

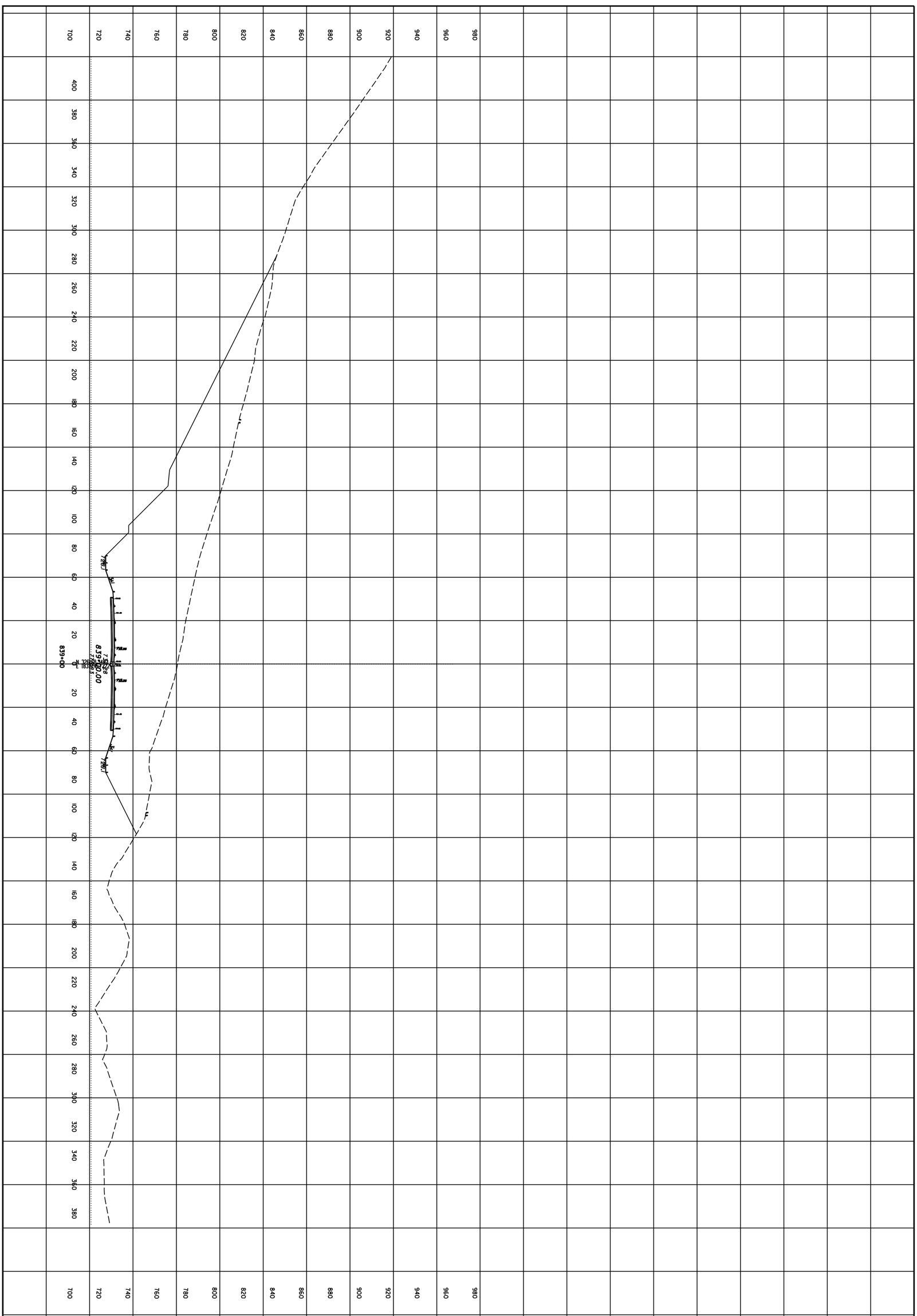


26
43

SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 838+50

CHECKED

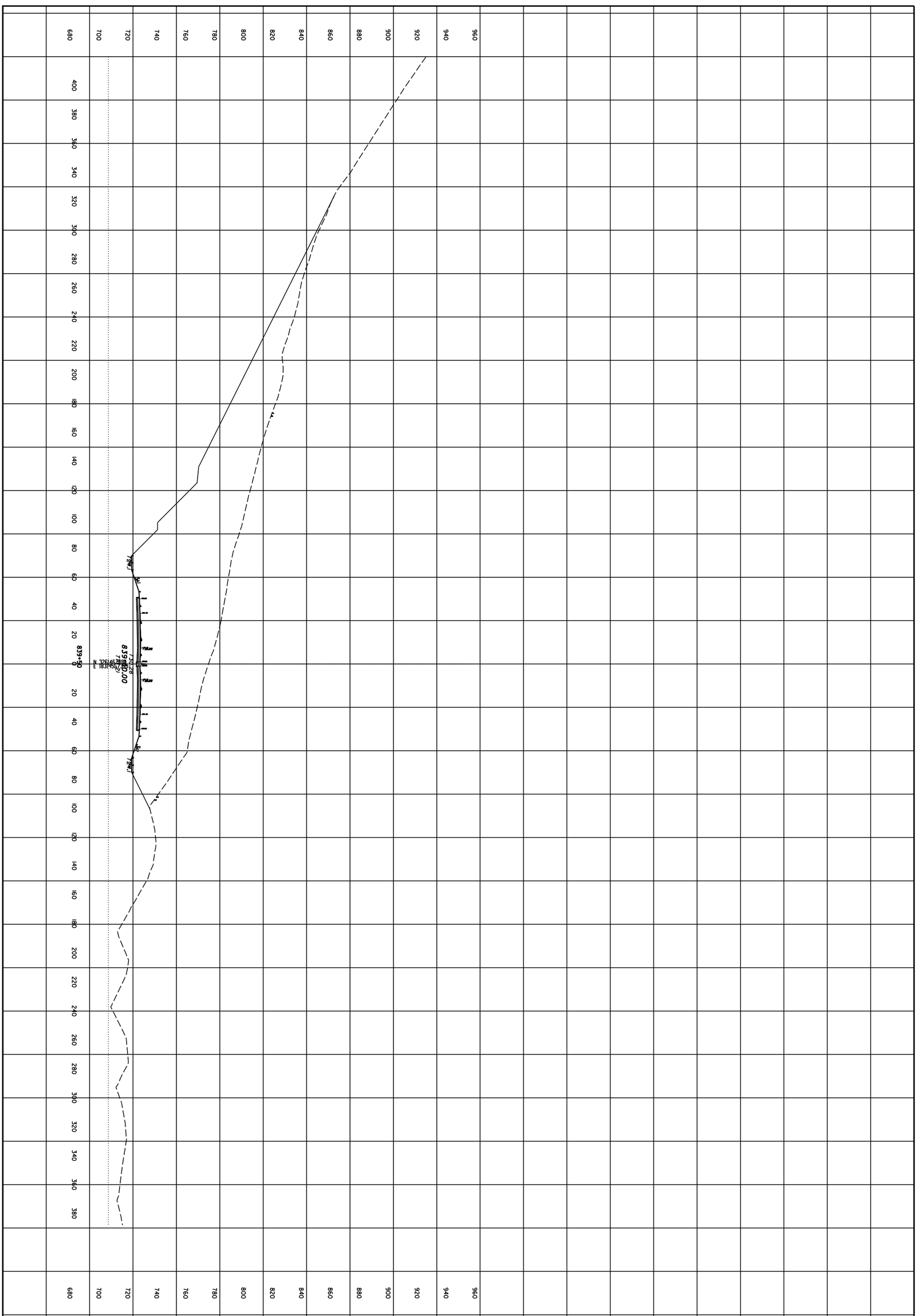


27
43

SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 839+00

CHECKED

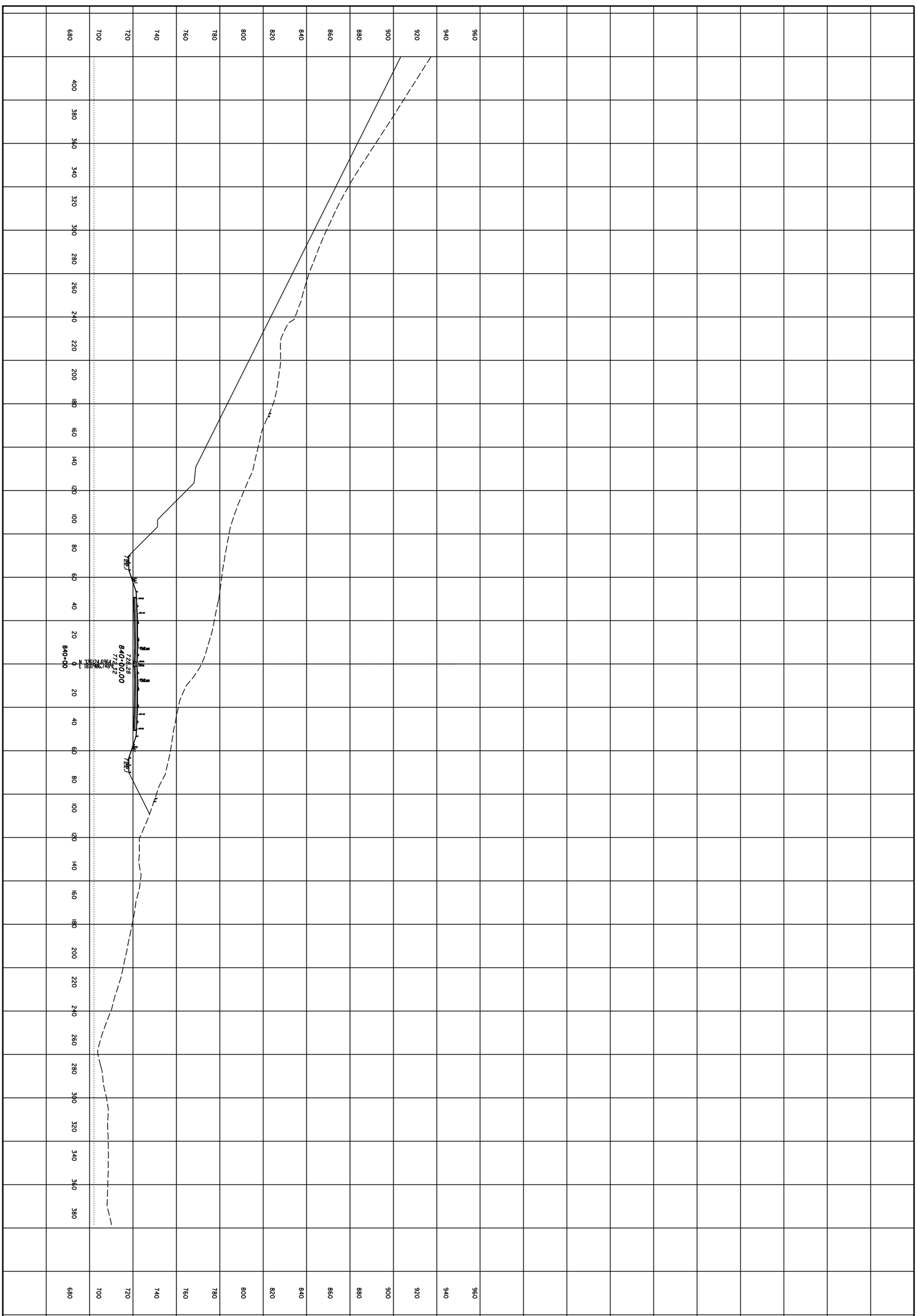


28
43

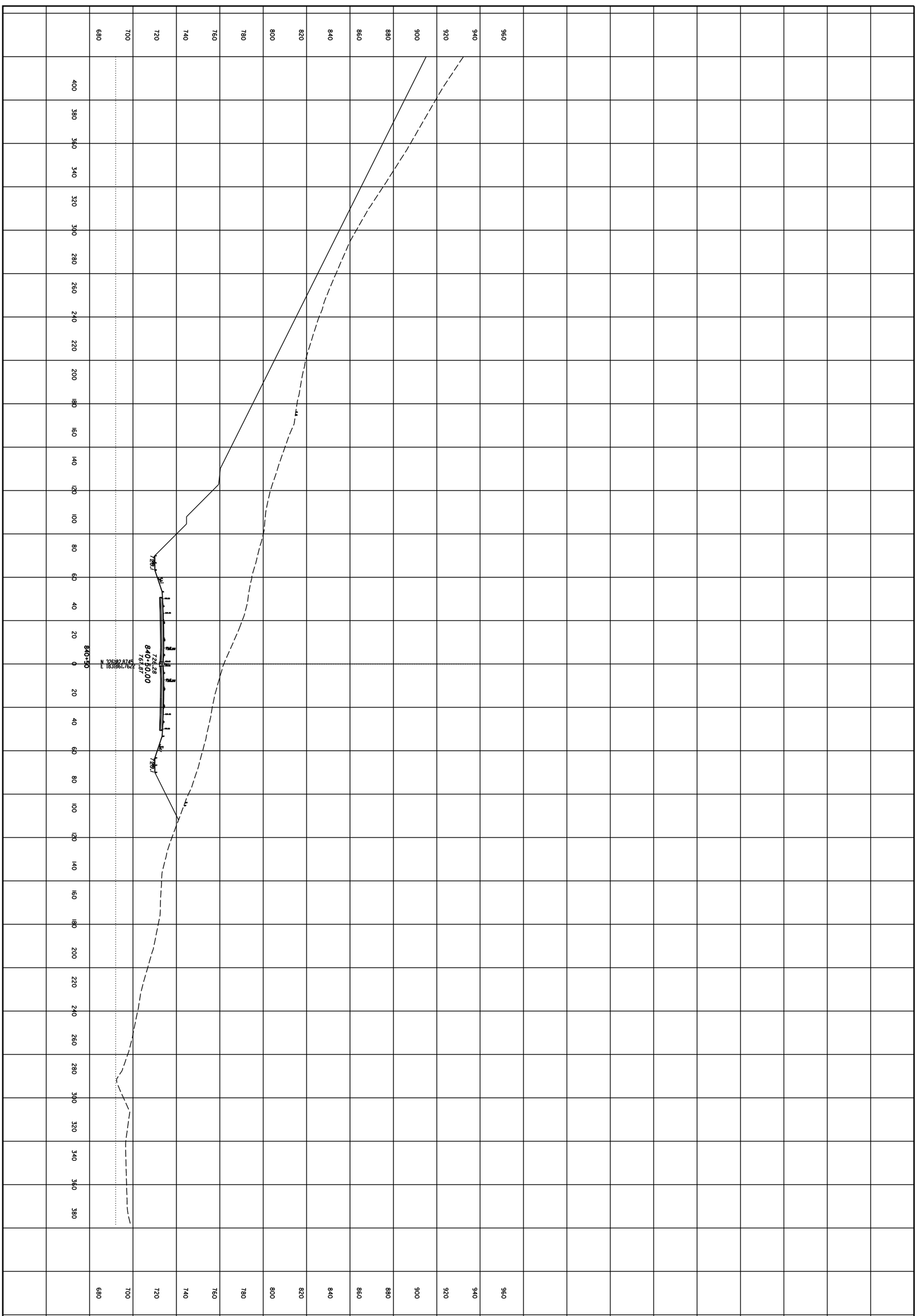
SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 839+50

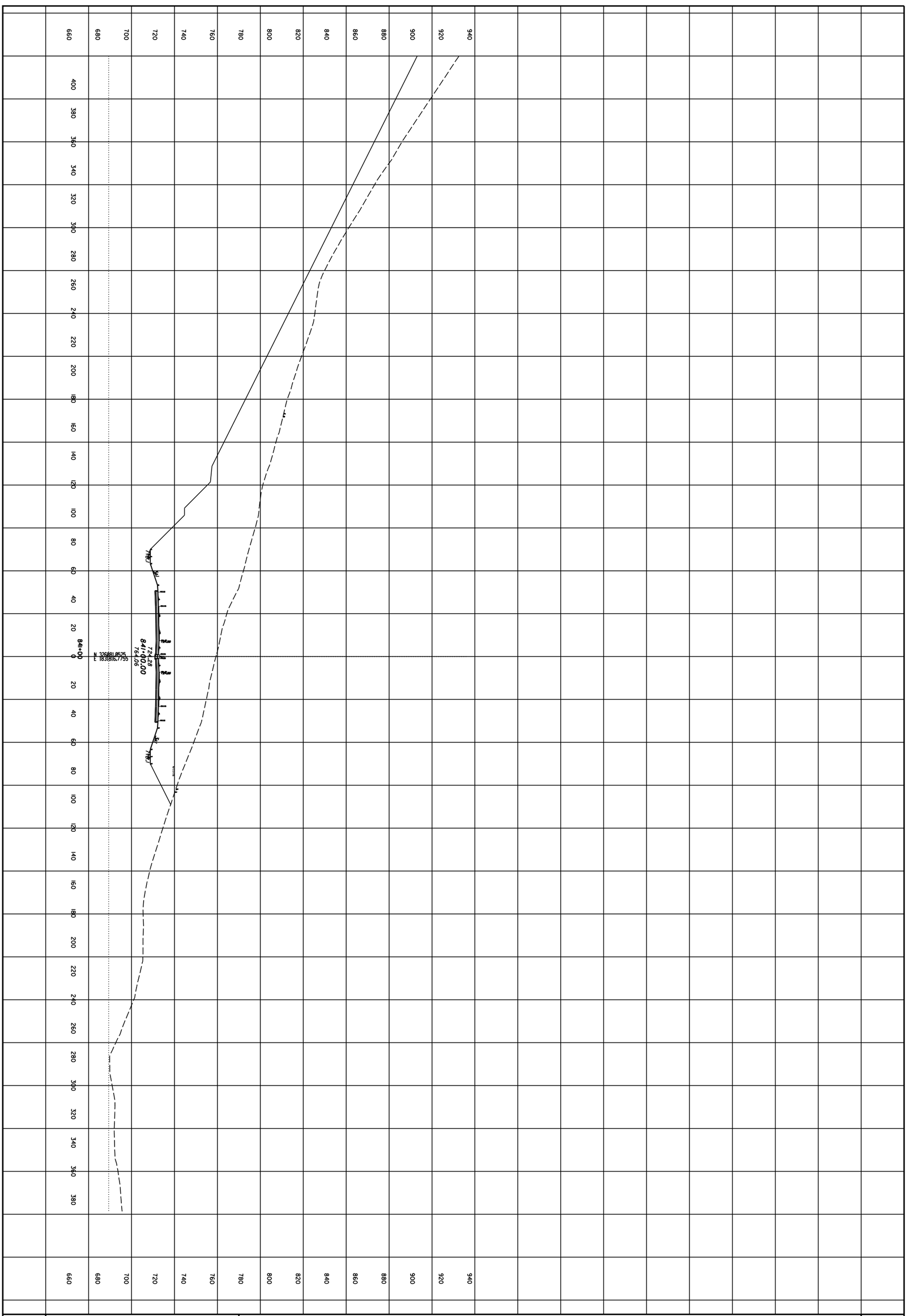
CHECKED



29 / 43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 840+00
		CHECKED

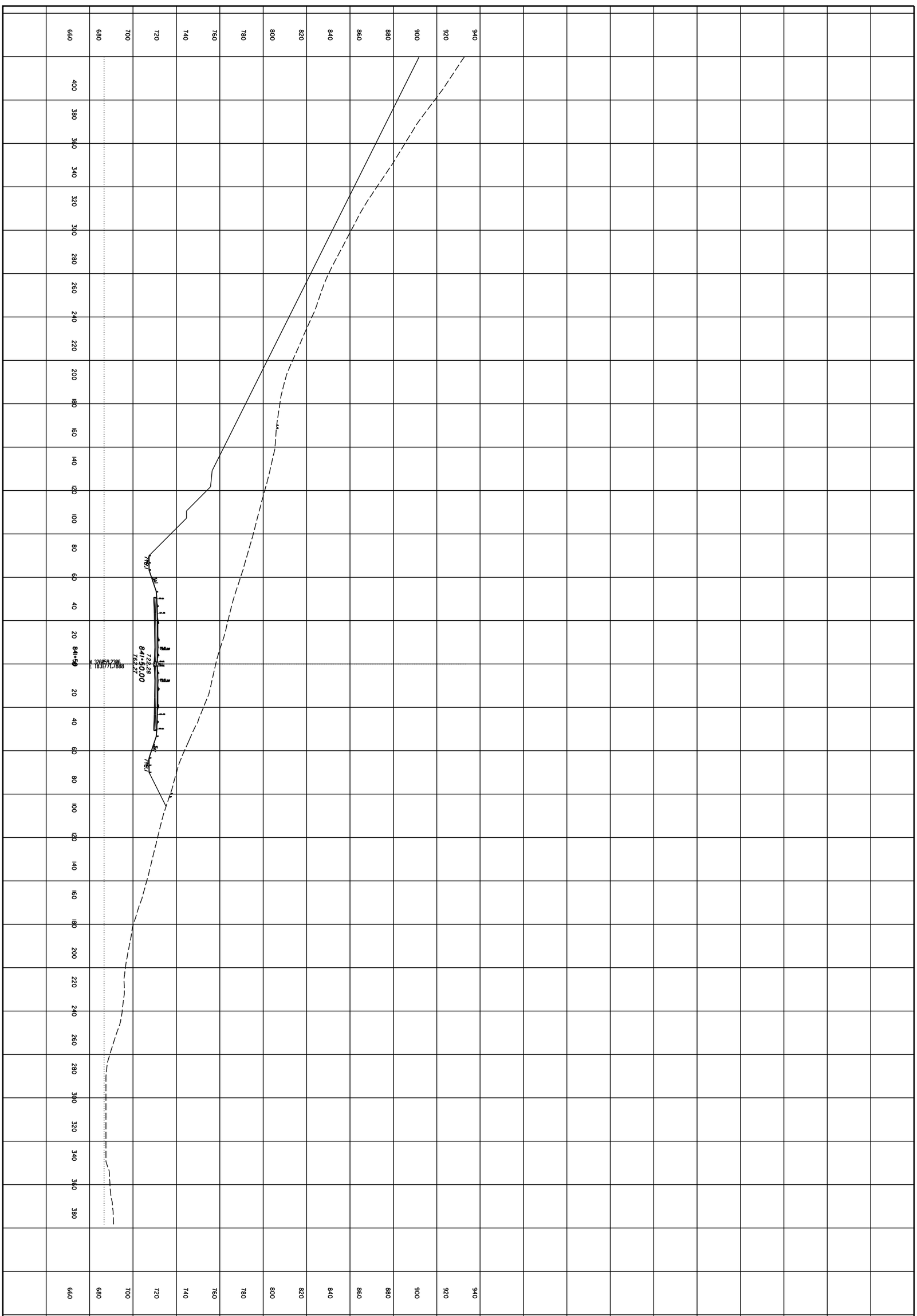


30/43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 840+50
		CHECKED

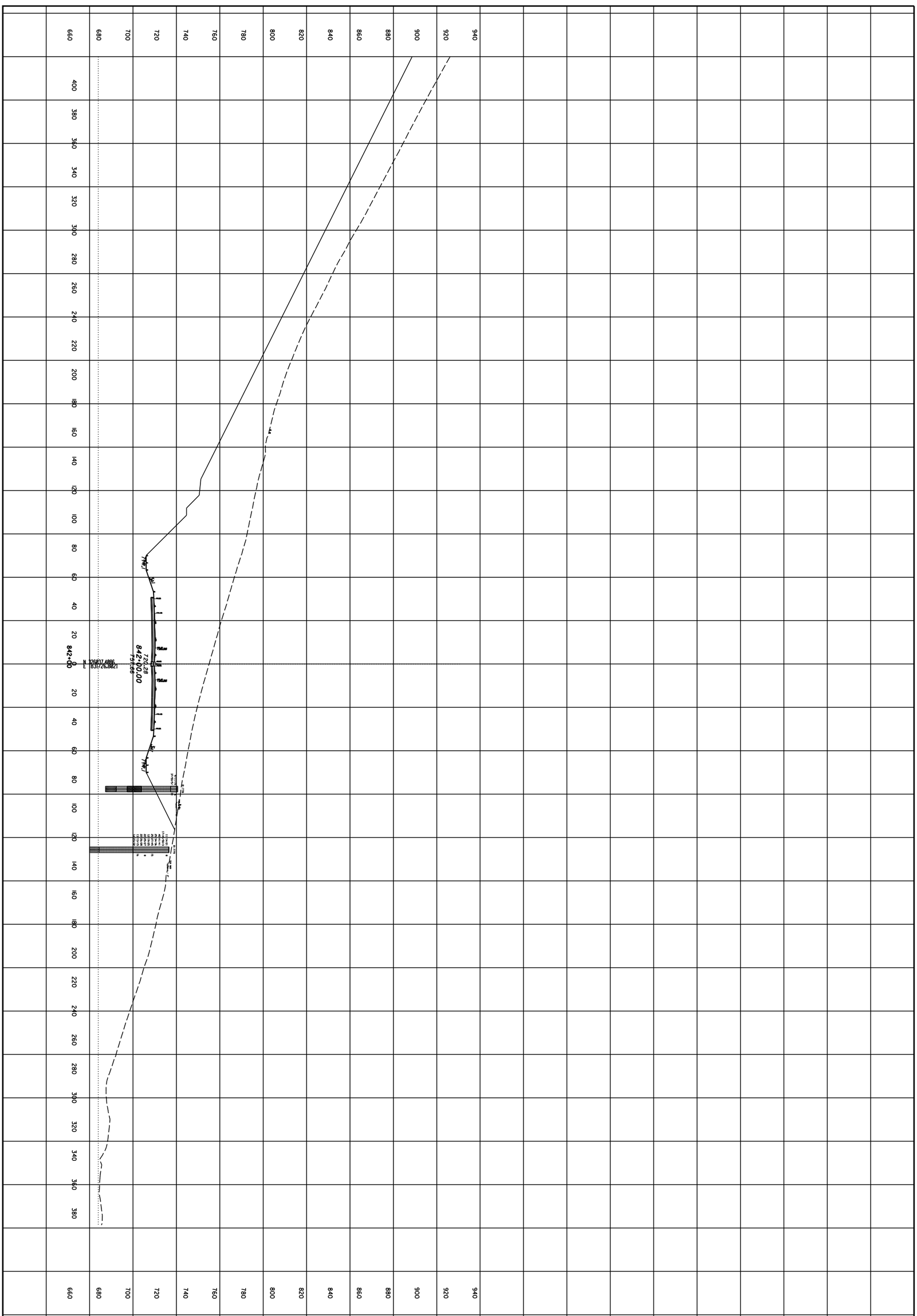


31/43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 841+00

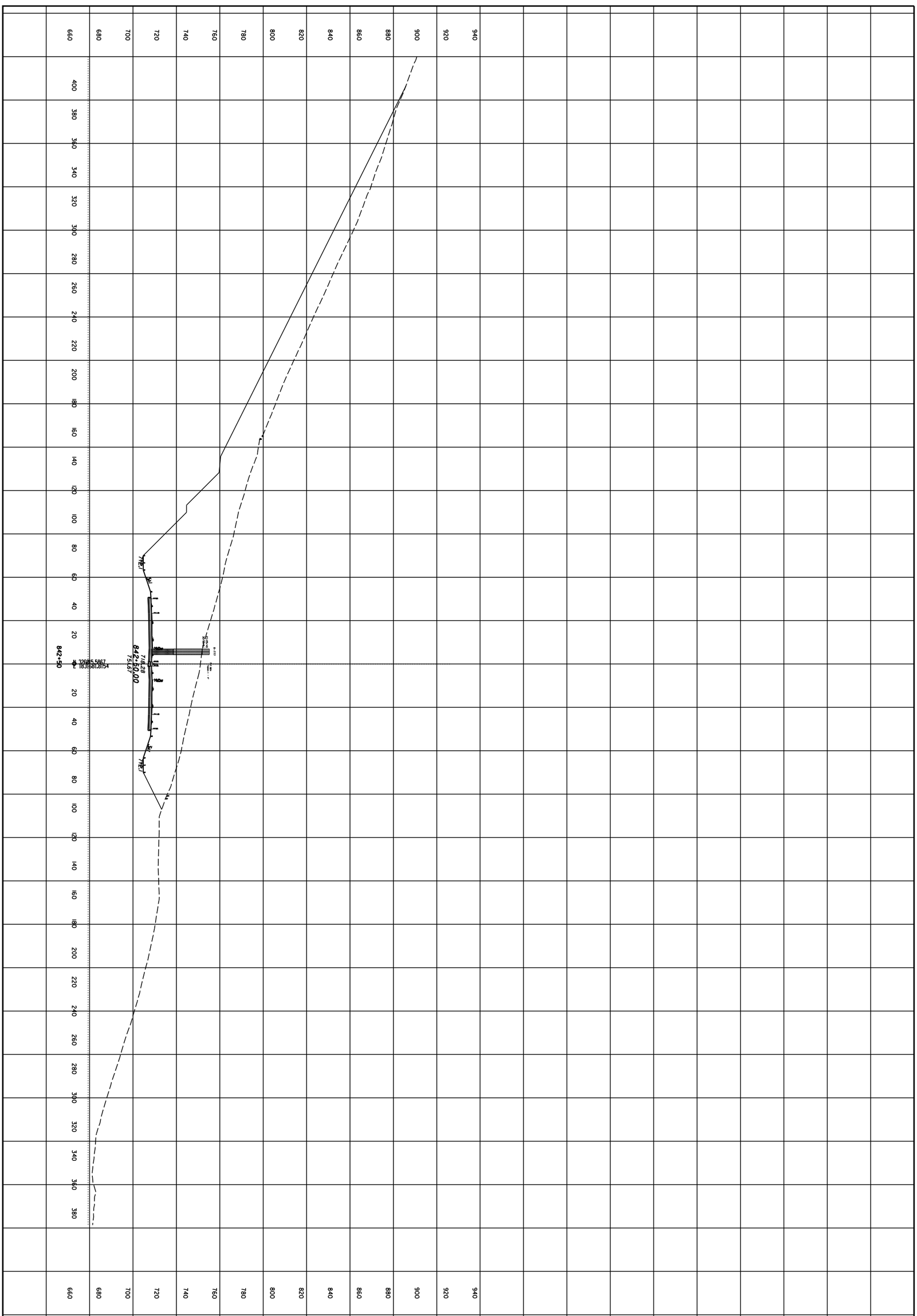
CHECKED



32 / 43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 841+50
		CHECKED



33 / 43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 842+00
		CHECKED

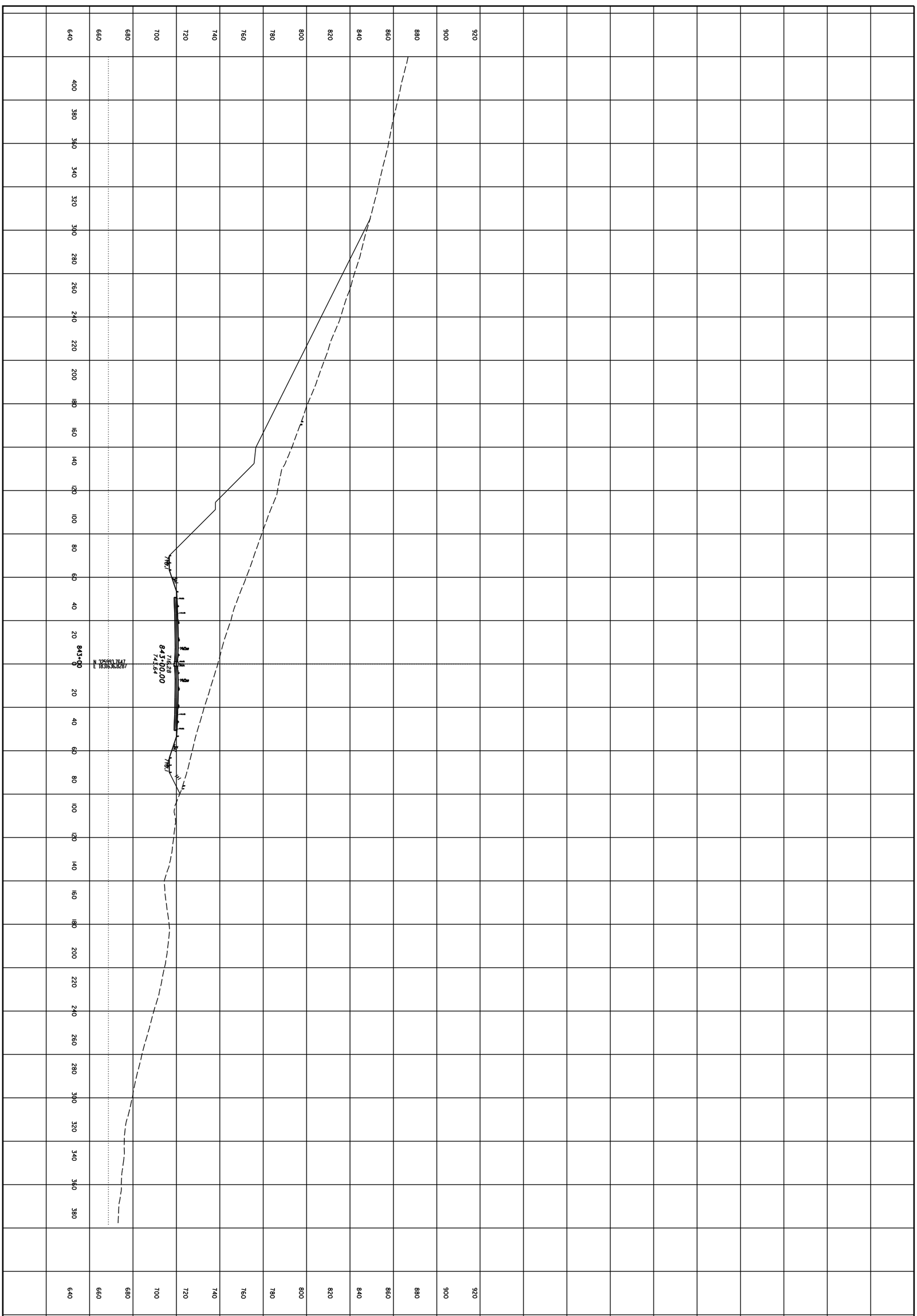


34
43

SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 842+50

CHECKED

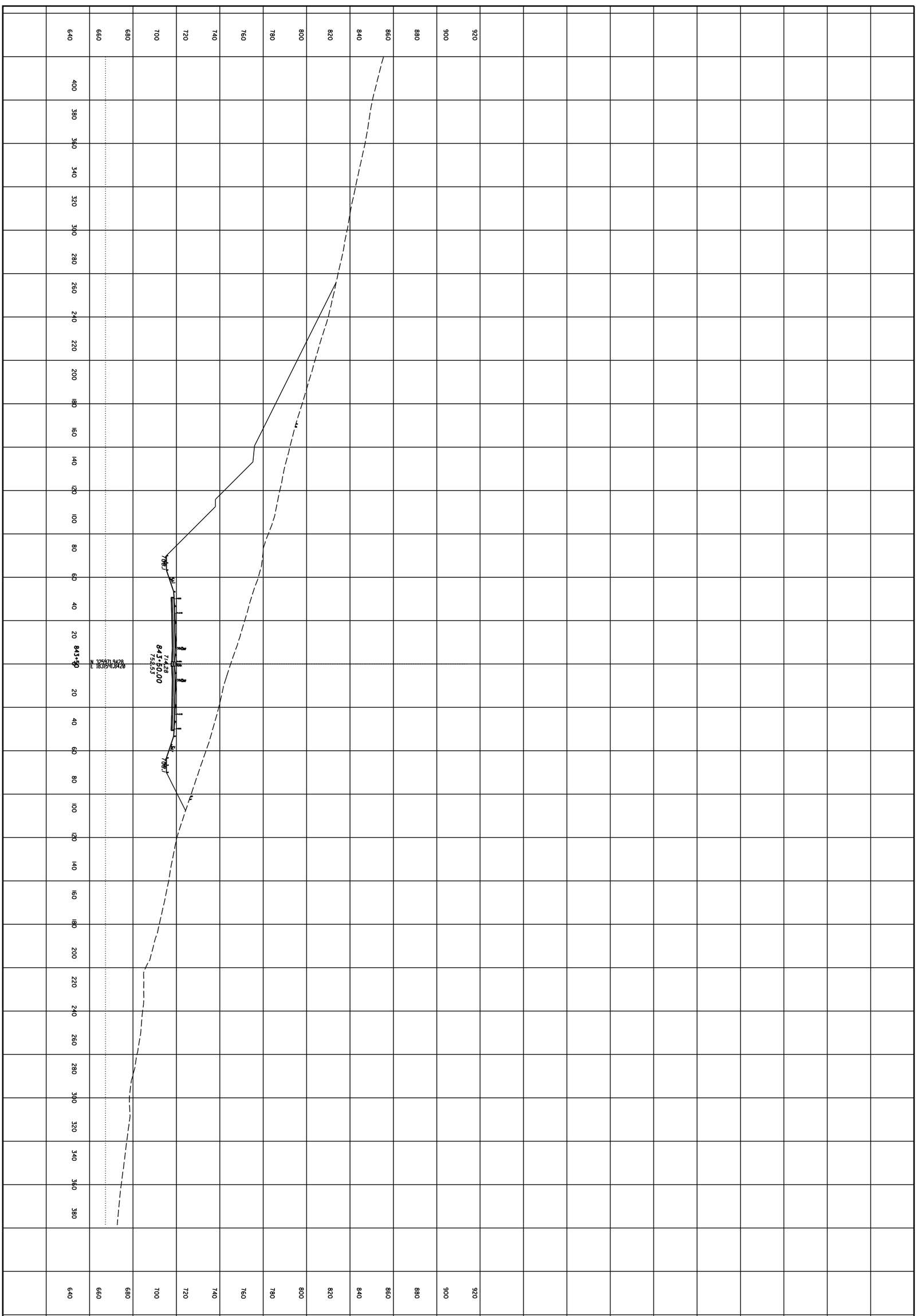


35
43

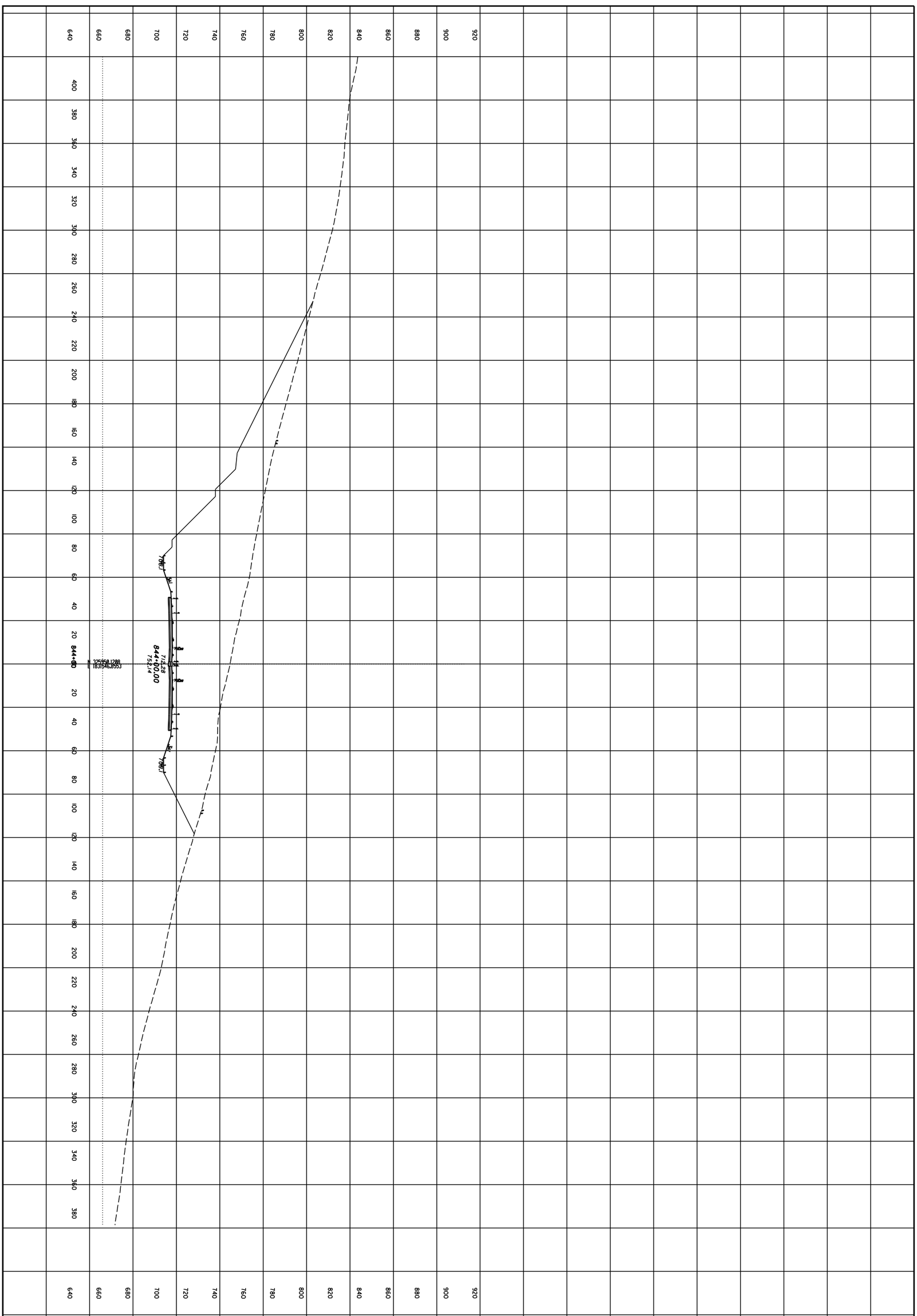
SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 843+00

CHECKED



36 / 43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 843+50
		CHECKED

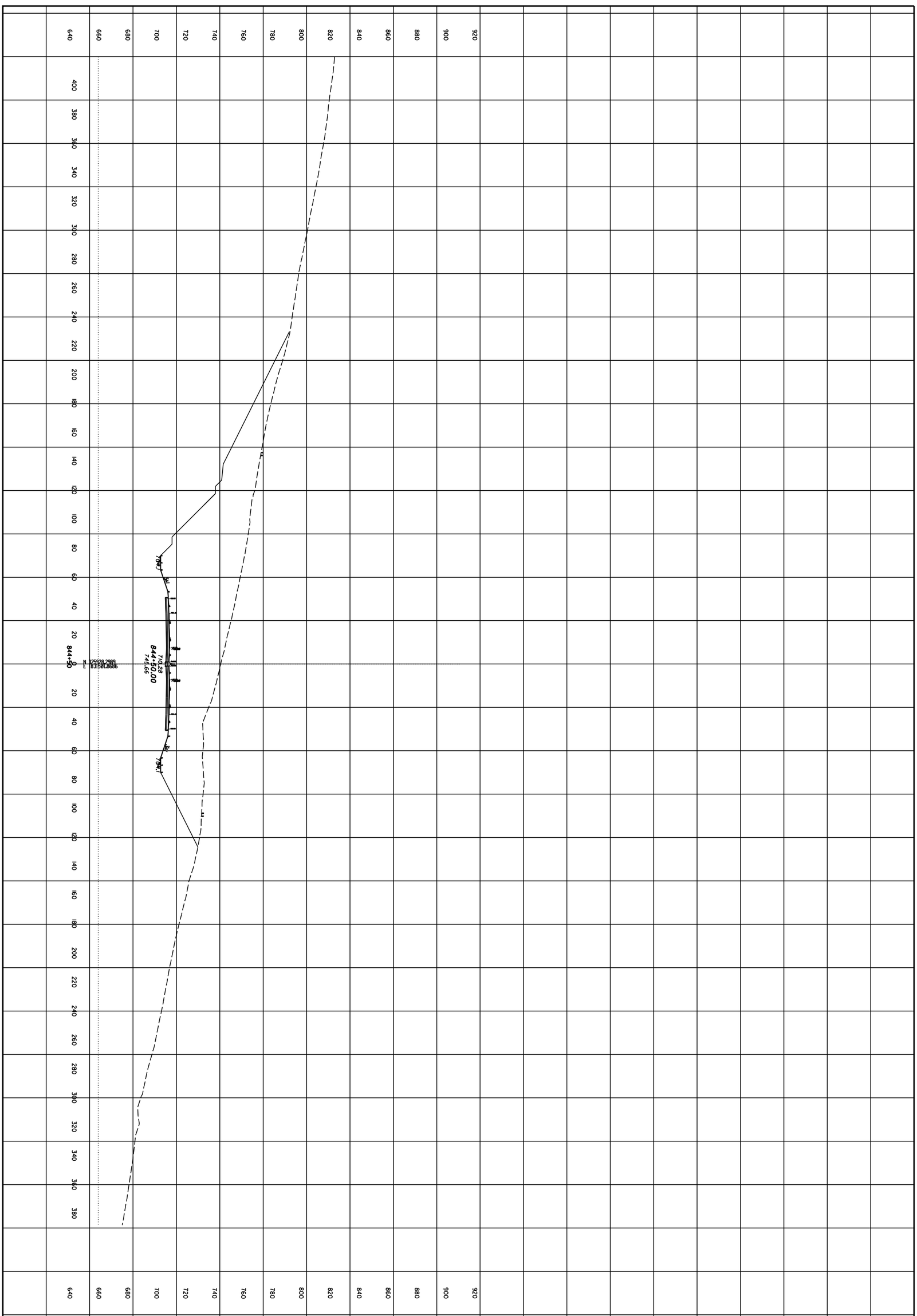


37
43

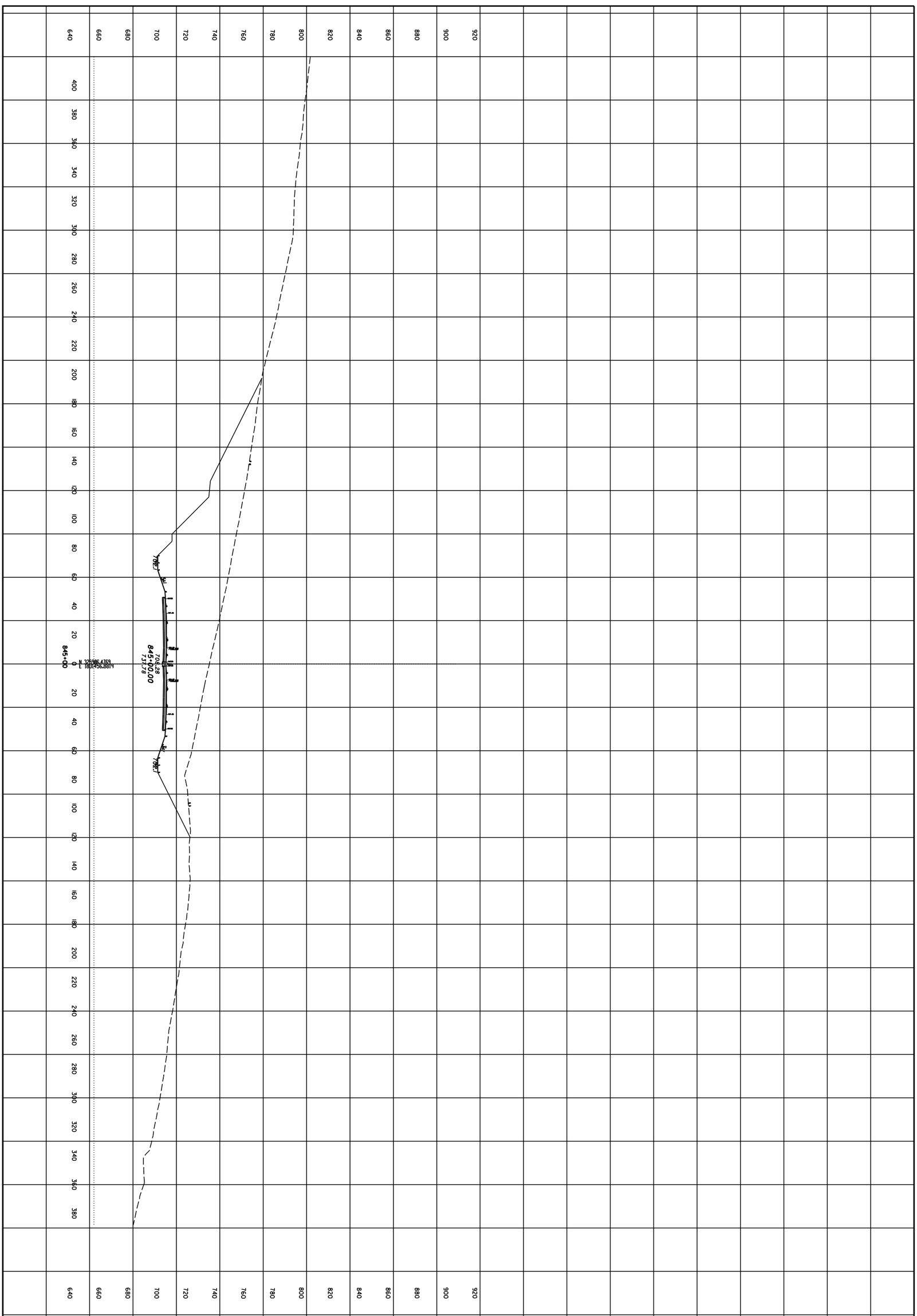
SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 844+00

CHECKED



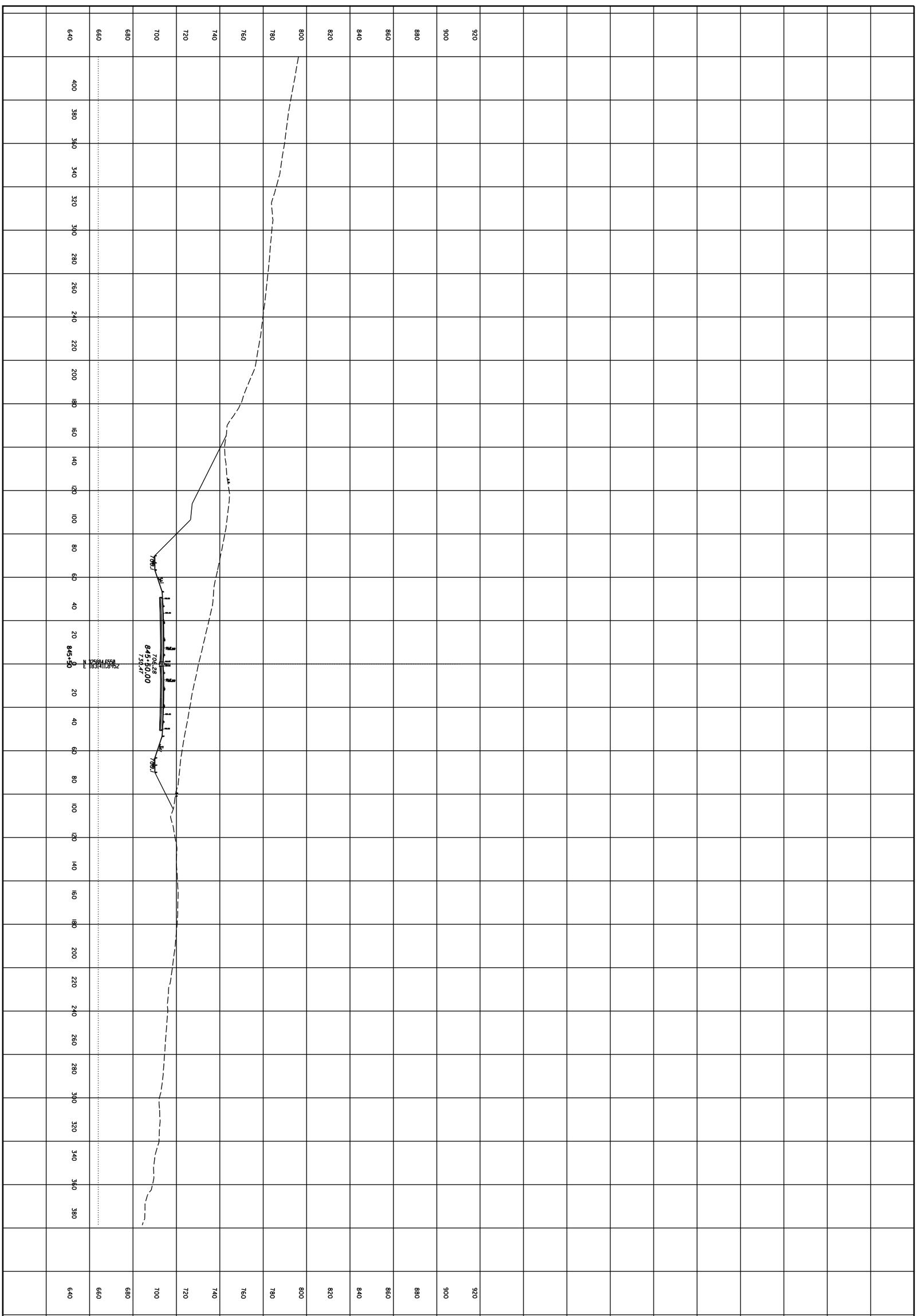
38 / 43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 844+50
		CHECKED



SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 845+00

CHECKED

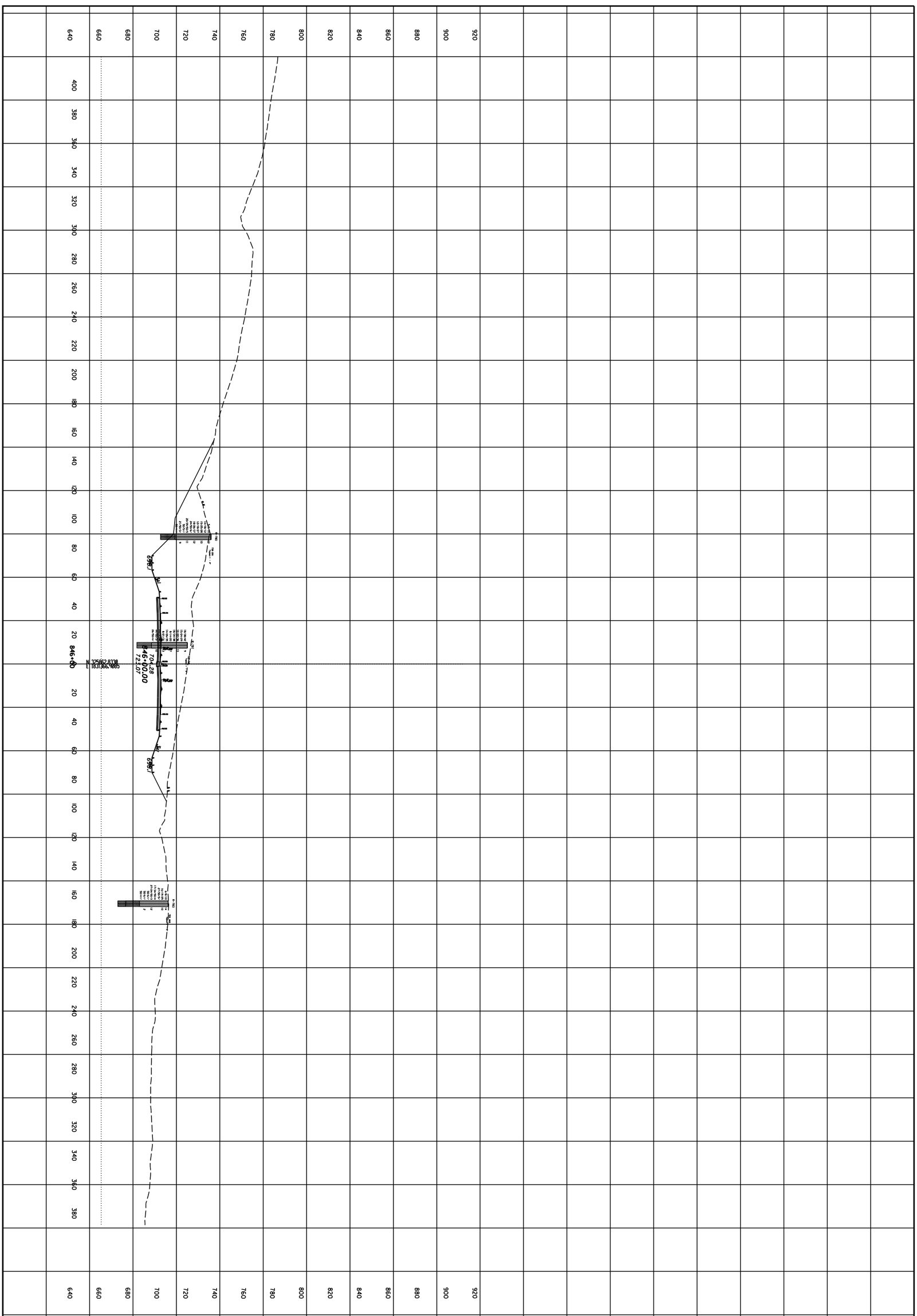


40
43

SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 845+50

CHECKED



41
43

SCI-823-6.81

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 846+00

CHECKED

920
900
880
860
840
820
800
780
760
740
720
700
680
660
640

400 380 360 340 320 300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 **846+50** 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380

698.1

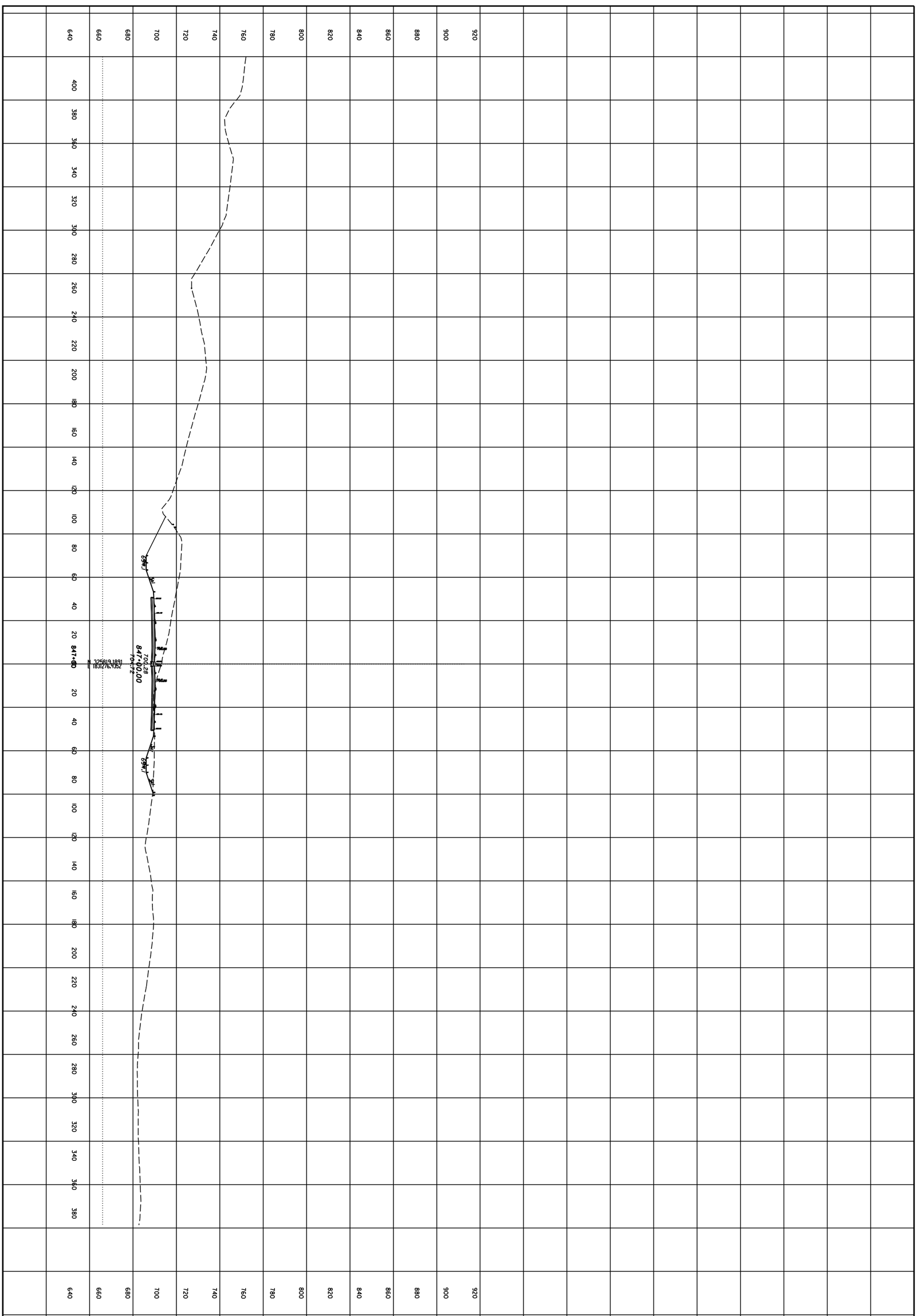
702.28
846+50.00
711.61

698.1

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 31
STA 846+50

SCI-823-6.81

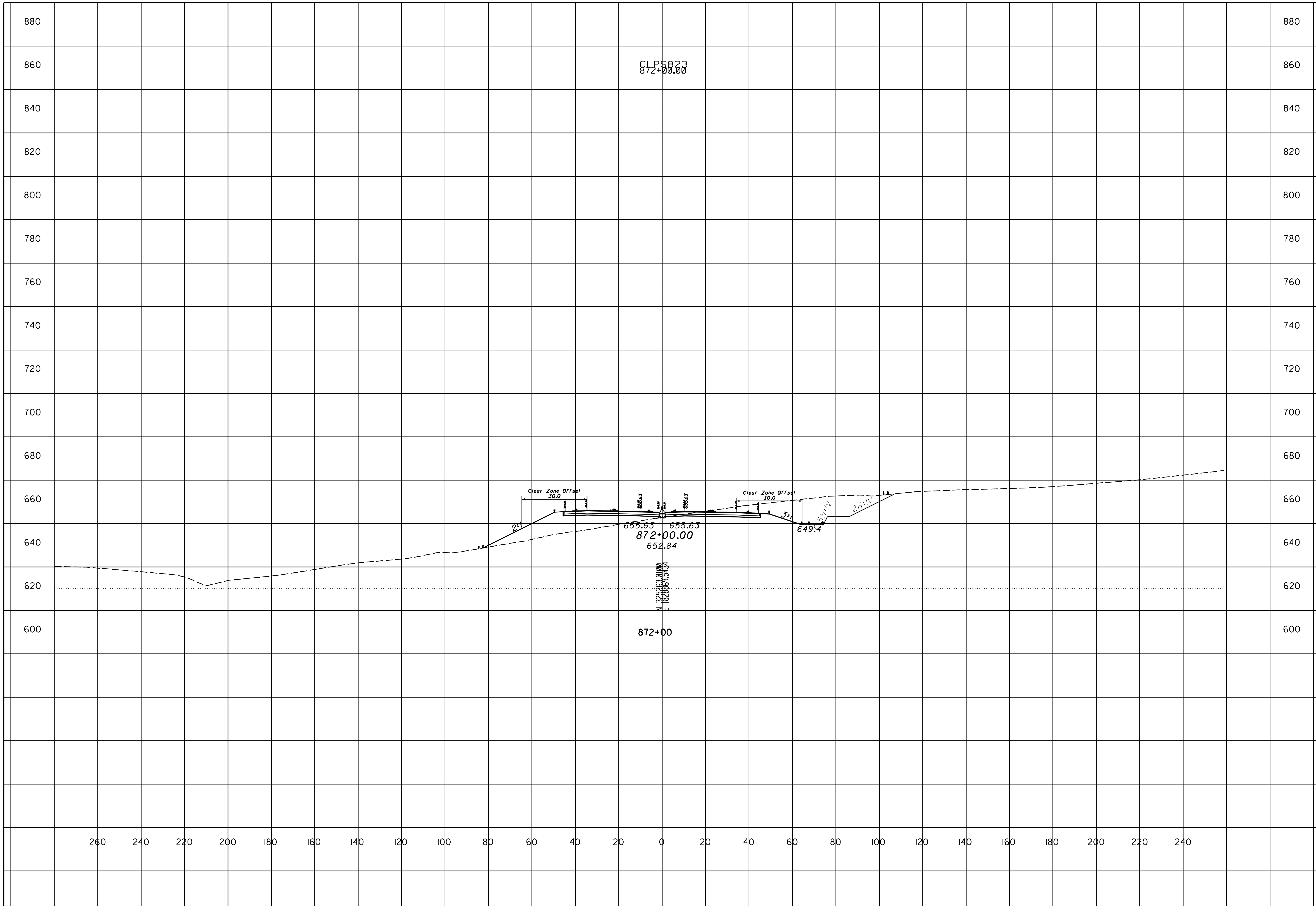


43/43	SCI-823-6.81	ROCK CUT SLOPE DESIGN - ROCK CUT 31 STA 847+00	CHECKED

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 865+50

SCI-823-6.81



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 872+00

SCI-823-6.81

2
35

880
860
840
820
800
780
760
740
720
700
680
660
640
620
600

CLPS823
872+50.00

Clear Zone Offset
30.0

2:1
3:1
3:1
1.5H:1V
2H:1V

654.13
872+50.00
652.47
647.9

N 1252264.4108
E 1828819.5651

872+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 872+50

SCI-823-6.81

3
35

860
840
820
800
780
760
740
720
700
680
660
640
620
600
580

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

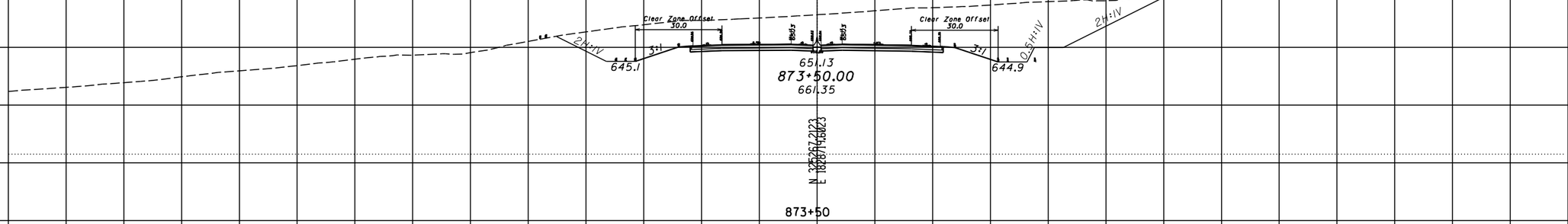
Clear Zone Offset
30.0
2H:1V
4:1
646.8
652.63
873+00.00
658.68
N 3257551.8115
E 1828694.5827
873+00
Clear Zone Offset
30.0
3:1
646.4
0.5H:1V
2H:1V

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32 STA 873+00

SCI-823-6.81

CL PS823
873+50.00



N 1825261.2023
E 1828714.6023

873+50

860 840 820 800 780 760 740 720 700 680 660 640 620 600

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32 STA 873+50

SCI-823-6.81

CHECKED

860
840
820
800
780
760
740
720
700
680
660
640
620
600

CLPS823
874+00.00

2H:1V
0.5H:1V
Clear Zone Offset
30.0
3:1
643.4
649.63
874+00.00
664.89
N 1225268.6131
E 1629869.6220
874+00
Clear Zone Offset
30.0
3:1
0.5H:1V
2H:1V
643.4

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 874+00

SCI-823-6.81

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 874+50

SCI-823-6.81

820

800

780

760

740

720

700

680

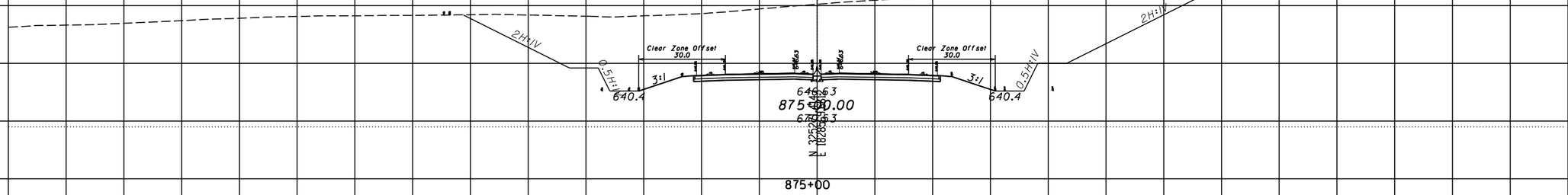
660

640

620

600

CLPS823
875+00.00



260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 875+00

SCI-823-6.81

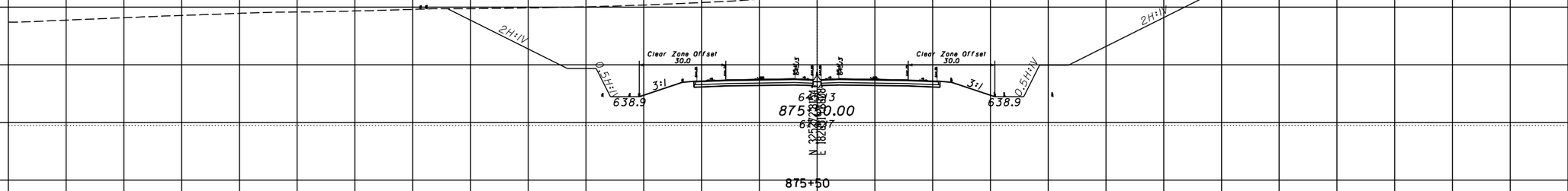
CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 875+50

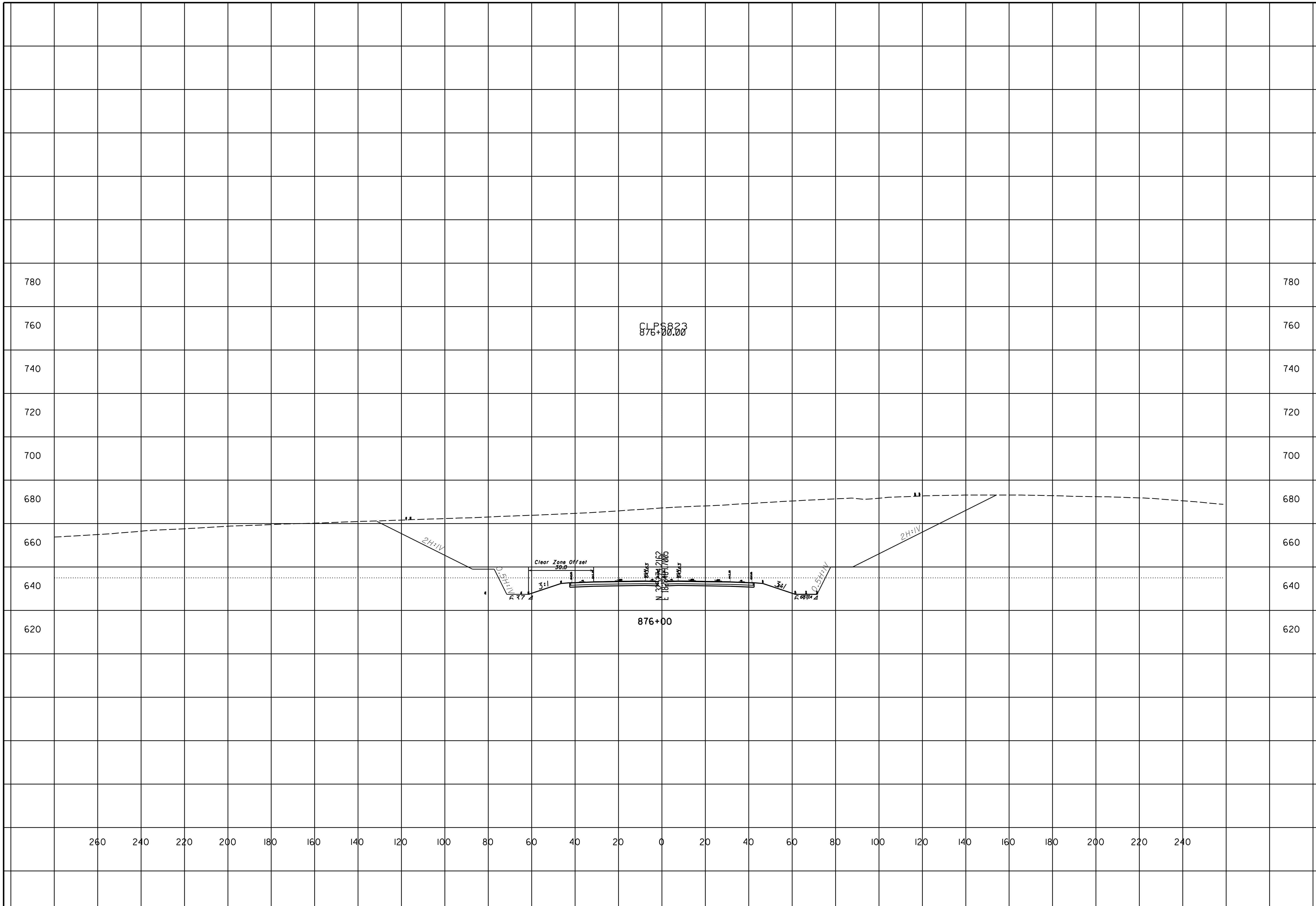
SCI-823-6.81

800
780
760
740
720
700
680
660
640
620
600

CL PS823
875+50.00



260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 876+00

SCI-823-6.81

10
35

760
740
720
700
680
660
640
620

CLPS823
876+50.00

2H:1V
0.5H:1V
3%
3%
0.5H:1V
2H:1V

876+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32 STA 876+50

SCI-823-6.81

II
35

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 877+00

CLPS823
~~877+00.00~~

780
760
740
720
700
680
660
640
620

2H:1V
0.5H:1V
2H:1V
3:1
3:1
0.5H:1V
2H:1V
646.63

877+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

SCI-823-6.81

12
35

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 877+50

SCI-823-6.81

800
780
760
740
720
700
680
660
640
620

CLRS823
877+50.00

2H:1V
0.5H:1V
2H:1V
3H:1V
3H:1V
0.5H:1V
0.5H:1V
2H:1V

877+50.00

877+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 878+00

CLPS823
878+00.00

820
800
780
760
740
720
700
680
660
640
620

2H:1V
0.5H:1V
2H:1V
6m
3m
6m
0.5H:1V
2H:1V

878+00.00

878+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

SCI-823-6.81

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32 STA 878+50

SCI-823-6.81

CLPS823
878+50.00

878+50

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 879+00

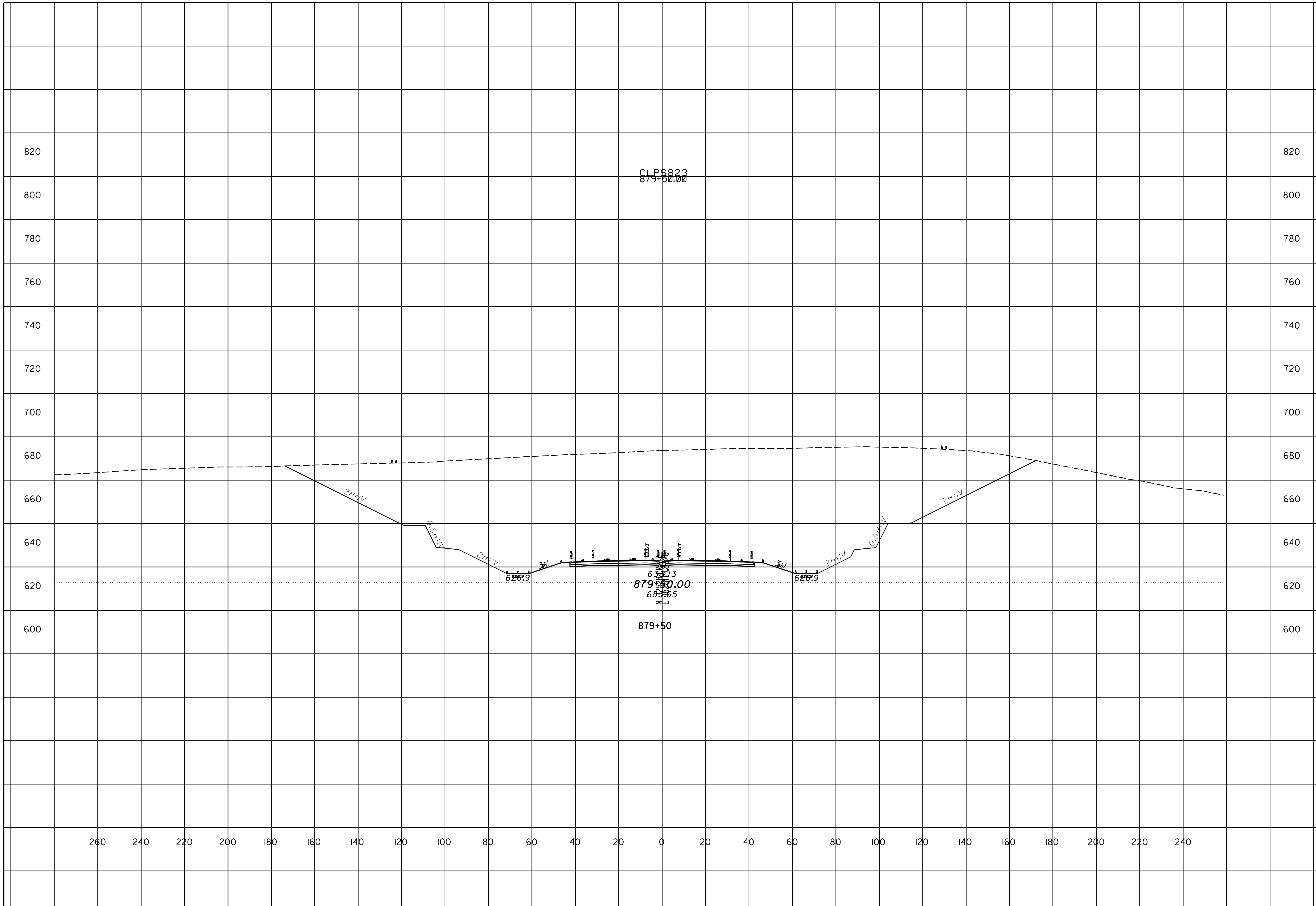
SCI-823-6.81

CLPS823
879+00.00

2H:1V
0.5H:1V
2H:1V
3%
3%
2H:1V
0.5H:1V
2H:1V

879+00.00

879+00



CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 879+50

SCI-823-6.81

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 880+00

SCI-823-6.81

CLPS823
880+00.00

2H:1V
0.5H:1V
2H:1V
3%
625.4
3%
625.4
2H:1V
0.5H:1V
2H:1V

880+00

820
800
780
760
740
720
700
680
660
640
620
600

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 880+50

CLPS823
880+50.00

2H:1V
0.5H:1V
2H:1V
3:1
3:1
2H:1V
0.5H:1V
0.5H:1V
2H:1V

625.9
625.9

880+50.00

880+50

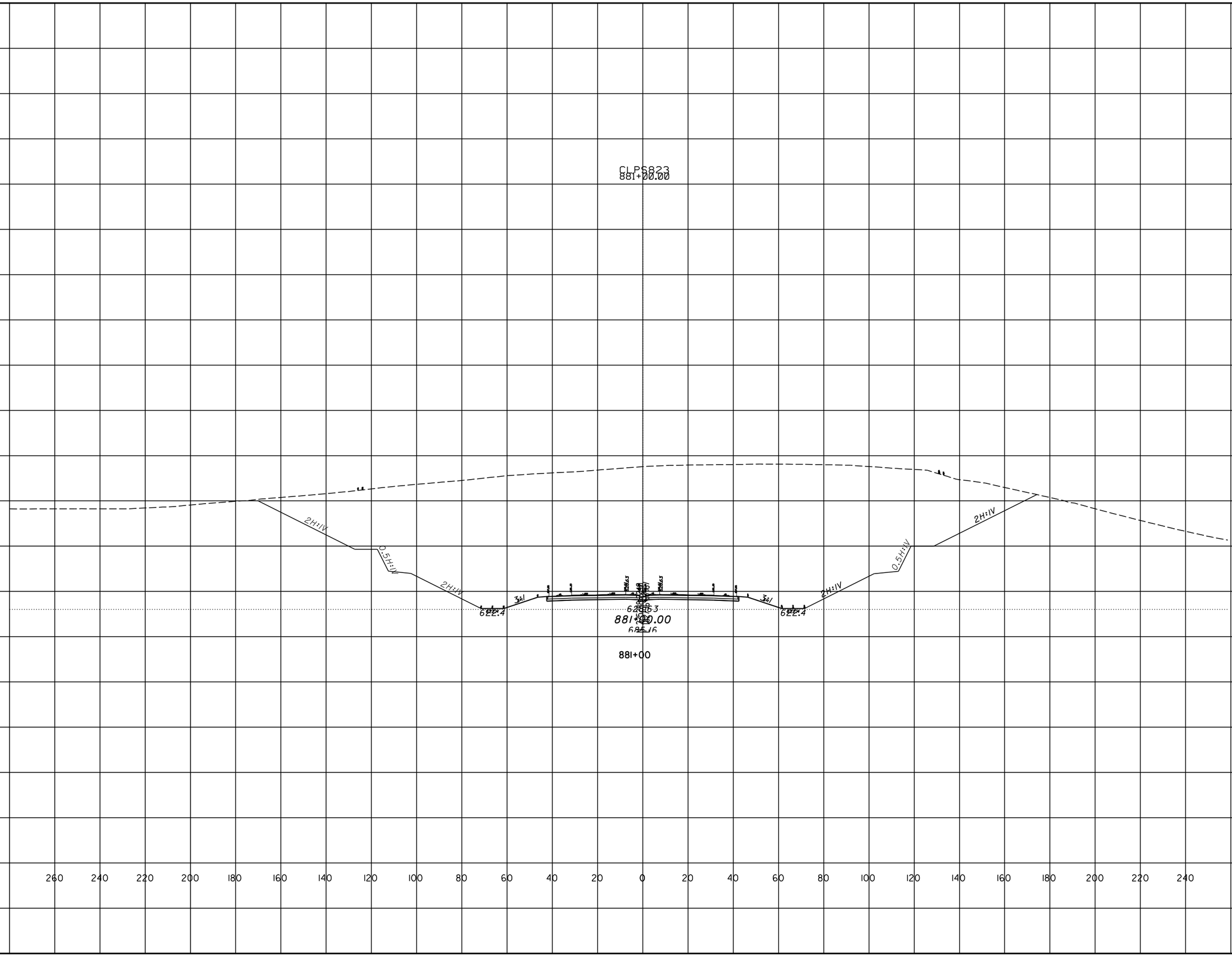
820
800
780
760
740
720
700
680
660
640
620
600

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

SCI-823-6.81

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 881+00



SCI-823-6.81

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 881+50

CLPS823
881+50.00

2H:1V
0.5H:1V
2H:1V
3:1
620.9
620.9
2H:1V
0.5H:1V
2H:1V
3:1

881+50.00

881+50

840 820 800 780 760 740 720 700 680 660 640 620 600

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

SCI-823-6.81

21
35

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32 STA 882+00

SCI-823-6.81

CLPS823
882+00.00

2H:1V
0.5H:1V
2H:1V
3in
619.4
3in
619.4
2H:1V
0.5H:1V
2H:1V

882+00.00

882+00

CHECKED

CL PS823
882+50.00

840
820
800
780
760
740
720
700
680
660
640
620
600

2H:1V
0.5H:1V
2H:1V
617.9
3%
3%
617.9
2H:1V
0.5H:1V
2H:1V

882+50.00

882+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

ROCK CUT SLOPE DESIGN - ROCK CUT 32 STA 882+50

SCI-823-6.81

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32 STA 883+00

CLPS823
883+00.00

840
820
800
780
760
740
720
700
680
660
640
620
600

2H:1V
0.5H:1V
2H:1V
3:1
618.4
625.83
883+00.00
883+00
3:1
1H:1V
618.4
2H:1V
0.5H:1V
2H:1V

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

SCI-823-6.81

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32 STA 883+50

SCI-823-6.81

CLPS823
883+50.00

2H:1V
0.5H:1V
2H:1V
3:1
614.9
1H:1V
2H:1V
0.5H:1V
2H:1V
3:1
614.9

883+50

CLPS823
884+00.00

2H:1V
0.5H:1V
2H:1V
1H:1V
2H:1V
0.5H:1V
2H:1V

884+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32 STA 884+00

SCI-823-6.81

CHECKED

CLPS823
884+50.00

2H:1V
0.5H:1V
2H:1V
1H:1V
2H:1V
0.5H:1V
2H:1V

884+50

ROCK CUT SLOPE DESIGN - ROCK CUT 32 STA 884+50

SCI-823-6.81

CHECKED

CLPS823
885+00.00

2H:1V
0.5H:1V
2H:1V
3:1
3:1
1H:1V
2H:1V
0.5H:1V
2H:1V
610.3
610.4
885+00

ROCK CUT SLOPE DESIGN - ROCK CUT 32 STA 885+00

SCI-823-6.81

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32 STA 885+50

CLPS823
885+50.00

2H:1V
0.5H:1V
2H:1V
1H:1V
2H:1V
0.5H:1V
2H:1V

885+50

SCI-823-6.81

CLPS823
886+00.00

2H:1V
0.5H:1V
2H:1V
1H:1V
2H:1V
0.5H:1V
2H:1V
607.3
607.3
886+00

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 886+00

SCI-823-6.81

30
35

CHECKED

CLPS823
886+50.00

2H:1V
0.5H:1V
2H:1V
1H:1V
2H:1V
0.5H:1V
2H:1V

886+50

ROCK CUT SLOPE DESIGN - ROCK CUT 32 STA 886+50

SCI-823-6.81

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 887+00

SCI-823-6.81

CLPS823
887+00.00

887+00

CHECKED

SLOPE DESIGN - ROCK CUT 32
STA 887+50

CLPS823
887+50.00

2H:1V
0.5H:1V
2H:1V
3m
3m
1H:1V
0.5H:1V
2H:1V

609.13

887+50

820
800
780
760
740
720
700
680
660
640
620
600

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

SCI-823-6.81

33
35

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 888+00

SCI-823-6.81

800
780
760
740
720
700
680
660
640
620
600
580

CLPS823
888+00.00

2H:1V
3:1
1H:1V
0.5:1H:1V
2H:1V

888+00.00

888+00

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

760
740
720
700
680
660
640
620
600
580

CLPS823
888+50.00

599.0
3:1
3:1
599.4
1H:1V
2H:1V
888+50.00
888+50

260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240

CHECKED

ROCK CUT SLOPE DESIGN - ROCK CUT 32
STA 888+50

SCI-823-6.81

35
35

Colorado Rock Fall Simulation
Analysis Data Disk