APPENDIX B CARRAÍZO SEDIMENTATION SURVEY OF LAGO LOÍZA

SEDIMENTATION SURVEY OF LAGO LOÍZA, PUERTO RICO



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1 INTRODUCTION

The Puerto Rico Aqueduct and Sewer Authority (PRASA) owns and operates the Loíza (Carraízo) dam and reservoir. This reservoir is one of the most important sources of water for the Puerto Rico metropolitan area, supplying raw water to the Sergio Cuevas filtration plant. Lago Loíza is located between the municipalities of Trujillo Alto, Caguas and Gurabo in the north east side of Puerto Rico as presented in Figure 1.

Sedimentation has been the principal threat to this reservoir, and the original capacity of 26.8 Mm^3 (at el. 41.14 m) has been reduced to 15.06 Mm^3, a 44% volume loss. This situation has led to a continuous reduction in firm yield. In 1997 the reservoir was dredged recovering 6 Mm^3 of lost storage volume, returning capacity to about 20.6 Mm^3. Today, 22 years later, the recovered volume has been essentially lost.

This study has been commissioned by the Puerto Rico Aqueduct and Sewer Authority (PRASA) to determine the current storage capacity of Lago Loíza. This new sedimentation survey will be used to establish the rate of sedimentation and the volume lost since the last sedimentation survey performed in 2009. In addition, it is intended to estimate the amount of sediment deposited in the reservoir during the passage of hurricane María on September, 20, 2017.



Figure 1: Location of Lago Loíza

2 DAM AND RESERVOIR CHARACTERISTICS

2.1 System Description

Lago Loíza was completed in 1953 and then was modified in 1977 to increase radial gate height by 1 meter, increasing the full operational level to 41.14 m, equivalent to an original storage volume of 26.8 Mm^3 prior to sedimentation. The coordinates of the dam are 18°

19' 40" N latitude, 66° 00' 57" W longitude. Lago Loíza impounds waters from Río Loíza and Río Gurabo, both have been gaged since late 1959 by the United States Geological Survey (USGS): station 50055000 (R. Loíza) and station 50057000 (R. Gurabo). This reservoir has one of the largest watersheds in the island as seen in Figure 1 and Figure 2. Figure 2 also shows the hydrography within the tributary area and the USGS gage stations.

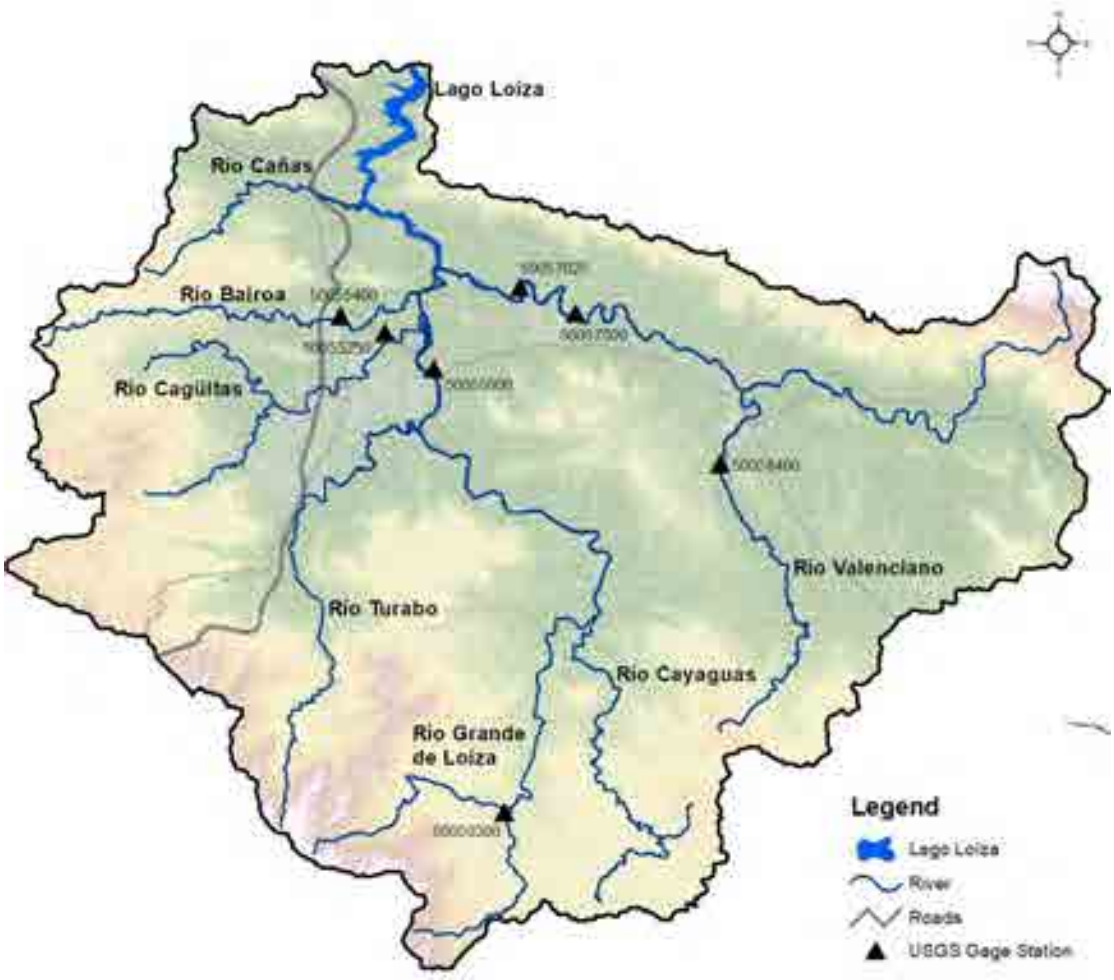

Figure 2: Lago Loíza watershed limits and hydrography within its tributary area.

The principal characteristics of the dam and reservoir are presented in Table 1. The reservoir is impounded by a concrete gravity dam on Río Loíza, controlled by eight (8) 9.14-meter high by 11.88 wide Tainter (radial) gates. Dam configuration is shown in Figure 3 and in Figure 4, and Appendix A contains original construction drawings of the dam.

Table 1: Principal Characteristics of Loíza Dam and Reservoir.

Construction Year	1953
Reservoir Original Volume (1953, based on 41.14 m el.)	26.80 Mm^3
Type of Dam	Concrete Gravity
Length of Dam	210 m
Length of Spillway Section	95.1 m
Dam Top Elevation	44.0 m-msl
Maximum Pool Elevation (design flood)	43.0 m-msl
Gated Ogee Spillway	Eight (8) Tainter Gates
Spillway Crest Elevation	31.0 m-msl
Normal Pool Elevation (max. operational level)	41.14 m-msl
Watershed Area Tributary to Dam	538 km^2



Figure 3: Photograph of downstream face of Loíza dam.

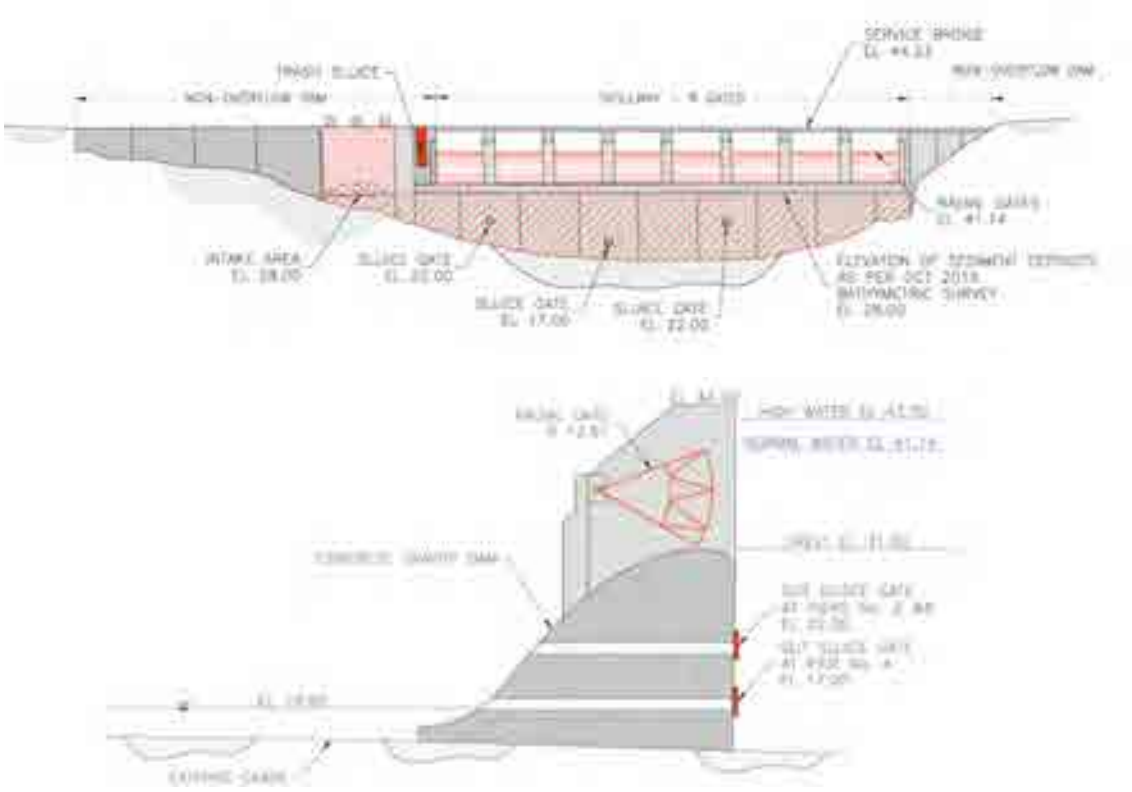

Figure 4: Lago Loíza Dam configuration defined from construction drawings included in Appendix A.

3 BATHYMETRIC SURVEY

3.1 Survey Methodology

Field data for the sedimentation survey were collected during October 2019 using a Survey Case-200S bathymetric survey system manufactured by Specialty Devices Inc. The system included an onboard computer, depth sounder (200 kHz), and GPS system. The computer included the SMARTSURVEY navigation software and DEPTHPIC software for data collection and post processing. The survey was performed using a boat onto which the GPS – SONAR system was mounted, and the collected data were post-processed later in the office.

Transducer calibration to the speed of sound in the water column was performed at the beginning of each survey day and again at noon using the technique for deep manual probing recommended by the U.S. Army Corps of Engineers ("Lead Line Technique", Engineering Manual 1110-2-1003). Instrument depth versus measured depth after speed of sound calibration typically produced a difference on the order of 1 cm. Reservoir water level measurements at 15 minute intervals registered by the USGS were used to establish the water level corresponding to each survey transect. Water levels during the survey were in the range of 40.70 – 40.78 m. All measurements were adjusted to the full reservoir

level of 41.14m for the purpose of plotting and volume computations. A 50-meter survey interval was used along the reservoir, the same interval used in the 2009 sedimentation survey performed by the USGS (Soler, 2012). A total of 209 sections were surveyed using the track lines presented in Figure 5. Survey work extended from the dam upstream to the confluence of Río Grande de Loíza and Río Gurabo.

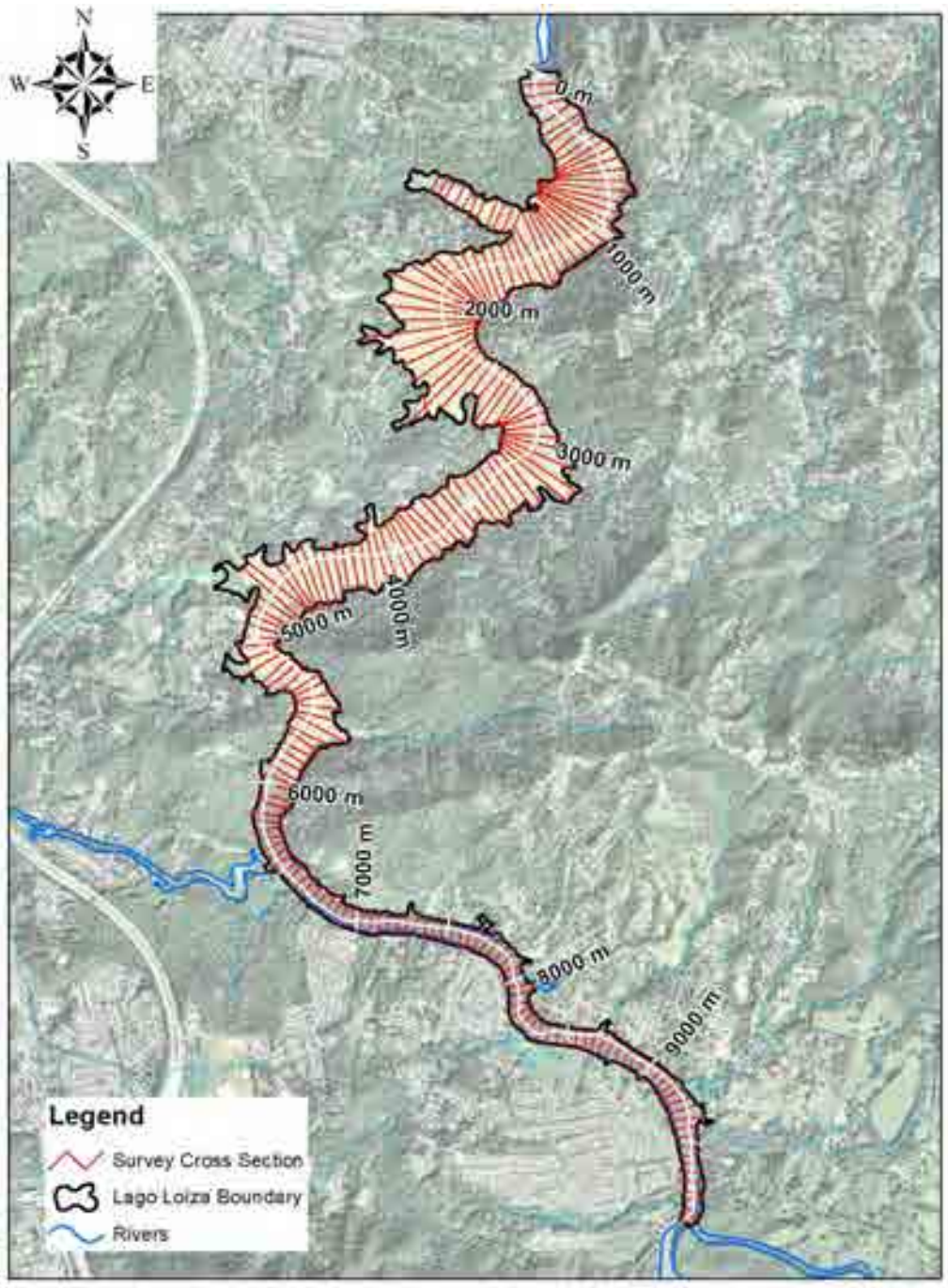

Figure 5: Cross sections measured during the October 2019 sedimentation survey.

Bathymetric survey data were post processed by DEPTHPIC software, analyzing each surveyed cross section to identify and eliminate outliers in the collected data (signals reflected from fish, debris, noise, etc). Post-processed cross section points were then exported to AutoCAD as X-Y-Z text files, which were combined into a single file containing the data from all surveyed sections (over 90,000 points). The complete dataset was used to create a DEM (digital elevation map) within the Auto CAD Civil 3D environment. The DEM was subsequently processed to prepare contour maps of elevation, and then exported to ARC-GIS for subsequent data processing and calculations. Bed profile and a stage-storage curve were defined within the ARC-GIS environment and exported to EXCEL for graphic representation.

3.2 Survey Results

The resulting bed profile is presented in Figure 6, comparing the 2004, 2009 and 2019 minimum bed elevations along the reservoir (thalweg profile). The bed profile has remained very consistent in the last 15 years.

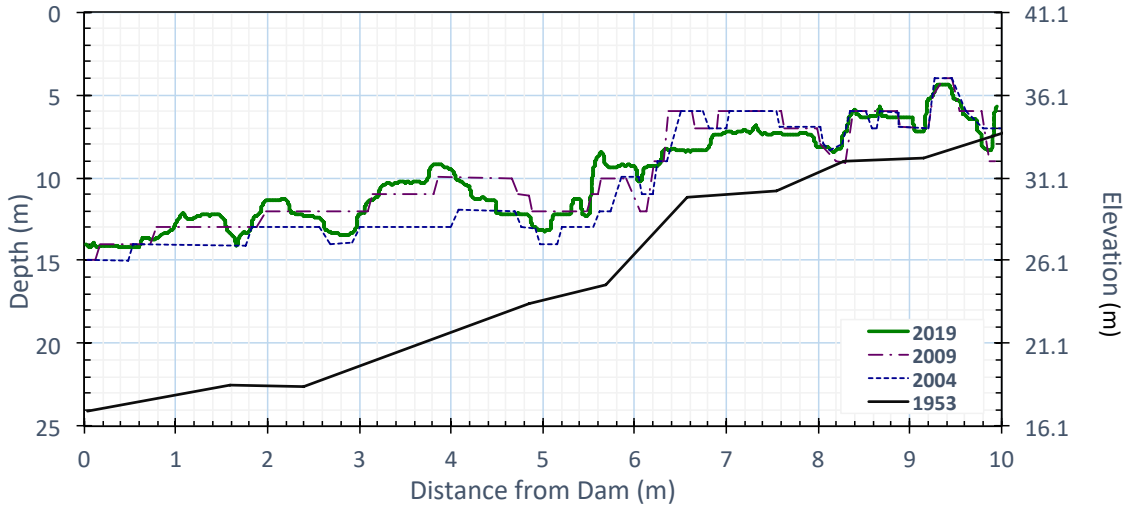

Figure 6: Bathymetric profiles of Lago Loíza for the last three surveys and compared to the 1953 pre-impoundment profile.

In addition, the generated DEM was used to develop a stage storage curve for the reservoir from the deepest point to an elevation of 41.14 meters corresponding to the normal operating level, using a 1-meter interval. Elevation-storage data are tabulated in Table 2 and shown graphically in Figure 7. Data reported from previous studies (2004 and 2009) are shown for comparison.

Table 2: Lago Loíza stage storage data presented for survey years 2004, 2009 and 2019.

Elevation	2004	2009	2019	Elevation	2004	2009	2019
(m-msl)	Storage Volume (Mm^3)			(m-msl)	Storage Volume (Mm^3)		
26.14	0.00	0.01	0.00	34.14	4.76	3.88	3.02
27.14	0.03	0.01	0.00	35.14	5.90	5.01	4.08
28.14	0.25	0.08	0.07	36.14	7.31	6.36	5.38
29.14	0.76	0.31	0.22	37.14	8.95	8.00	6.90
30.14	1.41	0.74	0.50	38.14	10.80	9.83	8.63
31.14	2.12	1.32	0.91	39.14	12.84	11.85	10.55
32.14	2.91	2.06	1.47	40.14	15.07	14.05	12.71
33.14	3.78	2.91	2.17	41.14	17.53	16.42	**15.06**

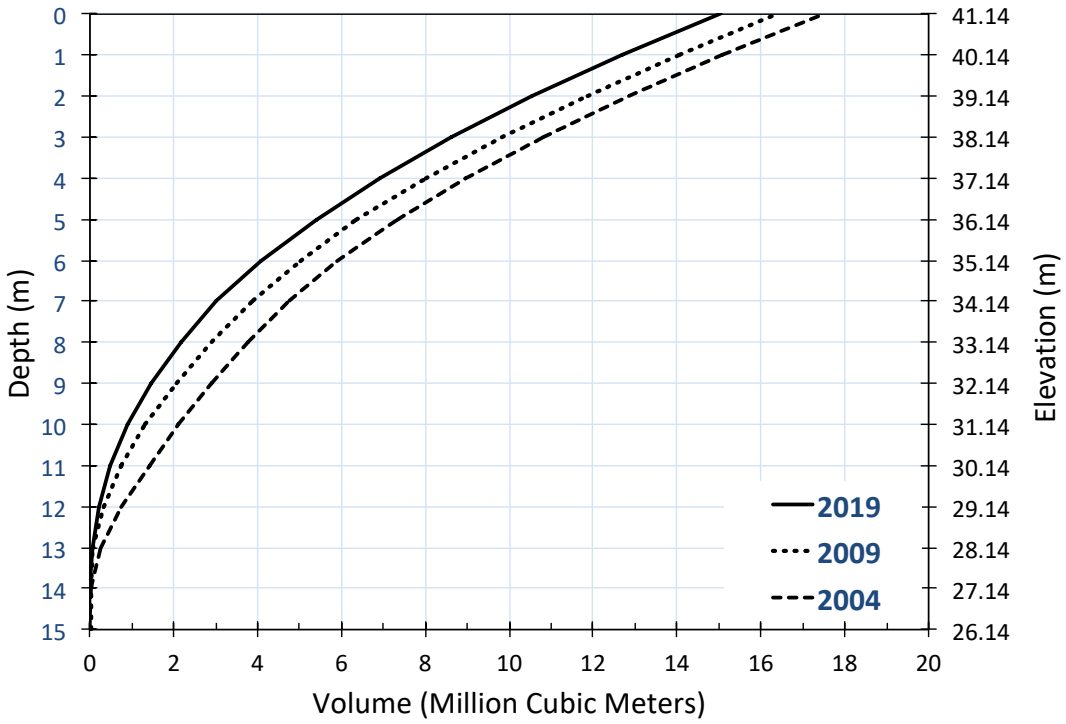

Figure 7: Lago Loíza elevation-storage relationships for 2004, 2009 and 2019.

The resulting 2019 storage capacity is 15.06 Mm^3 as defined using the ARC-GIS 3D Analysis toolset using the generated DEM. The DEM map prepared for Lago Loíza is

presented in Figure 8, showing the variation in elevation along the reservoir. Appendix B contains the bathymetric contour map generated from the DEM.

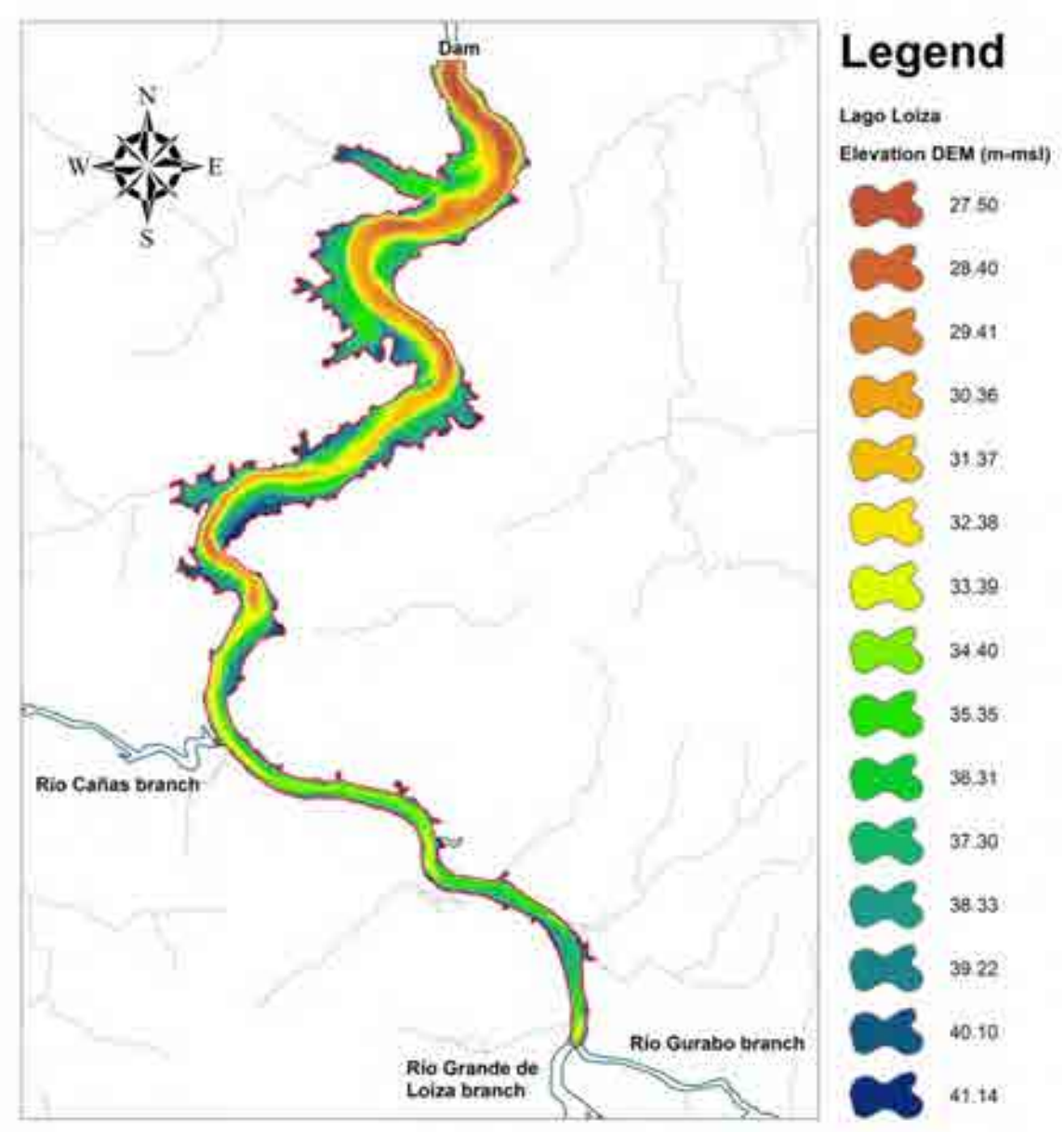

Figure 8: Lago Loíza DEM map developed from bathymetric survey data of October, 2019.

3.3 Current Capacity and Rate of Storage Loss

The current storage capacity of 15.06 Mm^3 at 41.14 m corresponds to 56% of the original storage of 26.8 Mm^3 in 1953 (44% volume loss). The gross storage volume of Loíza reservoir at elevation 41.14 m has declined by 1.36 Mm^3 as compared to the 2009 survey. The storage loss trend is presented in Figure 9, showing the decline in storage over time due to sediment accumulation. From the graph notice the following:

1. The inter-survey rate of volume loss appears to be reducing over the past 15 years. This behavior is also noticeable during the period of 1971 to 1994 when the reservoir had a similar storage volume.
2. The storage volume gained by dredging has been essentially lost due to new sediment accumulation.

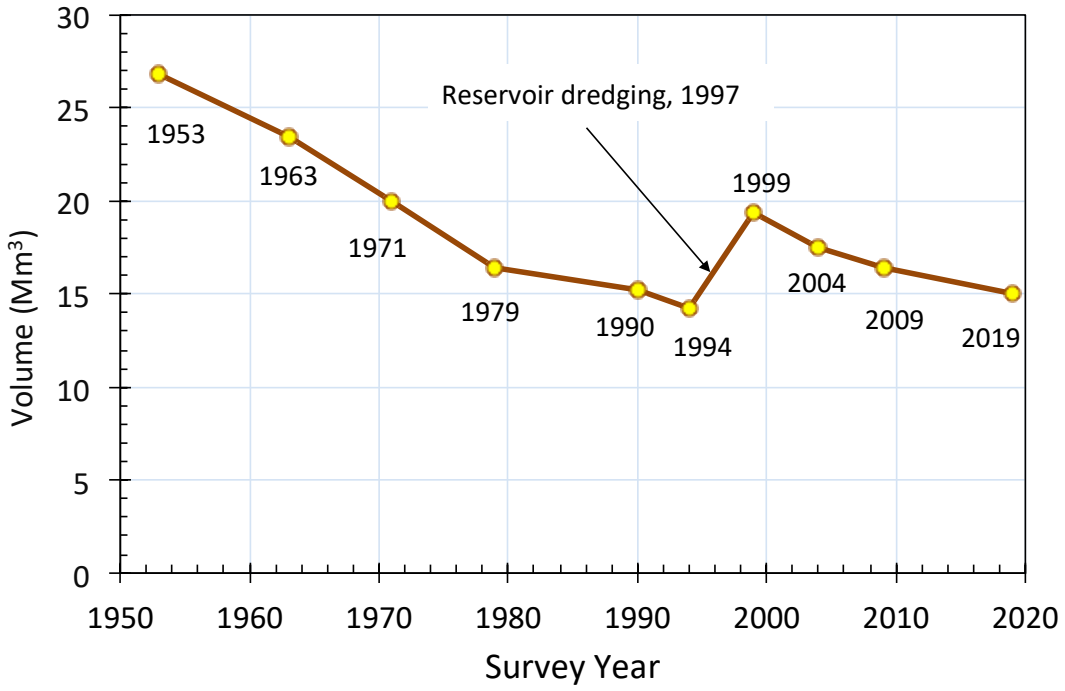

Figure 9: Volume history of Loíza reservoir. Previous survey values obtained from Webb (1997), Soler (2005) and Soler (2012).

Table 3: Sedimentation Data for Lago Loiza.

Parameter	Year of Survey		
	2004	2009	2019
Capacity at 41.14 m, Mm^3	17.53	16.42	15.06
Years since construction	51	56	66
Total volume lost due to sedimentation, Mm^3	9.27	10.38	11.74
Sediment accumulated since previous survey, Mm^3	1.82	1.11	1.36
Years since previous survey	5	5	10
Inter-survey average annual storage loss, Mm^3/yr	0.364	0.222	0.136
Storage capacity to annual inflow ratio, C/I	0.048	0.045	0.041

4 SEDIMENTATION DURING HURRICANE MARIA

4.1 Overview of Methodology and Results

4.1.1 Methodology

The best way to estimate the amount of sediment deposited during hurricane María would be through detailed sediment transport modeling, but this is beyond this scope of work. Accordingly, an empirical approach was used to compute the trap efficiency of the daily sediment load to determine the change in reservoir volume on a day-by-day basis over the period of hydrologic data (1960-present), including hurricane María.

The amount of sediment trapped in Carraízo reservoir during hurricane María has been estimated by performing daily computations over the period of USGS gage record from 1/1/1960 to 10/27/2019, when field data collection was completed for the last reservoir survey. The computational procedure is as follows:

1. Prepare a sediment rating curve and calculate the daily sediment load;
2. Estimate reservoir capacity on January 1, 1960, which corresponds to the start of USGS daily inflow data at the upstream Gurabo and Loíza gage stations;
3. Calculate daily sediment load from 1960 to 2019, converting daily load to daily volume based on dry bulk density of the reservoir's sediment deposits;
4. Compute daily trap efficiency from a calibrated curve of daily trap efficiency vs. HRT, calculating each day's value of HRT from daily inflow and reservoir volume;
5. Add the amount of daily sedimentation to update reservoir volume for the next day's computation of HRT;
6. Adjust reservoir volume for dredging when it occurs;

After completing the above calculations, the volume loss during the hurricane was computed by comparing the daily reservoir volume calculated before the hurricane (9/19/2017) and after the storm (9/23/3017).

The basis of this calculation is the methodology developed by Brune (1953) who presented a relationship of trap efficiency vs. hydraulic retention time (HRT), also known as the Capacity/Inflow ratio, for use in estimating average multi-year trap efficiency in normally impounded reservoirs, that is, reservoirs not specifically managed to reduce sediment trapping.

The actual trap efficiency varies day-by-day due to variation in inflow, just as it also varies as a function of reservoir capacity. This fact was clearly recognized by Brune, and in Figure 4 of his paper he presents a graph of the measured trap efficiency at Imperial Dam Reservoir on the lower Colorado River as a function of HRT (the C/I ratio). Values of HRT vary from 0.5 to 7 days, and trap efficiencies vary from 44% to 99%. On days with low

inflow the HRT is long and virtually all sediment is trapped, whereas on days of high inflow the HRT is short and much less sediment is trapped.

Brune's paper clearly shows that a trap efficiency curve can be developed based on a daily time step, and this approach has also been used by other researchers (Lewis et al. 2013).

The Churchill (1948) method is arguably better for calculating trap efficiency in a hydrologically small reservoir, like Carraízo. The same procedure was applied using the Churchill methodology, and a calibrated Churchill curve, producing results very similar to the Brune methodology.

4.1.2 Summary Results

Results from both methodologies are summarized below in Table 4. One of the key assumptions in this approach is that of "normal" reservoir operation, and the trap efficiency calculations have been made based on the reservoir water level at 41.14 m. However, during María the water level was held between 36 and 38 m during the peak discharges, which means that the true HRT will be significantly less than calculated, and the trap efficiency will also be less than has been calculated here. Thus, Table 4 is expected to over-estimate sediment trapping during the hurricane. The remainder of this section describes the methodology and results in more detail.

Table 4: Estimates of Volume Loss During Hurricane María, 19 to 23 Sept. 2017.

	Brune Method	Churchill Method	Average
Sediment inflow, Mt	2.35	2.35	
Volume of sediment inflow, Mm^3	2.35	2.35	
Reservoir Vol. on 9/19/17, Mm^3	14.87	14.76	
Reservoir Vol. on 9/23/17, Mm^3	14.31	14.25	
Volume Loss, Mm^3	0.56	0.51	0.535
Hurricane sediment trap efficiency	24%	22%	23%

1 Computed using a dry bulk density of 1.0 t/m^3.

4.2 Inflowing Sediment Load

Daily data from the USGS gage stations on Río Loíza (50055000) and Río Gurabo (50057000) were downloaded for the period January 1, 1960 to date. This dataset included 6227 days having both suspended sediment and discharge values for both gages. These data corresponded to the period 1983 to 2001. The water and sediment discharge values from both gages were summed to estimate daily load as a function of discharge, and the resulting trendline equation was adjusted by Excel® Solver to match the load in the

original 6227 daily dataset. The resulting relationship is given in Figure 10 and the rating equation for load (t/d) at the gage stations is:

$$LOAD_{gage\ stations} = 1.865\ Q^{1.9}$$

where LOAD is t/d of suspended sediment and Q is the total river discharge at the two gage stations in m^3/s.

An additional watershed area enters the reservoir downstream of the two gages, and the average inflow into the reservoir averages 1.12 times the gaged inflow. This same factor has been applied to the load computed at the gage stations to estimate the sediment inflow into the reservoir. This adjustment was made by the rating equation to:

$$LOAD_{reservoir} = 2.0888\ Q^{1.9}$$

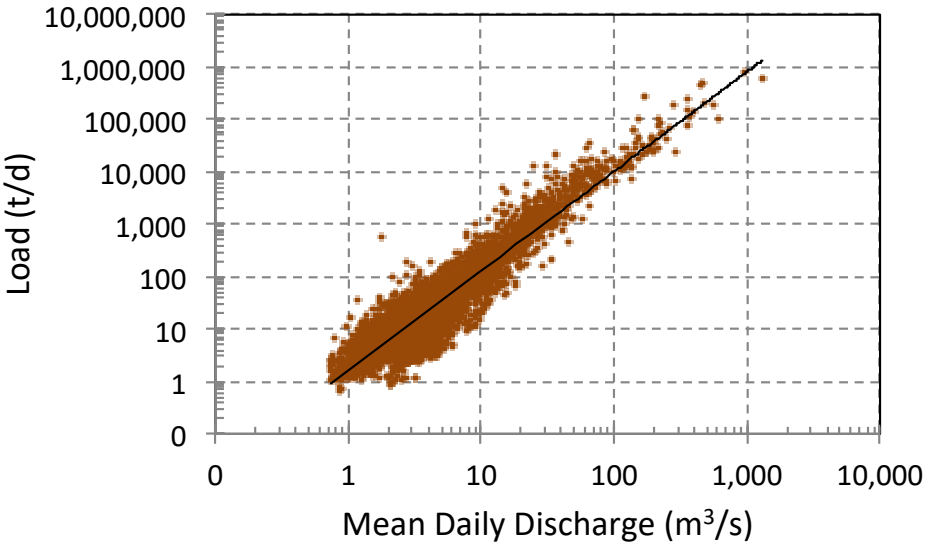

Figure 10: Suspended sediment load vs. discharge, Loiza + Gurabo gages.

The USGS also estimated bed load and reported these values with the published data for part of the data series. Bed load was estimated at about 1% of the suspended load. This amount is considered negligible for this analysis and no correction to the suspended load has been made.

The entire time series of daily flows from 1960 to the survey date was used to estimate daily inflowing sediment load. The cumulative sediment inflow is shown in Figure 11. Hurricane María is one of the major sediment-contributing events in the historical dataset. Unfortunately, there are no suspended sediment field data from the USGS during hurricane María to corroborate the estimate of sediment load computed by the rating equation.

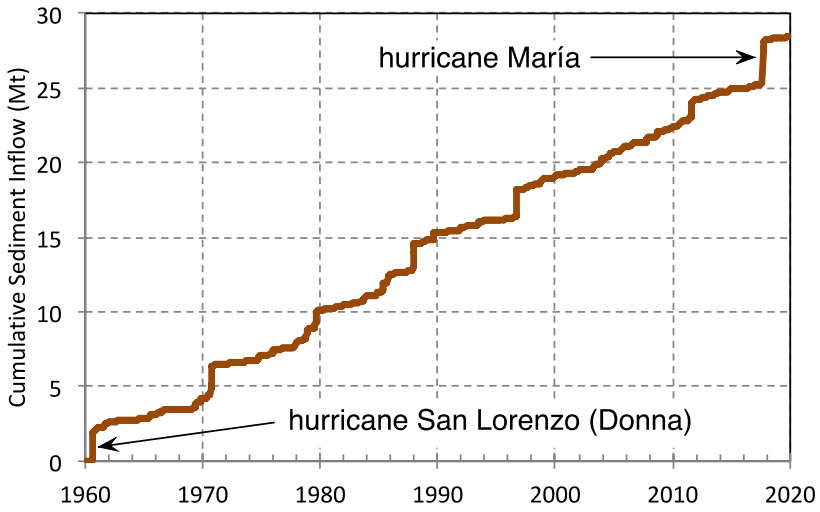

Figure 11: Cumulative sediment inflow to Loíza reservoir during period covered by streamflow gage data.

4.3 Dry Bulk Density

The dry bulk density of the sediment deposits has been taken as 1.0 t/m^3 based on sampling performed in Carraízo reservoir prior to the first dredging as reported in Sec. 20.3.4 of Morris and Fan (1998).

4.4 Initial Reservoir Volume

Carraízo reservoir began impounding several years prior to installation of USGS gages on the Loíza and Gurabo rivers at the end of 1959. The time series used in this analysis starts on 1/1/1960 and the volume of the reservoir on that date is estimated at 24.43 Mm^3 by linear interpolation between the initial reservoir capacity of 26.8 Mm^3 in 1953 and 23.4 Mm^3 in 1963.

4.5 Trap Efficiency Calibration

4.5.1 Trap Efficiency and Hydraulic Retention Time (HRT)

The sediment *trap efficiency* of a reservoir is defined as the percentage of the inflowing sediment load that is trapped in the reservoir over a specified period of time:

$$Trap\ Efficiency\ (TE) = \frac{Sediment\ Load\ Trapped}{Sediment\ Load\ Entering\ Reservoir}$$

Trap efficiency may be defined over any specified period of time. Different methods can be used to estimate trap efficiency, but the most commonly used method is to use Brune's curve to estimate average trapping efficiency over an annual or multi-year period.

A fundamental characteristic of sedimentation processes is that the efficiency of trapping sediment in any basin is related to the hydraulic retention time (HRT), which is also known as the Capacity/Inflow (C/I) ratio. It is defined as:

$$HRT = \frac{Capacity}{Inflow} = \frac{Reservoir\ Volume}{Inflow\ Volume}$$

Expressing inflow in annual units, such as Mm^3/year, will result in the average hydraulic retention time in years. For Carraízo's current volume, the value is:

$$HRT = \frac{Capacity}{Annual\ Inflow} = \frac{15.06\ Mm^3}{363.8\ Mm^3} = 0.0414\ years = 15\ days$$

From the hydrologic standpoint Carraízo is a very small reservoir because the average hydraulic residence time is very short.

4.5.2 Brune Curve and Variation of Trap Efficiency with HRT

The Brune curve (Figure 12) has been commonly used to estimate the long-term average trap efficiency of reservoirs in Puerto Rico given its simplicity and because it has been shown to give reasonable results when applied at many reservoirs throughout the world. The average value of trap efficiency declines as reservoir volume and HRT diminish.

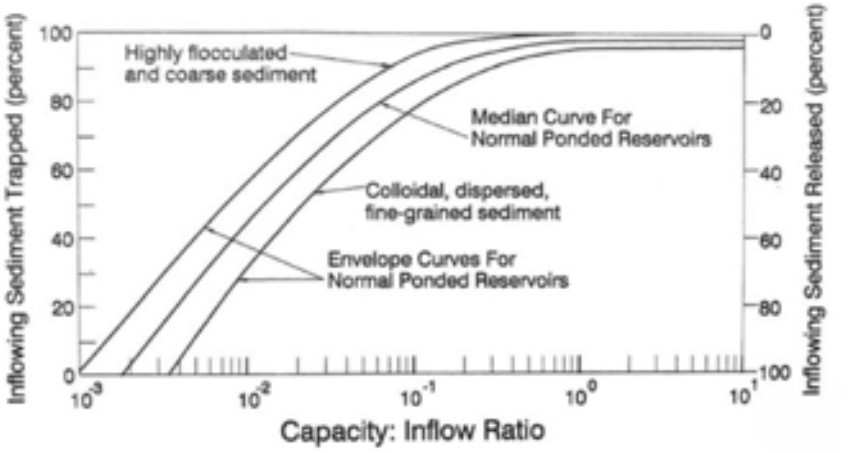

Figure 12: Curves presented by Brune (1953) relating long-term average reservoir trap efficiency to the capacity:inflow ratio.

Utilization of the Brune method within the context of a daily time step was outlined by Lewis et al. (2013) based on the general form of the equation presented by Heinemann (1981). Interestingly, Heinemann's equation for "small reservoirs" actually fits completely within the lower portion of the range of values given by Brune and previously shown in Figure 12.

The Brune median curve can be expressed by an equation having the following form:

$$T.E = \frac{C/I}{0.012 + 1.02\ (C/I)} = \frac{C/I}{B_1 + B_2(C/I)}$$

In development of the daily trap efficiency curve the values for B_1 and B_2 will be determined by calibration against the available data for Carraízo reservoir.

Trap efficiency varies as a function of storm size, with large storms having a lower trap efficiency than small storms or ordinary flows, because the hydraulic retention time diminishes as the inflow increases. Brune also recognized that trap efficiency could even be negative, stating in his paper:

> *It appears probable that reservoirs of very low C/I ratio may alternately fill and scour, depending upon stream-flow conditions, and thus may have a trap efficiency of zero or less during periods of scour.* (p 414)

This variation in trapping efficiency on both daily and annual time frames has been documented by field data from both small and large reservoirs (Dendy and Cooper 1984; Garg and Jothiprakash 2008; Lewis et al. 2013). Thus, development of daily trap efficiency curves represents a feasible extension of Brune's methodology, and an example curve of short-term variations in trap efficiency as a function of HRT was given in Figure 4 of Brune's paper, as previously mentioned.

4.5.3 Churchill Method

Another method used to estimate trap efficiency is that of Churchill (1948), which incorporates a term to account for the flow velocity through the reservoir as well as the capacity:inflow ratio. The curve presented by Churchill is shown in Figure 13. Note that this graph shows the percent of "sediment passing through reservoir" instead of the "sediment trapped".

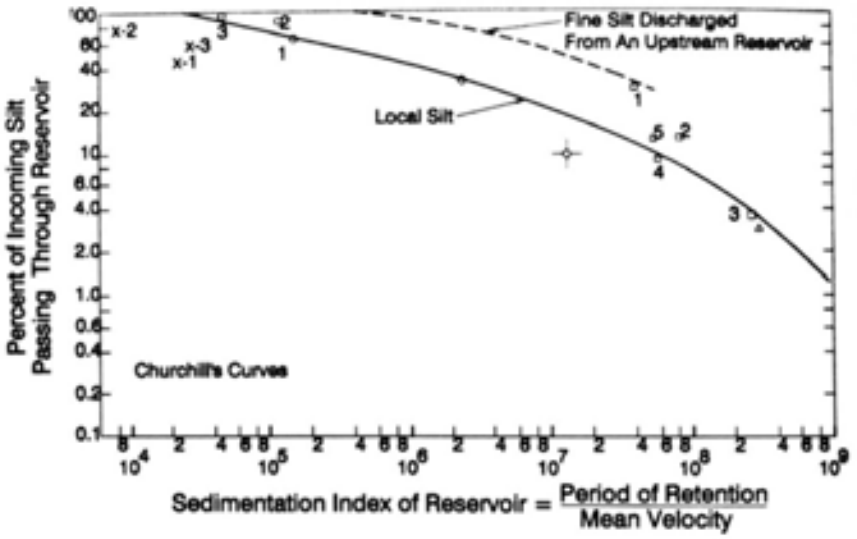

Figure 13: Curves presented by Churchill (1948) relating sediment release efficiency (1-trap efficiency) to the reservoir sedimentation index.

Lewis et al. (2013) concluded that the Churchill provided a somewhat better predictor of sedimentation at the reservoirs they were working with, as compared to Brune. The equation for the Churchill method was expressed by Lewis et al. (2013) in the following form:

$$TE = 112 - 800\left[\frac{V/Q}{Q/A}\right]^{-0.2}$$

Where the value of V/Q in the numerator is an indicator of hydraulic residence time (in seconds) computed from Volume (m^3) and inflow Q (m^3/s). The term A in the denominator is calculated as $A=V/L$, Volume (m^3) divided by reservoir Length (m). For the purpose of model calibration, the equation was re-written as:

$$TE = C_1 - C_2\left[\frac{V/Q}{Q/A}\right]^{C_3}$$

where C_1, C_2 and C_3 are coefficient values that can be adjusted in the calibration process to achieve the best fit against the Loíza reservoir survey data. The exponent value of C_3 = -0.2 proposed by Lewis et.al. was retained but the coefficients C_1 and C_2 were modified two ways. First, they are divided by 100 to express the trap efficiency as a decimal fraction. Second, both values were adjusted by calibration against the historical reservoir volume data from bathymetric surveys.

The alternative forms of the Churchill equation presented by Heinemann and the U.S. Bureau of Reclamation (1987) were also tested but did not offer any improvement when applied to Loíza reservoir during the calibration process.

4.5.4 Calibration of Daily Trap Efficiency

Coefficient values for the Brune and Churchill curves were calibrated against historical data for Carraízo reservoir. The available data are:

- Time series of daily inflow;
- Time series of daily sediment load and equivalent deposit volume;
- The estimated original (1/1/1960) reservoir capacity and results of 8 bathymetric surveys giving reservoir volume at different points in time; and
- A total of 6 Mm^3 of dredging which was completed in 1997.

The curves of daily trap efficiency vs HRT required for the analysis were developed by calibrating coefficient values for the two equations, Brune and Churchill. Computations were undertaken each day starting on January 1, 1960, using the computational methodology previously summarized in Sec. 4.1. The daily reservoir volume was then graphed and compared to the volumes determined by reservoir survey on the corresponding dates. The coefficient values were optimized using the Excel® SOLVER, using as an objective function minimization of the error between the measured volumes and the calculated volumes for the various bathymetric surveys. An exact calibration to all the data points was not possible, and the calibration was adjusted to give the best overall results emphasizing the post-dredging period which includes the hurricane.

The coefficients determined by the calibration procedure are:

- For Brune, $B_1 = 0.001$ and $B_2 = 1.02$
- For Churchill, $C_1 = 1.05$ and $C_2 = 5.25$

The daily reservoir volumes are given in Figure 14 as calculated by the calibrated Brune and Churchill curves, together with the historical reservoir survey volumes. As can be seen from the graph, the calibrated Churchill and Brune equations gave nearly identical results. Curves of daily values for trap efficiency vs. HRT are given in Figure 15 showing values for all daily computations.

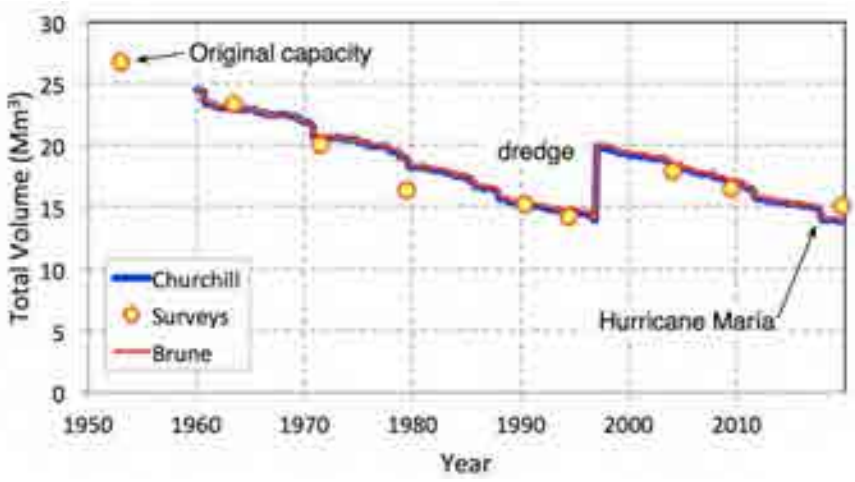

Figure 14: Results of model calibration showing change in reservoir capacity over time compared to historical volume surveys based on daily computations of sediment and trap efficiency by the Brune and Churchill methods.

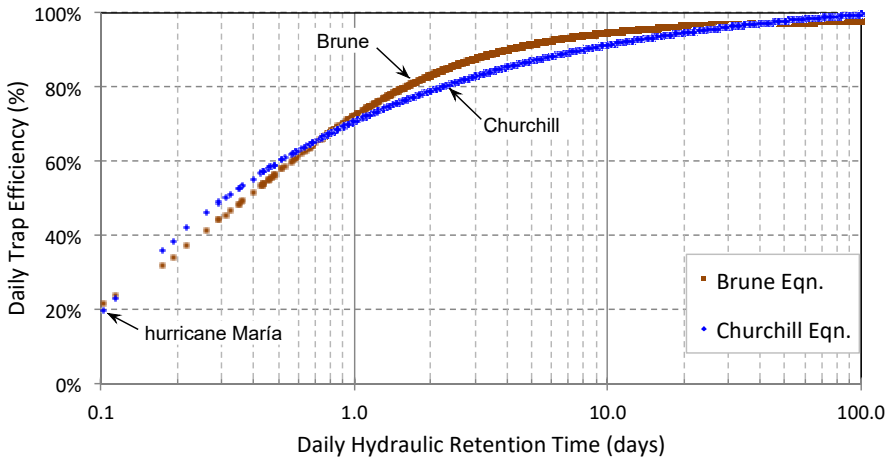

Figure 15: Calibrated daily trap efficiency curves generated by the Brune and Churchill equations.

4.6 Reservoir Storage Loss During Hurricane María

4.6.1 Results Summary

Hurricane María hit Puerto Rico on September 20, 2017, and significant discharges continued for 2 days following the storm. The volume loss as a result of the hurricane has been estimated by comparing the reservoir volume on the day prior to the hurricane (9/19/2017) against the volume 3 days following the hurricane (9/23/2019). The resultant values for volume loss due to María were previously shown in Table 4 and are also shown in Table 5 below. In contrast, the amount of sediment delivered into the reservoir between 9 and 23 September, 2017, was 2.35 Mt, equivalent to 2.35 Mm^3 at a dry bulk density of 1.0 t/m^3.

The average trap efficiency of the reservoir during María computed by this methodology was about 23%, corresponding to a volume loss of 0.535 Mm^3.

Table 5: Estimates of Volume Loss During Hurricane María by Two Methods.

	Brune Method	Churchill Method	Average
Reservoir Vol. on 9/19/17, Mm^3	14.87	14.76	
Reservoir Vol. on 9/23/17, Mm^3	14.31	14.25	
Volume Loss, Mm^3	0.56	0.51	0.535

4.6.2 Discussion of Results

Figure 14 shows that although this methodology matches reservoir volume quite well for most of the period, it predicts a sediment volume for 2019 that is significantly lower that the measured volume. In other words, it is probably over-predicting sediment accumulation due to the hurricane.

A key assumption in this methodology is that of "normal" reservoir operation; the HRT value and the resultant trap efficiency value have been calculated based on a reservoir water level of 41.14 m. However, during María the water level was held between 36 and 38 m during the period of peak discharge, which means that the true HRT will be much less than calculated by this method (approximately half). This means that true trap efficiency will also be less than has been calculated here. Thus, the amount of sediment trapped during the hurricane is probably significantly less than calculated by this methodology.

The graph in Figure 9 also shows that the rate of volume loss in the reservoir is reduced significantly when the capacity declines below about 16 Mm^3. The average annual rates of volume loss are nearly identical in the years following the 1979 survey (which included

hurricanes Hortense and Hugo) and in the years following the 2009 survey (which included hurricane María), as shown in Table 6. By comparison, the total sediment load delivered into the reservoir from 2009 to 2019, based on the rating equation, was 2.6 Mt. Thus, the low rates of sediment accumulation documented in this survey are not unusual; this sedimentation behavior has already been observed previously at Carraízo.

Table 6: Rates of Volume Loss When Reservoir Capacity is Approximately 16 Mm^3.

Period	Initial Volume	Final Volume	Volume Loss, Mm^3	Average Annual Loss, Mm^3/year
1979-1994	16.38	14.19	2.19	0.146
2009-2019	16.42	15.06	1.36	0.136

Although it may seem counter-intuitive that the hurricane deposited so little sediment into the reservoir, this conclusion is consistent from the theoretical standpoint and is supported by the data:

- Trap efficiency is known to decline to a low level when the reservoir detention time is very short and a sediment-laden flood is passed through the reservoir rapidly. This effect was further increased because the reservoir was partially drawn down during the hurricane.
- The average annual rate of sediment accumulation for the 1979-1994 period was almost exactly the same as the 2009-2019 period, despite storms including hurricanes Hortense and Hugo. Thus, the low rate of sedimentation reported here is consistent with the reservoir's prior behavior.
- By examining the bottom profiles in Figure 6, several areas may be observed where the 2019 profile is lower than the 2009 profile, indicating that the reservoir bottom has been scoured. Thus, not only was the rate of sediment deposition low, but in some areas of the reservoir sediment was actually scoured out.

Even though María delivered a high sediment load, as was shown in Figure 11, the high flow rate, short hydraulic residence time, and high flow velocity, greatly reduced the sediment trapping efficiency of the reservoir.

5 REFERENCES

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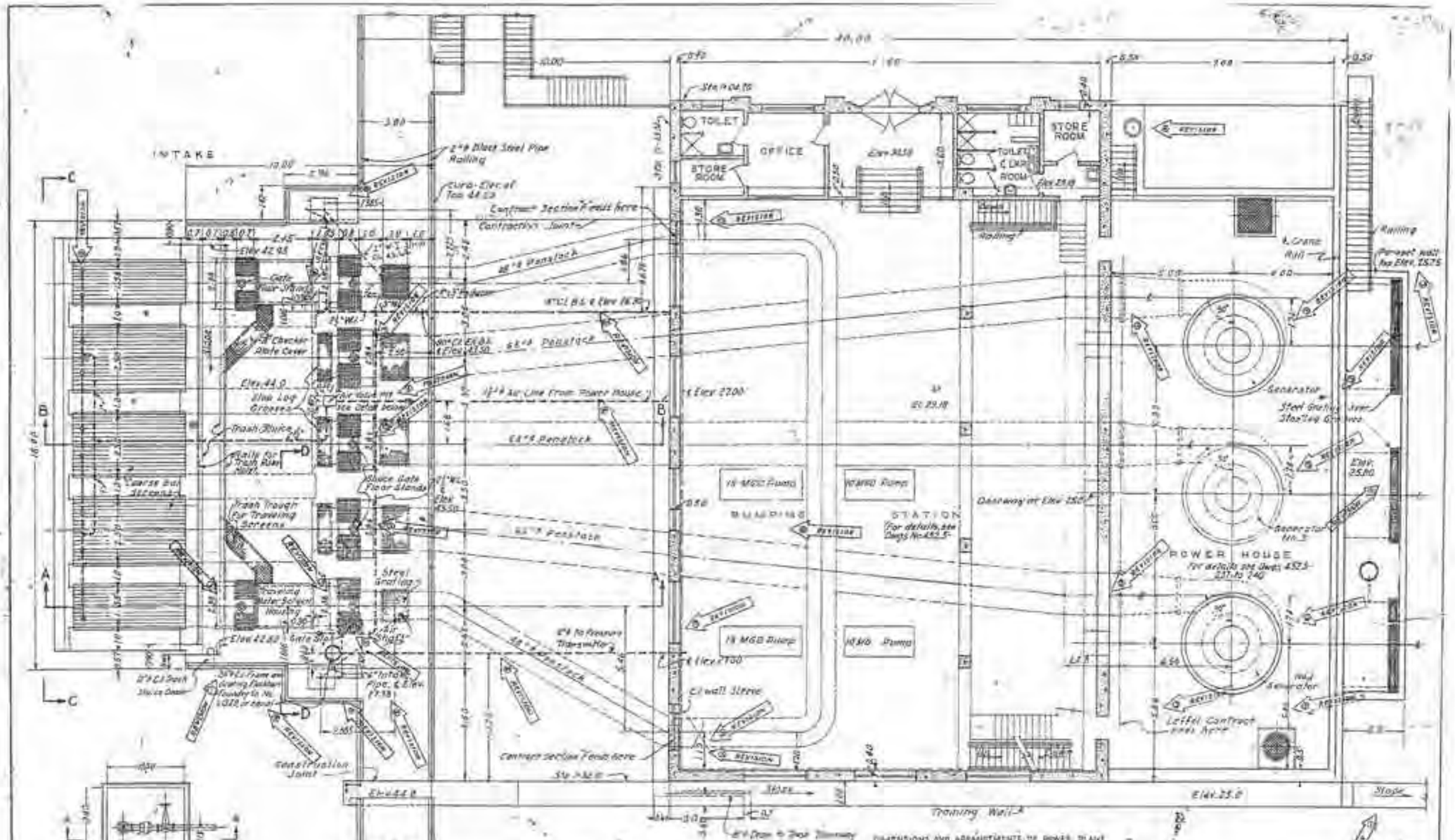
Webb, R.M. and Soler-López, L.R., 1997. "Sedimentation history of Lago Loiza, Puerto Rico, 1953-94". U.S. Geological Survey Water-Resources Investigations Report 97-4108.


INTAKE
TOILET
OFFICE
STORE ROOM
STORE ROOM
TOILET & SHOWER ROOM
Crane Rail
Railing
Parapet wall top Elev. 25.75
Generator
Steel Grating over Starting Grooves
Elev. 25.00
Generator Unit 3
POWER HOUSE
for details see Dwgs 452.5-237 to 240
Leffel Contract Unit Area
Elev. 25.0
Stoplogs
Training Wall
Contract Section Fence here
Contraction Joints
Elev. 44.0
Elev. 42.95
Elev. 42.83
Gate Slot
Trash Trough for Traveling Screens
Trash Sluice
Rails for Trash Rake
Bulkhead Slot
Bulkhead Recess
Coarse Bar Screens
Fine Bar Screens
Traveling Water Solvent Housing
Steel Grating
Air Shafts
Gate Stem
Gate Floor Stands
Gate Floor Stands
Elev. 45.50
Elev. 43.50
Elev. 43.00
Elev. 42.83
Elev. 41.50
Elev. 27.00
Elev. 30.50
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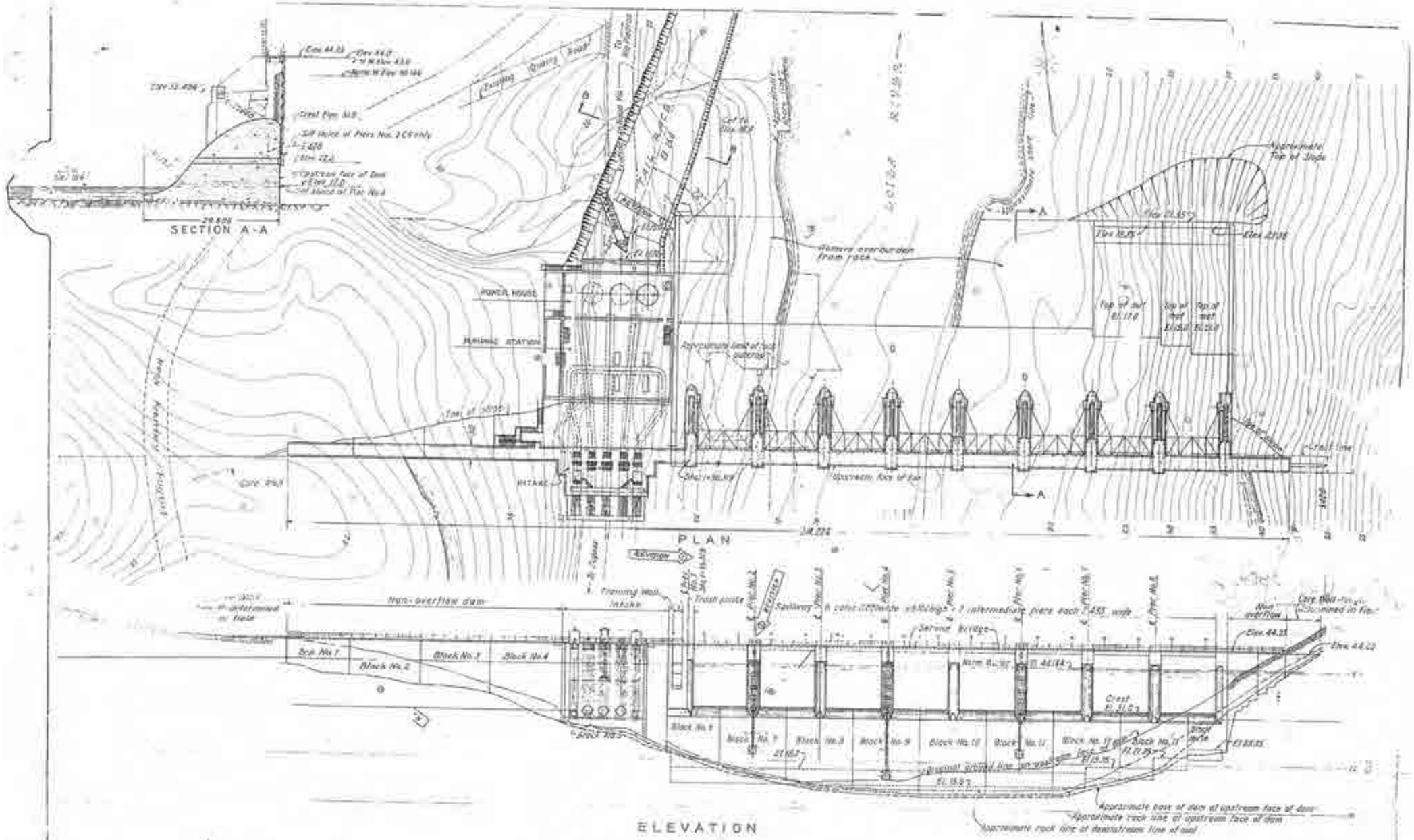
Elev. 43.00



NOTE:
Elevations are given in meters and refer to Mean Sea Level.
Dimensions are in meters.

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DATE.....

GOVERNMENT OF PUERTO RICO
PUERTO RICO AQUEDUCT AND SEWER SERVICE
SAN JUAN METROPOLITAN WATER DISTRICT

RIO GRANDE DE LOIZA DEVELOPMENT
LOIZA DAM
GENERAL PLAN AND ELEVATION

Buck, Seifert and Jost
Consulting Engineers
New York, N.Y. - San Juan, P.R.

Scale: 1:500 August 194

Drawn by: Checked by: Approved by:

Revisions:

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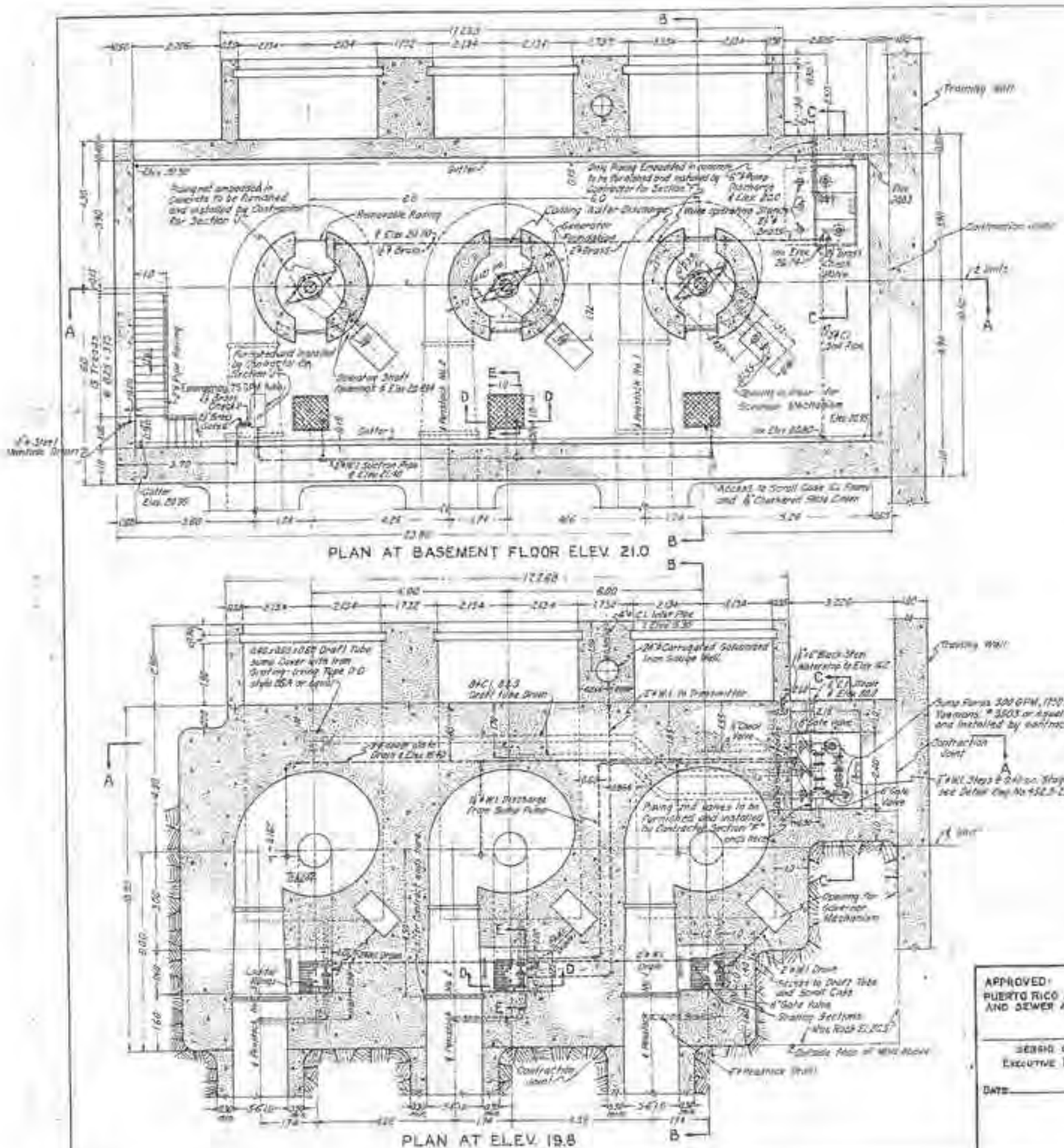
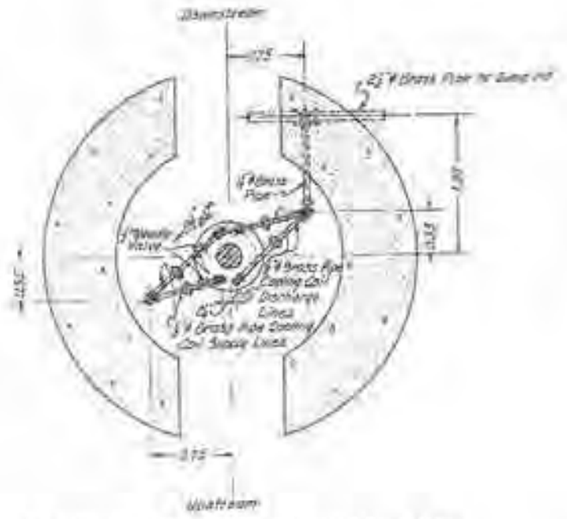


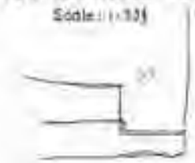
PLAN AT BASEMENT FLOOR ELEV. 21.0

PLAN AT ELEV. 19.8



DETAIL OF SUPPLY AND DISCHARGE LINES FOR COOLING COILS

Scale: 1:33½



DRAWING No. 452.5-237

APPROVED: PUERTO RICO AQUEDUCT AND SEWER AUTHORITY SERGIO CUEVAS EXECUTIVE DIRECTOR DATE:	GOVERNMENT OF PUERTO RICO PUERTO RICO AQUEDUCT AND SEWER AUTHORITY SAN JUAN METROPOLITAN WATER DISTRICT RIO GRANDE DE LOIZA DEVELOPMENT LOIZA DAM POWER HOUSE PLANS AT ELEVATION 19.8 AND BASEMENT FLOOR Buck, Seifert and Jost Consulting Engineers Scale: 1:60, As Shown New York, N.Y.–San Juan, P.R. April 1951 Drawn by: J.J.C. Checked by: EHT Approved by: Revisions:

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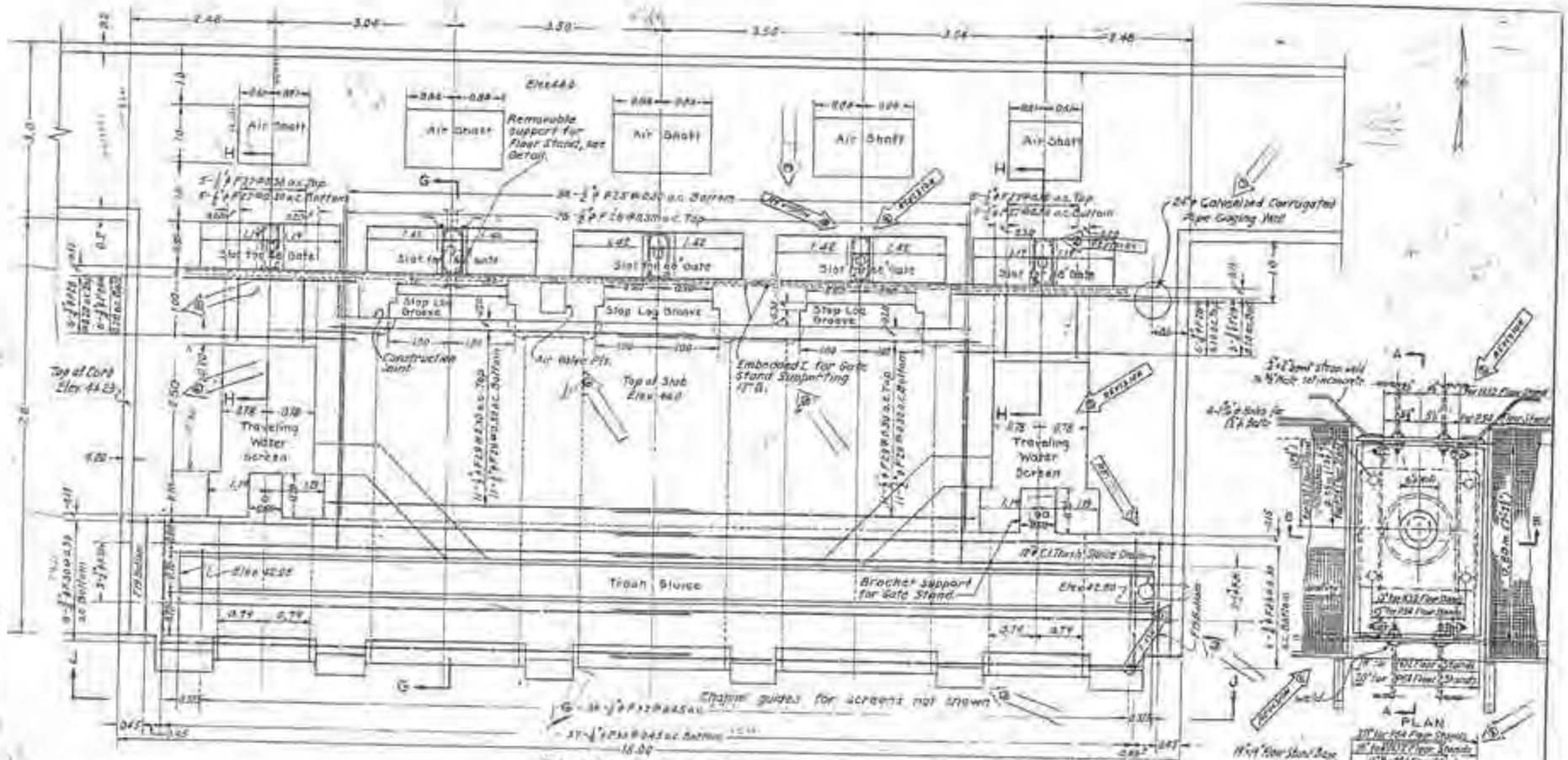

PLAN OF SLAB
Scale: 1:30

SECTION G-G
Scale: 1:50

SECTION H-H
Scale: 1:30

PLAN

SECTION A-A

SECTION B-B

DETAIL OF REMOVABLE SUPPORT FOR FLOOR STAND
Scale: 1"=1'-0"

DRAWING No. 4563-234

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SAN JUAN METROPOLITAN WATER DISTRICT

RIO GRANDE DE LOIZA DEVELOPMENT

LOIZA DAM
INTAKE
REINFORCING DETAILS - KEY PLAN AND SECTIONS

Buck, Seifert and Jost
Consulting Engineers
New York, N.Y. — San Juan, P.R.

Scale: 1:30 & 1"=1'-0" | August 1948

Drawn by: M.B.	Checked by: W.F.J.	Approved by:
Revisions: 2-4-49 1-20-50	10-30-48 1-10-50 2-8-50	

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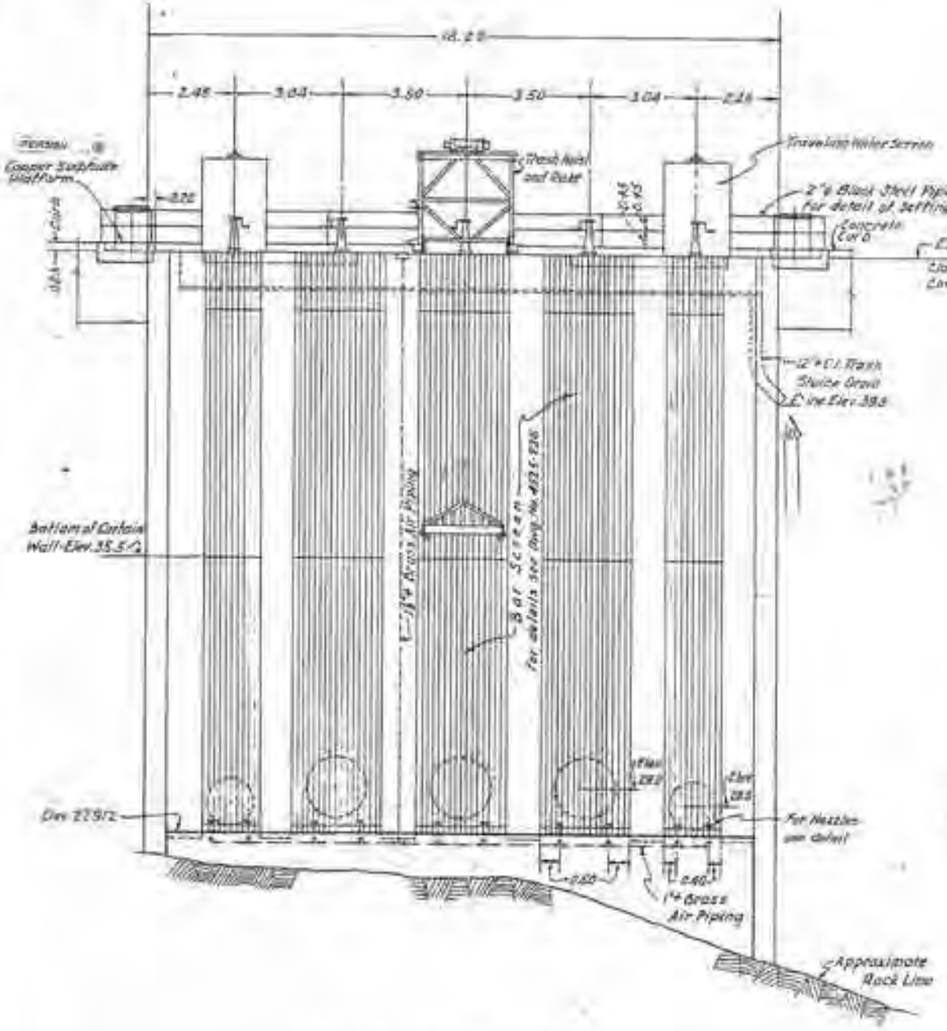
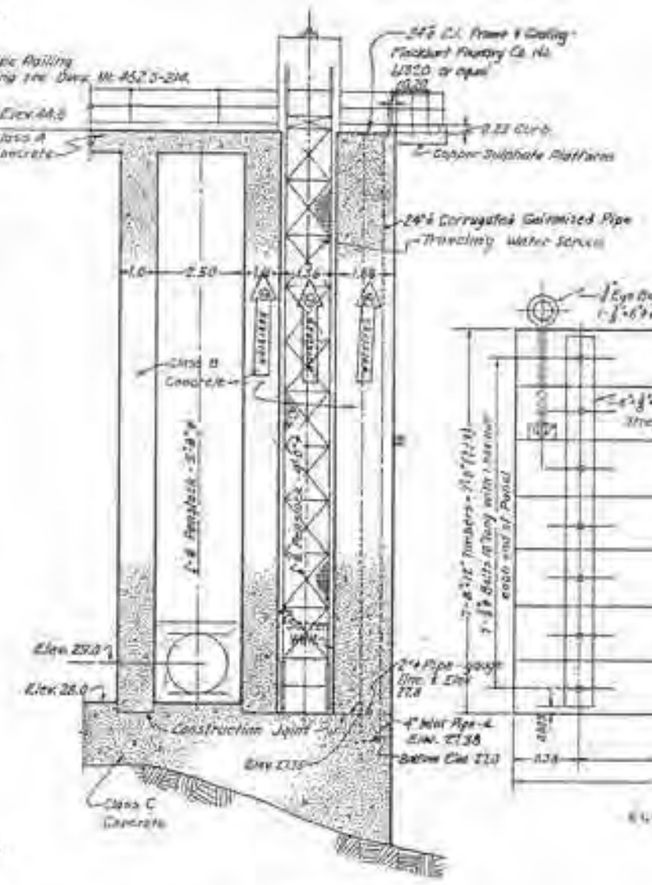


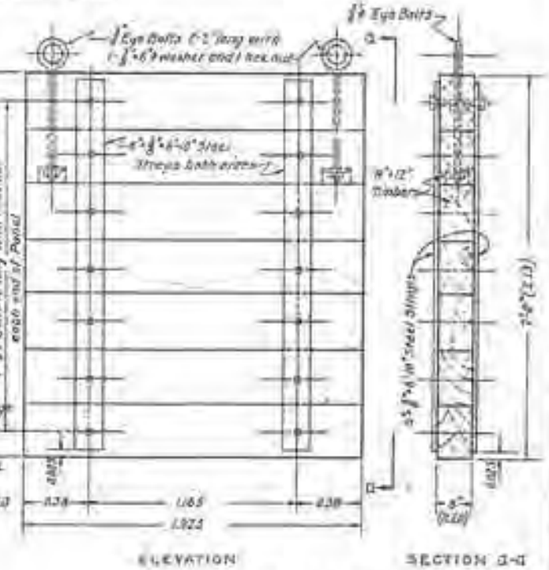
ELEVATION C-C

Scale: 1/8"



SECTION D-D

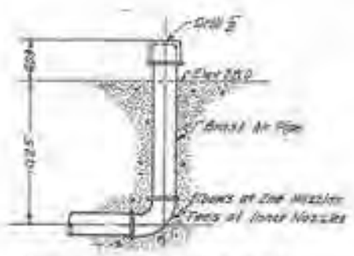
Scale: 1/8"



STOP LOG PANEL

Scale: 1/2"

ONE REQUIRED



DETAIL OF AIR NOZZLES

Note:
For Plan showing Sections C-C and D-D, see Dwg. No. 452.5-231.

DRAWING No. 452.5-233

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SAN JUAN METROPOLITAN WATER DISTRICT

RIO GRANDE DE LOIZA DEVELOPMENT
LOIZA DAM
INTAKE
ELEVATION C-C AND SECTION D-D

Buck, Seifert and Jost
Consulting Engineers
New York, N.Y. – San Juan, P.R.

Scale: As Shown		August 1949
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Revisions:		

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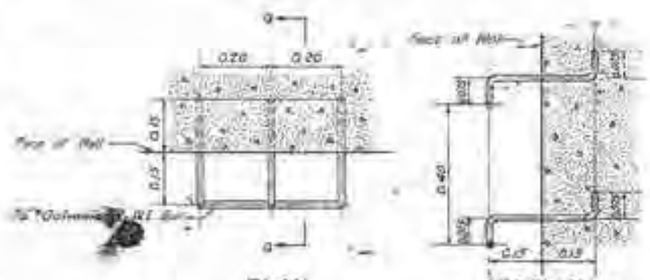
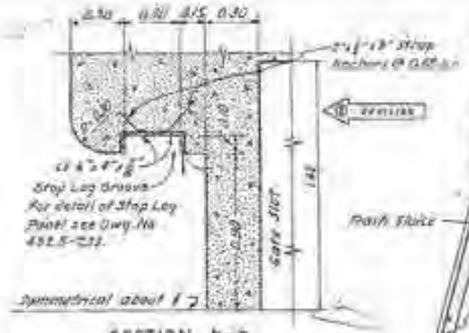
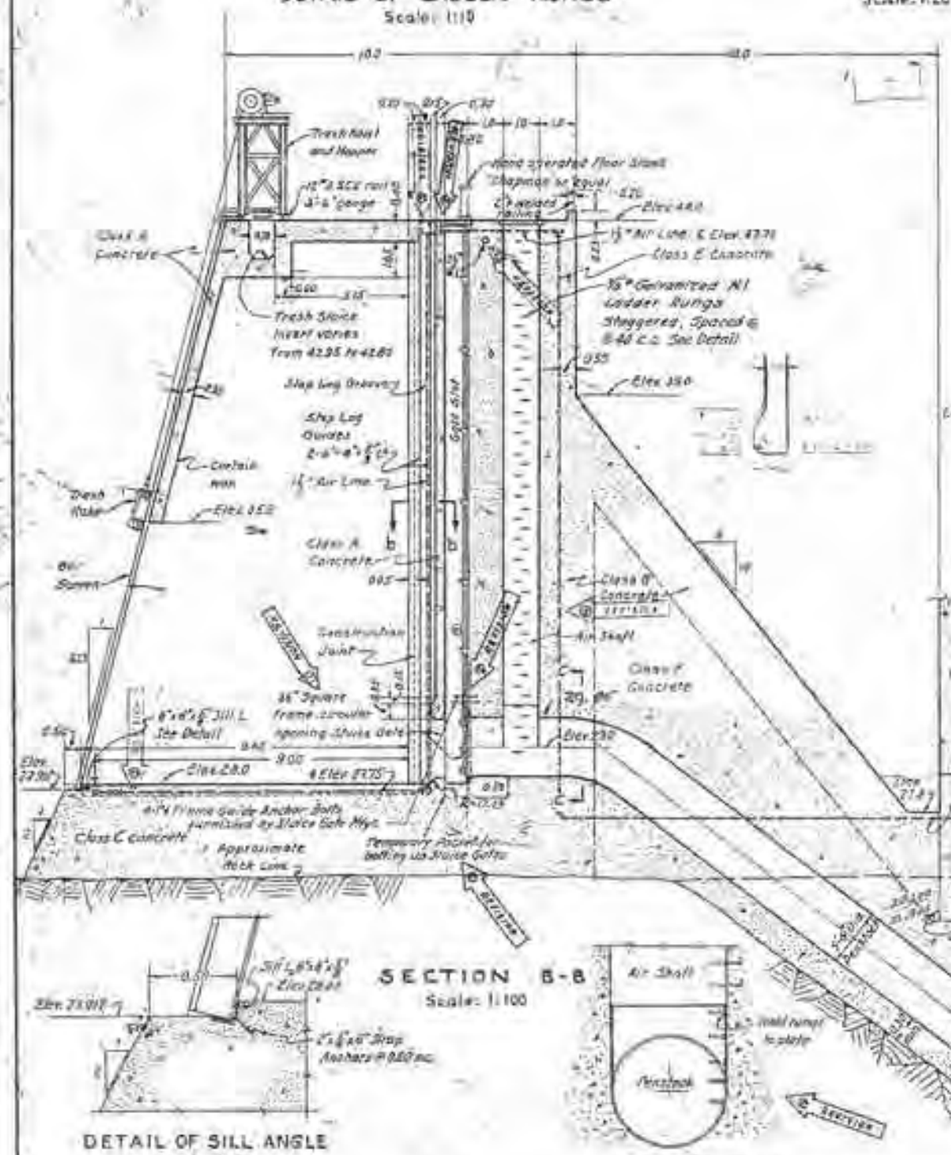


DETAIL OF LADDER RUNGS
Scale: 1:10



SECTION b-b
Scale: 1:20



DETAIL OF SILL ANGLE
Scale: 1:25

SECTION A-A
Scale: 1:100

Note
For plan showing sections A-A and B-B see Dwg. No. 452.5-230

DRAWING No. 452.5-232

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GOVERNMENT OF PUERTO RICO
PUERTO RICO AQUEDUCT AND SEWER SERVICE
SAN JUAN METROPOLITAN WATER DISTRICT

RIO GRANDE DE LOIZA DEVELOPMENT
LOIZA DAM
INTAKE
SECTIONS A-A AND B-B

Buck, Seifert and Jost
Consulting Engineers
New York, N.Y. — San Juan, P.R.

Scale: As Shown | August 1954

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Revisions:		

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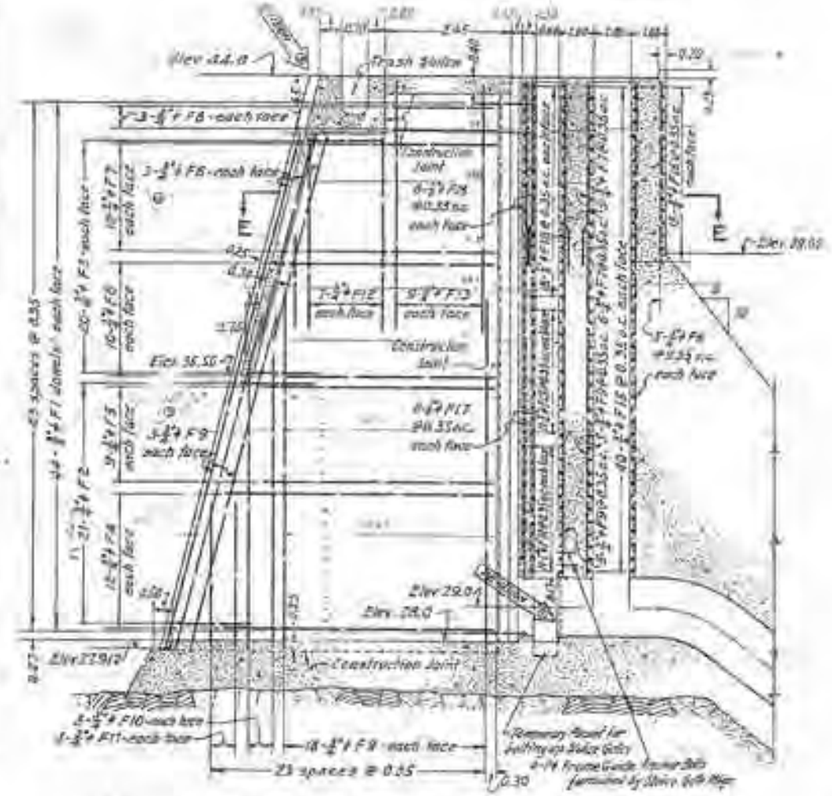
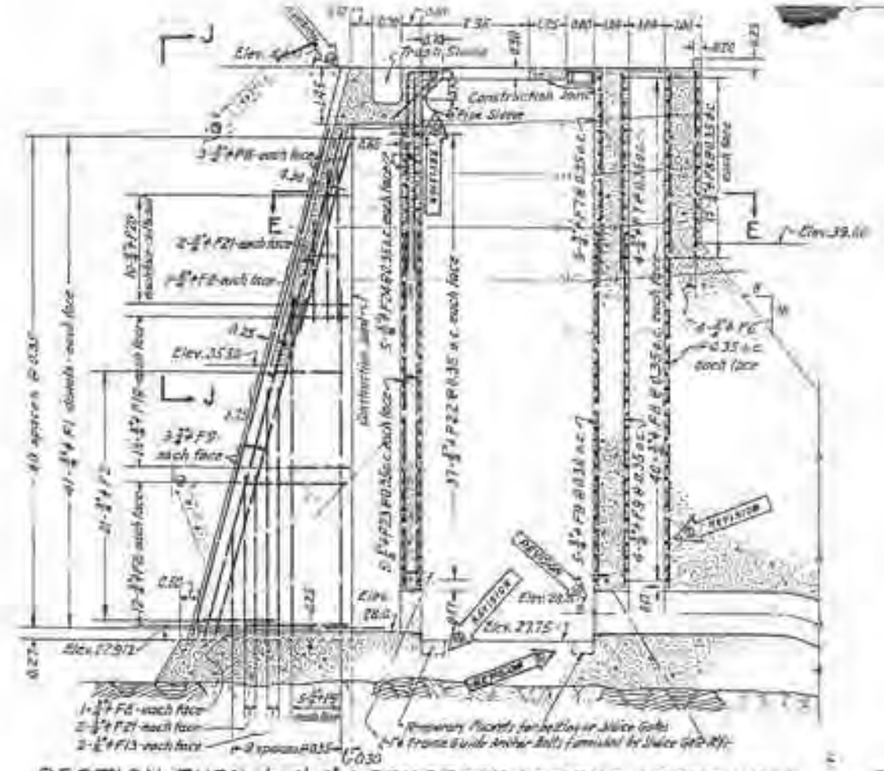
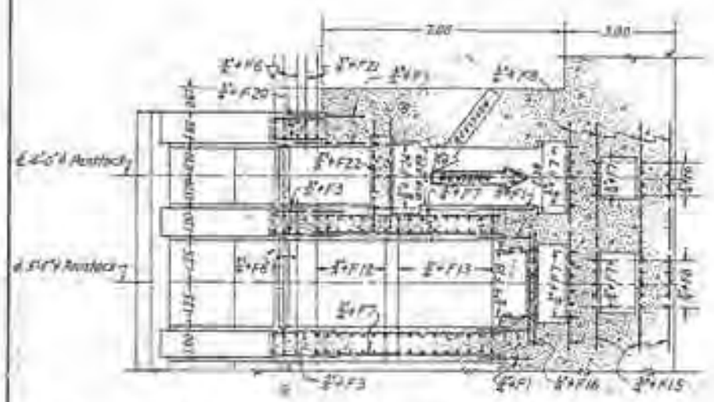


SECTION THRU ℄ 5'-6" ϕ PENSTOCKS
REINFORCING FOR ALL INTERIOR WALLS SIMILAR



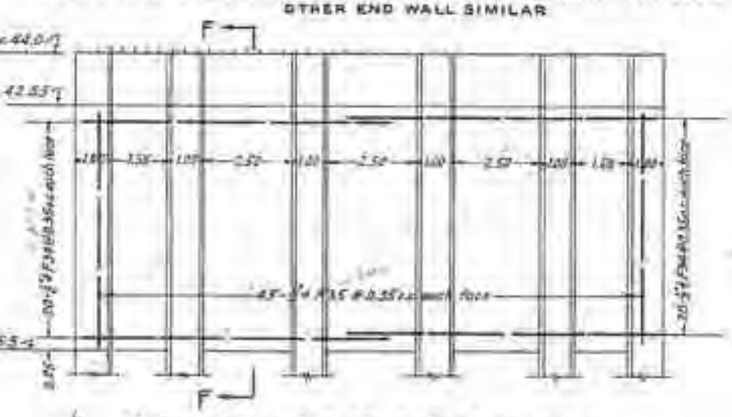
SECTION THRU ℄ 4'-0" ϕ PENSTOCK LOOKING AT END WALL
OTHER END WALL SIMILAR



SECTION E-E



SECTION F-F



ELEVATION J-J OF CURTAIN WALL

Addendum #3
Intake rehab
2 - 41" butterfly
35.5 ℄
34.6 ℄
35' below water surf.
mud level

Note:
For Reinforcing Schedule see Seq. No. 452.5-235

DRAWING No. 452.5-235

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GOVERNMENT OF PUERTO RICO
PUERTO RICO AQUEDUCT AND SEWER SERVICE
SAN JUAN METROPOLITAN WATER DISTRICT

RIO GRANDE DE LOIZA DEVELOPMENT
LOIZA DAM
INTAKE
REINFORCING DETAILS-SECTIONS

Buck, Seifert and Jost
Consulting Engineers
New York, N.Y. & San Juan, P.R.

Scale: 1:100 | August, 1949

Drawn by: DWS | Checked by: | Approved by:
Revisions:

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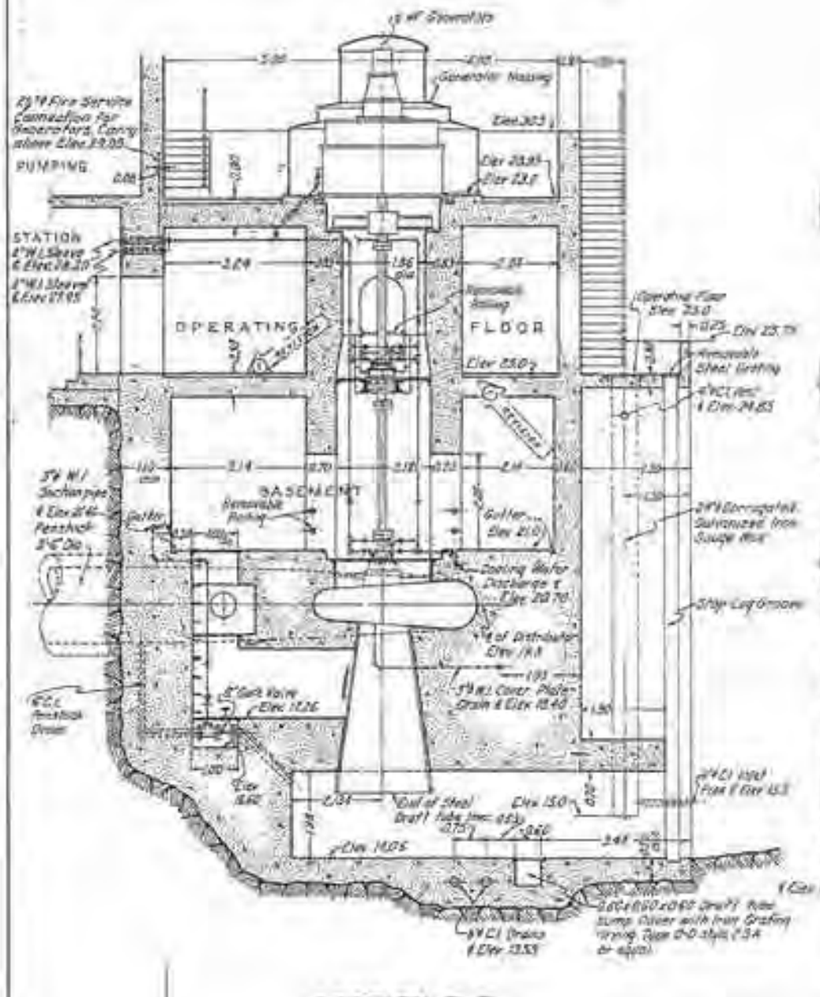
PUMPING
STATION
OPERATING
FLOOR
BASEMENT
Generator Housing
Removable Roofing
Removable Steel Grating
Sump Pump 500 G.P.M.
Elev 30.3
Elev 28.8
Elev 23.0
Elev 21.0
Elev 20.70
Elev 15.0
Elev 13.5
Elev 13.25
Elev 10.5
Elev 13.55
Elev 13.35
Elev 12.0
Elev 10.5
Elev 10.0
Elev 9.5
Elev 8.5
Elev 7.5
Elev 6.5
Elev 5.5
Elev 4.5
Elev 3.5
Elev 2.5
Elev 1.5
Elev 0.5
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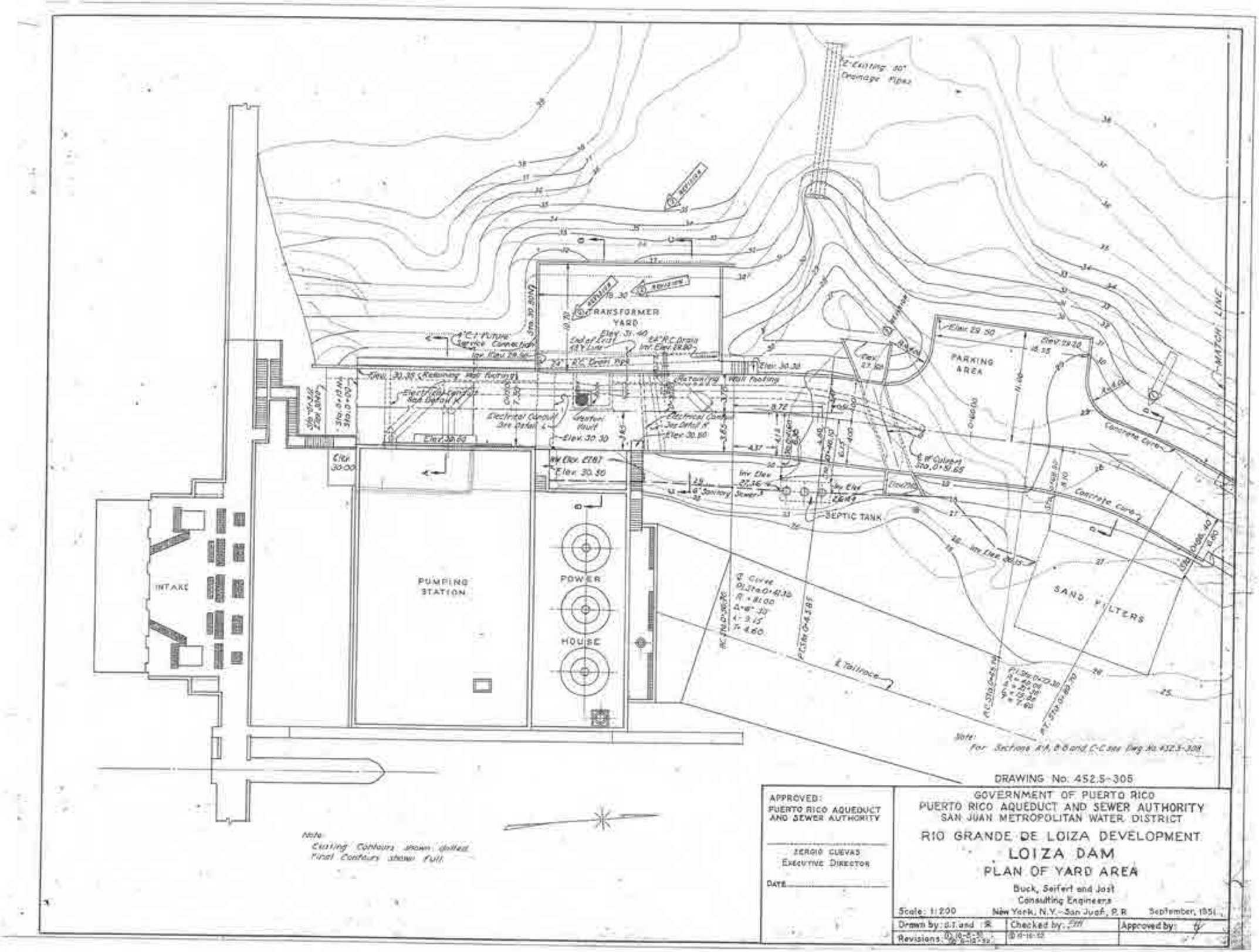
Elev -19.5
Elev



DRAWING No. 452.5-305

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SERGIO CUEVAS
EXECUTIVE DIRECTOR

DATE

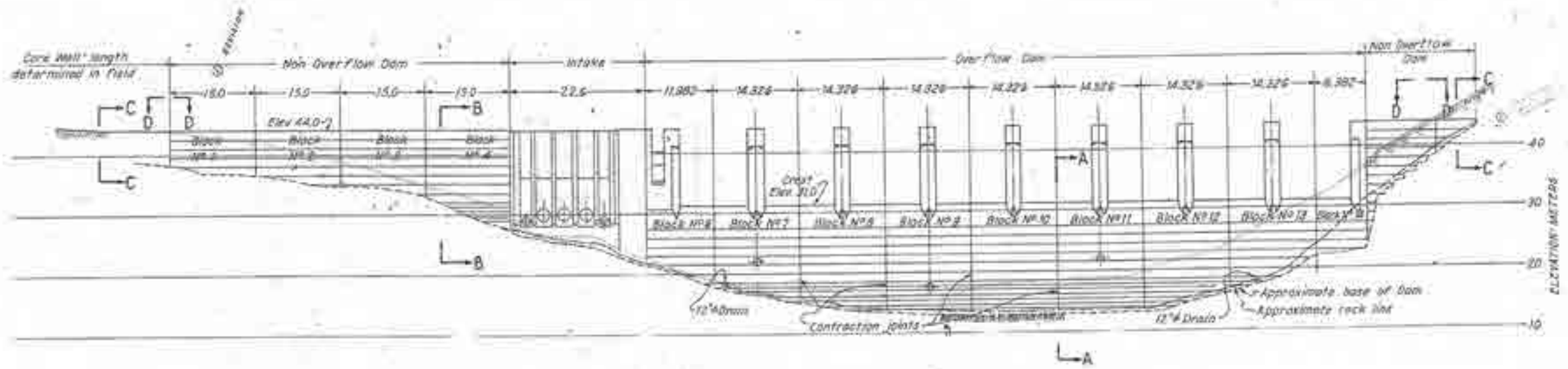
GOVERNMENT OF PUERTO RICO
PUERTO RICO AQUEDUCT AND SEWER AUTHORITY
SAN JUAN METROPOLITAN WATER DISTRICT

RIO GRANDE DE LOIZA DEVELOPMENT
LOIZA DAM
PLAN OF YARD AREA

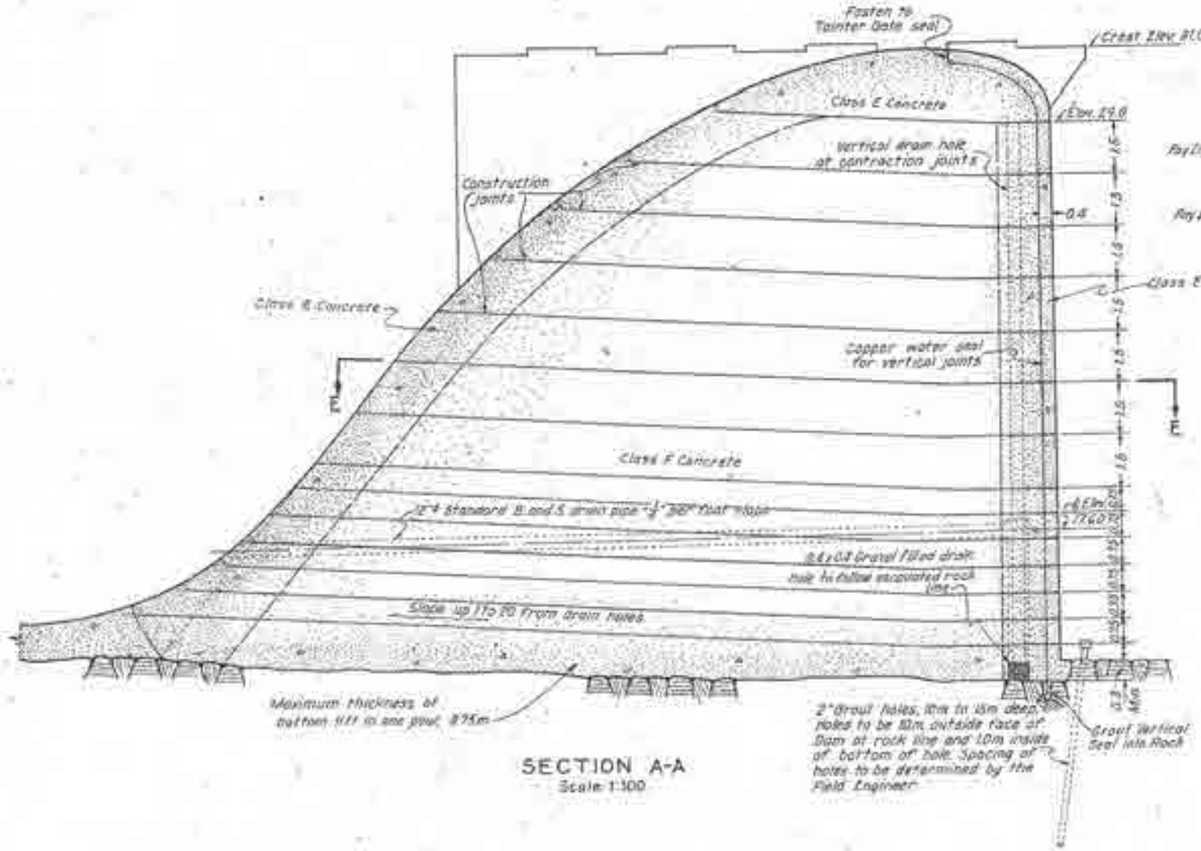
Buck, Seifert and Jost
Consulting Engineers
New York, N.Y. – San Juan, P.R.

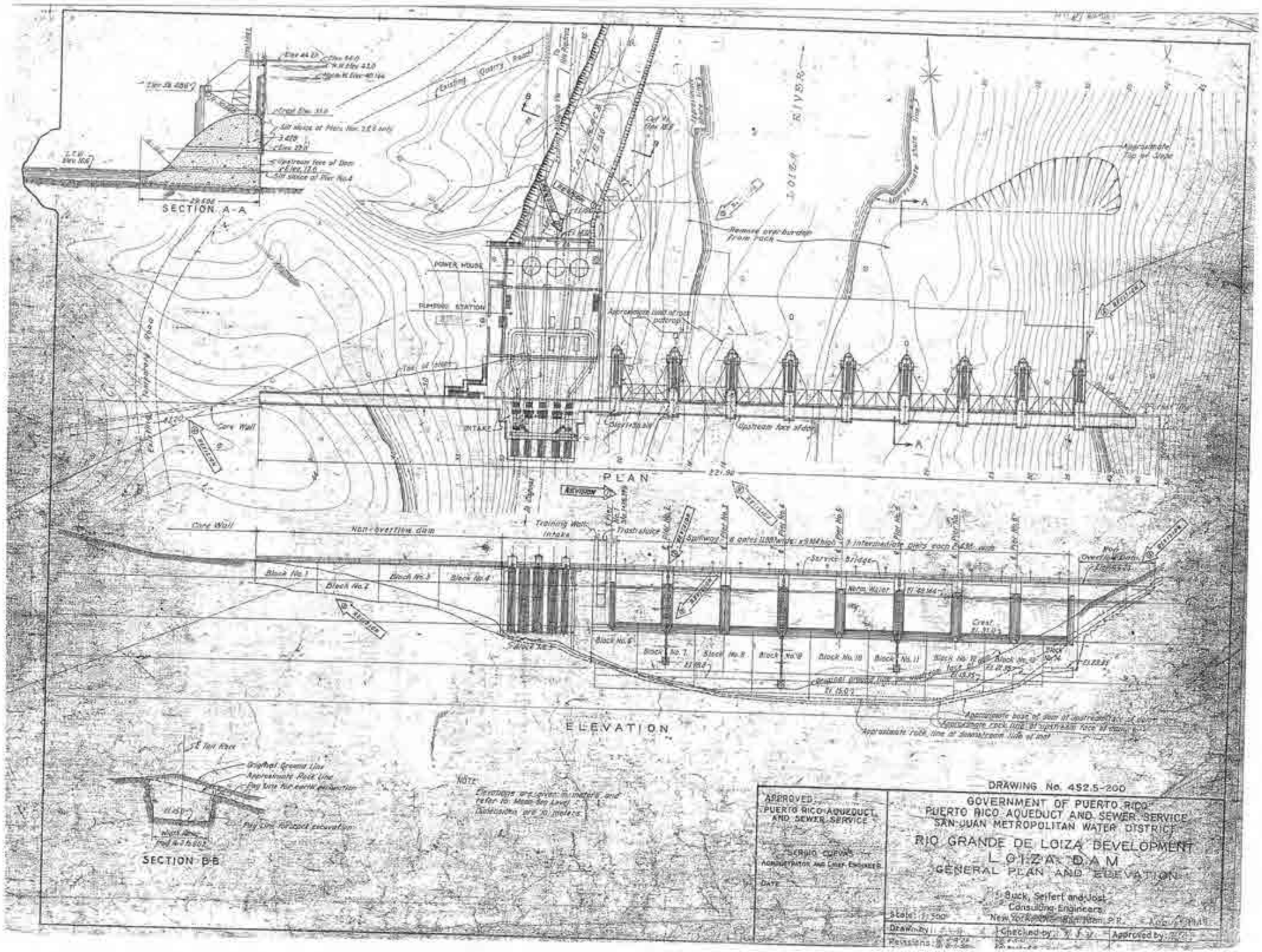
Scale: 1:200 | September, 1951

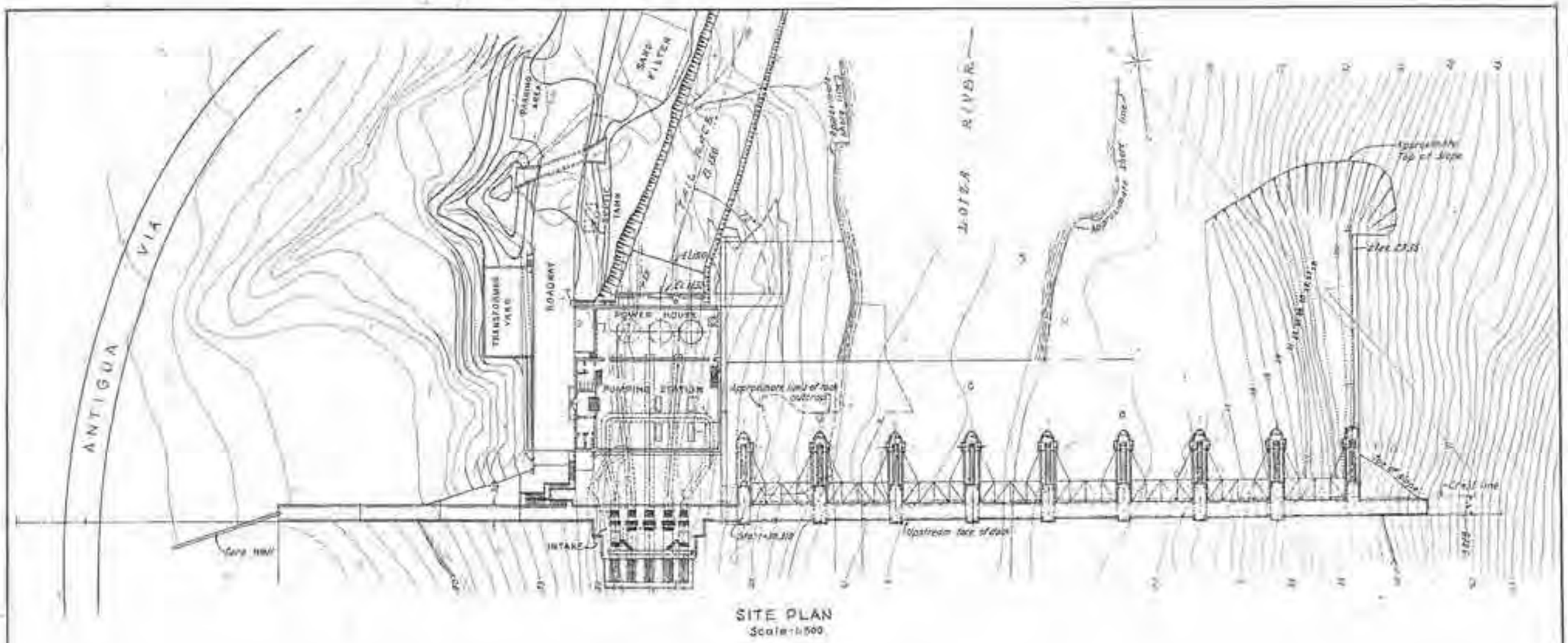
Drawn by: G.T. and I.R.	Checked by: [illegible]	Approved by:
Revisions: ① 10-5-51 ② 8-13-52	③ 8-16-52	



UPSTREAM ELEVATION OF DAM
Scale: 1:500


Fasten to Tainter Gate seal
Crest Elev 31.0
Elev. 29.0
Class E Concrete
Vertical drain hole at contraction joints
Construction Joints
0.6
1.5
1.5
1.5


SECTION A-A
PLAN
ELEVATION
SECTION B-B
POWER HOUSE
PUMPING STATION
INTAKE
Core Wall
Non-overflow dam
Training Wall
Trash sluice
Service Bridge
Block No. 1
Block No. 2
Block No. 3
Block No. 4
Block No. 6
Block No. 7
Block No. 8
Block No. 9
Block No. 10
Block No. 11
Remove overburden from rock
Approximate Top of Slope
Approximate base of dam at upstream face of dam
Approximate rock line at downstream line of dam
Approximate rock line at upstream face of dam
Existing Quarry Road
Existing Temporary Road
Tail Race
Original Ground Line
Approximate Rock Line
Pay Line for earth excavation
Pay Line for rock excavation
NOTE
Elevations are given in meters and refer to Mean Sea Level
Dimensions are in meters
DRAWING No. 452.5-200
APPROVED:
PUERTO RICO AQUEDUCT AND SEWER SERVICE
SERGIO CUEVAS
ADMINISTRATOR AND CHIEF ENGINEER
DATE
GOVERNMENT OF PUERTO RICO
PUERTO RICO AQUEDUCT AND SEWER SERVICE
SAN JUAN METROPOLITAN WATER DISTRICT
RIO GRANDE DE LOIZA DEVELOPMENT
LOIZA DAM
GENERAL PLAN AND ELEVATION
Buck, Seifert and Jost
Consulting Engineers
New York, N.Y. San Juan, P.R.
Drawn by
Checked by
Approved by
Revisions



SITE PLAN
Scale: 1:500


Bahía de San Juan
SAN JUAN
Río Grande de Loíza
Río Gurabo
Río Cagüitas
Río Bayamón
Río Piedras
Río Grande de Loíza
Río Valenciano
Río Canóvanas
Río Grande de Loíza
Río Gurabo
Río Loíza
Río Grande de Loíza
Río Grande de Loíza
Río Grande de

Appendix B:

Lago Loíza Bathymetric Contour Map

66°2'0"W 66°1'30"W 66°1'0"W 66°0'30"W 66°0'0"W

18°19'30"N 18°19'0"N 18°18'30"N 18°18'0"N 18°17'30"N 18°17'0"N 18°16'30"N

N W E S

Dam

Lago Loíza Reservoir

Location Map

Río Cañas branch

Río Gurabo branch

Río Grande de Loíza branch

Legend

Loiza Reservoir

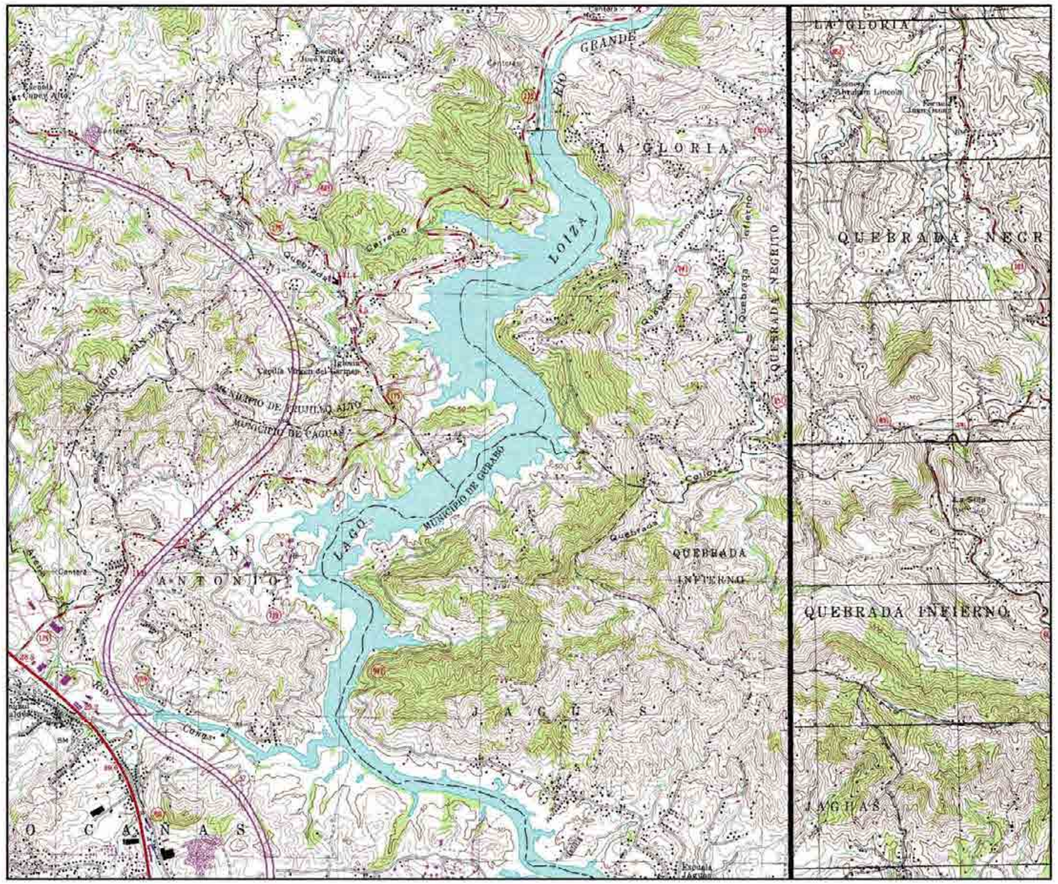
Loiza Contours 2019

Elevation of the reservoir bottom, in meters above mean sea level.
Contour interval 1 meter.

0 0.5 1 2 km

Lago Loíza Bathymetric Survey Contours, October 2019

APPENDIX C BASIS OF DESIGN DRAWINGS


LA GLORIA
RIO GRANDE
LOIZA
QUEBRADA NEGRITO
QUEBRADA INFIERNO
LAGO
SAN ANTONIO
JAGUAS
CAGUAS
TRUJILLO ALTO
GUAYNABO
CAROLINA
Capilla Virgen del Carmen
Cerro Cantera
Cerro Gallego
Cerro Cuchillas
Cerro Cuchillas
Cerro Cuchillas

DRAWING INDEX

SHEET NO.	DWG NO.	SHEET TITLE
GENERAL		
1	G-101	COVER SHEET
2	G-102	DRAWING INDEX
3	G 103	LEGEND, SYMBOLS AND ABBREVIATIONS
4	G-104	GENERAL NOTES
5	G-105	PROJECT COMPONENTS LAYOUT
6	G-106	LOIZA RESERVOIR 2021 BATHYMETRIC SURVEY
7	G-107	FEMA FLOOD ADVISORY MAP 100-YR FLOOD LEVELS AND LIMITS
STAGING AREA		
8	SA-101	STAGING AREA
9	SA-102	STAGING AREA PLAN AND PROFILE
10	SA 103	STACINC AREA SECTIONS
DREDGING TEMPLATE		
11	DT-101	LOIZA RESERVOIR DREDGING TEMPLATE PLAN
12	DT-102	LOIZA RESERVOIR DREDGING TEMPLATE SECTIONS (1 OF 4)
13	DT-103	LOIZA RESERVOIR DREDGING TEMPLATE SECTIONS (2 OF 4)
14	DT-104	LOIZA RESERVOIR DREDGING TEMPLATE SECTIONS (3 OF 4)
15	DT-105	LOIZA RESERVOIR DREDGING TEMPLATE SECTIONS (4 OF 4)
16	DT-110	COLUMN SETTLING TEST RESULTS
DREDGING PIPELINE		
17	DP-100	DREDGING PIPELINE LAYOUT
18	DP-101	DREDGING PIPELINE RESERVOIR TO DISPOSAL A PLAN AND PROFILE
19	DP-201	DREDGING PIPELINE RESERVOIR TO DISPOSAL B PLAN AND PROFILE (1 OF 2)
20	DP-202	DREDGING PIPELINE RESERVOIR TO DISPOSAL B PLAN AND PROFILE (2 OF 2)
21	DP-301	DREDGING PIPELINE RESERVOIR TO DISPOSAL C PLAN AND PROFILE (1 OF 4)
22	DP-302	DREDGING PIPELINE RESERVOIR TO DISPOSAL C PLAN AND PROFILE (2 OF 4)
23	DP-303	DREDGING PIPELINE RESERVOIR TO DISPOSAL C PLAN AND PROFILE (3 OF 4)
24	DP-304	DREDGING PIPELINE RESERVOIR TO DISPOSAL C PLAN AND PROFILE (4 OF 4)
CIVIL		
25	C-100	DISPOSAL AREA A PANORAMIC PHOTO
26	C-101	DISPOSAL AREA A EXISTING CONFIGURATION PLAN AND SECTIONS
27	C-102	DISPOSAL AREA A STAGE STORAGE AND AREA
28	C-103	DISPOSAL AREA A PHOTOS
29	C-104	DISPOSAL AREA A PLAN, PROFILE AND TYPICAL SECTION
30	C-105	DISPOSAL AREA A DIKE SECTIONS (1 OF 2)
31	C-106	DISPOSAL AREA A DIKE SECTIONS (2 OF 2)
32	C-107	DISPOSAL AREA A OUTFALL INFRASTRUCTURE PLAN
33	C-110	DISPOSAL AREA A GEOTUBES LAYOUT PLAN VIEW
34	C 111	DISPOSAL ARCA A CEOTUDES LAYOUT CENERAL DETAILS

SHEET NO.	DWG NO.	SHEET TITLE
CIVIL		
35	C-200	DISPOSAL AREA B PANORAMIC PHOTO
36	C-201	DISPOSAL AREA B EXISTING CONFIGURATION PLAN AND SECTIONS
37	C 202	DISPOSAL AREA B STAGE STORAGE AND AREA
38	C-203	DISPOSAL AREA B PHOTOS
39	C-204	DISPOSAL AREA B PLAN, PROFILE AND TYPICAL SECTION
40	C-205	DISPOSAL AREA B DIKE SECTION (1 OF 2)
41	C-206	DISPOSAL AREA B DIKE SECTION (2 OF 2)
42	C-207	DISPOSAL AREA B OUTFALL INFRASTRUCTURE PLAN
43	C-300	DISPOSAL AREA C PANORAMIC PHOTO
44	C-301	DISPOSAL AREA C EXISTING CONFIGURATION PLAN AND SECTIONS
45	C-302	DISPOSAL AREA C STAGE STORAGE AND AREA
46	C-303	DISPOSAL AREA C PHOTOS
47	C-304	DISPOSAL AREA C PLAN, PROFILE AND TYPICAL SECTION
48	C-305	DISPOSAL AREA C DIKE SECTIONS (1 OF 2)
49	C-306	DISPOSAL AREA C DIKE SECTIONS (2 OF 2)
50	C-307	DISPOSAL AREA C OUTFALL INFRASTRUCTURE PLAN
GENERAL DETAILS		
51	GD-101	PLAN CES GENERAL DETAILS AND NOTES
52	GD-102	PERIMETER FENCE GENERAL DETAILS
03	GD-103	AIXtbb KUAO UtAILS
54	GD-104	GENERAL DETAILS PIPELINE CROSSING DETAILS
55	GD-105	HOPE PIPE GENERAL DETAILS
56	GD-106	GENERAL DETAILS MOT
57	GD-107	OVERFLOW WEIR AND SPILLWAY GENERAL DETAILS
58	GD-108	FLOATING TURBIDITY CURTAIN TYPICAL DETAILS
BORING LOCATIONS		
59	BL-001	LOIZA RESERVOIR BORING LOCATIONS
60	BL-002	GEOTECHNICAL LOIZA RESERVOIR BORING LOGS (1 OF 2)
61	BL-003	GEOTECHNICAL LOIZA RESERVOIR BORING LOGS (2 OF 2)
62	BL-101	DISPOSAL AREAS BORING LOCATIONS
63	BL-102	GEOTECHNICAL DIKE A BORING LOGS (1 OF 2)
64	BL-103	GEOTECHNICAL DIKE A BORING LOGS (2 OF 2)
65	BL-104	GEOTECHNICAL DIKE B BORING LOGS (1 OF 2)
66	BL-105	GEOTECHNICAL DIKE B BORING LOGS (2 OF 2)
67	BL-106	GEOTECHNICAL DIKE C BORING LOGS (1 OF 4)
68	BL-107	GEOTECHNICAL DIKE C BORING LOGS (2 OF 4)
69	BL-108	GEOTECHNICAL DIKE C BORING LOGS (3 OF 4)
70	BL-109	GEOTECHNICAL DIKE C BORING LOGS (4 OF 4)
TOTAL NUMBER OF PAGES: 70		

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
REVISIONS				

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BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

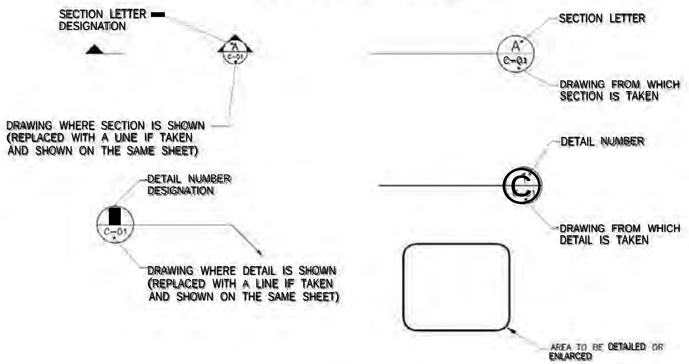
TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: DRAWING INDEX		SHEET ID. G-102	SHEET No. 2
		PROJ NO. CIP NO 1-01-9000	
SCALE AS SHOWN	BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY. 0 2CM	DATE JAN/28/2022	

DRAFTING SYMBOLS



LEGEND

EXISTING	PROPOSED	DESCRIPTION
B-1		TEST BORING LOCATION AND NUMBER
A		CONTROL POINT
©		TREE
		TREE TO BE REMOVED
5.27	A-4Z90	SPOT ELEVATION
		FLOW DIRECTION
t		CONCRETE LIGHTING POLE
		LIGHTING POLE
		WATER VALVE
©		MANHOLE
		ORDINARY HIGH WATER MARK
1.00		CONTOUR LINE ONE (1.00) METER INTERVAL
		CONTOUR LINE HALF (0.50) METER INTERVAL
		CHAIN LINK FENCE
		BARB WIRE FENCE
		CENTERLINE
		OVERHEAD POWER LINE
		GUARD RAIL
TOP OF SLOPE / TOE OF SLOPE		FILL SLOPE
TOP OF SLOPE / 1 / TOE OF SLOPE		CUT SLOPE

NOTE:

1. ALL SYMBOLS ARE NOT NECESSARILY USED ON THIS PROJECT.
2. REFER TO ELECTRICAL DRAWINGS FOR ELECTRICAL AND INSTRUMENTATION LEGEND AND ABBREVIATIONS.

VALVE SYMBOLS

SYMBOL	CODE	DESCRIPTION
	ARV	AIR RELEASE VALVE
TAN	AC	ACTUATOR
	AN	MECHANICAL COUPUNC ADAPTER ANGLE VALVE
FLOW	BA	BALL VALVE
FLOW	BCK	BALL CHECK VALVE
N	BU	BUTTERFLY VALVE
FLOW	BU CK	BUTTERFLY CHECK VALVE
FLOW	CV	CONE VALVE
	CK	CHECK VALVE
EI	DI	DIAPHRAM VALVE
	DR	DRAIN VALVE
WaN	EJ	EXPANSION JOINT
	FG	FLAP GATE
	GA	GATE VALVE
	GL	GLOBE VALVE
	KG	KNIFE GATE
	MC	MECHANICAL COUPLING ADAPTER
SEAL PORT	PV	PLUG VALVE ECCENTRIC
SV	SV	SOLENOID VALVE
CR	SR	SURGE RELIEF
	TSV	TELESCOPIC VALVE
	CO	CYLINDER OPERATOR (PNEUMATIC OR HYDRAULIC)
D	D	DIAPHRAGM VALVE
M	M	MOTOR OPERATOR
SO	SO	SOLENOID OPERATOR
	PV	PLUG VALVE
T	MO	MANUAL OPERATOR
-C53-	FE	FLOW ELEMENT
M	M	FLOW METER
	MX	MIXER
T	T	TURBIDITY MONITORING POINTS
TOC	TOC	TOTAL ORGANIC CARBON MONITORING POINT
PH	PH	PH MONITORING POINTS
A	A	ALKALINITY MONITORING POINTS
	E	ELETRIC MOTOR
SBL	SBL	SLUDGE BLANKET LEVEL

ABBREVIATIONS

ITEM	DESCRIPTION
AB	ANCHOR BOLT
ALUM	ALUMINUM
ALT	ALTERNATE
AWS	AMERICAN WELDING INSTITUTE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APPROX	APPROXIMATE
ACI	AMERICAN CONCRETE INSTITUTE
AUTO	AUTOMATIC
AUX	AUXILIARY
@	AT
AVG	AVERAGE
APVD	APPROVED
BF	BUND FLANGE
BOT	BOTTOM
C	CHANNEL(BEAM)
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CHK	CHECK, CHECKED
CJ	CONSTRUCTION JOINT
CLR	CLEAR
CL	CENTERLINE, CLEARANCE
CTR	CENTER
CONC	CONCRETE
CONT	CONTINUOUS
CPLG	COUPLING
CF	CUBIC FEET
CU IN	CUBIC INCHES
CY	CUBIC YARD
DET	DETAIL
DIP	DUCTILE IRON PIPE
DIA	DIAMETER
DP	DRAIN PIPE
DWG	DRAWING
E	EASTING COORDINATE
EA	EACH
EL	ELEVATION
ELB	ELBOW
ELEC	ELECTRICAL
ENG	ENGINEER
EQPT	EQUIPMENT
EW	EACH WAY
EWEF	EACH WAY EACH FACE
EXP	EXPANSION
EXP AB	EXPANSION ANCHOR BOLT
EXP JT	EXPANSION JOINT
EXIST	EXISTING
FC	FLEXIBLE COUPLING
FCA	FLANGED COUPLING ADAPTER
FF	FINISHED FLOOR
FFE	FINISHED FLOOR ELEVATION
FG	FINISHED GRADE
FL	FLOW LINE OR FLOOR
FLG	FLANGE
FIN	FINISH
FT	FOOT OR FEET
FTG	FOOTING
GA	GAUGE
GAL	GALLON
CALV	GALVANIZED
GC	GROOVED COUPLING
GCF	GROOVED COUPLING FITTING
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
HGT, HT	HEIGHT
HORIZ	HORIZONTAL
HP	HORSEPOWER
HWL	HIGH WAILK LEVIL
HSS	HOLLOW STRUCTURAL SECTION
ID	INSIDE DIAMETER
IN	INCHES
INSTM	INSTRUMENT
INV	INVERT
IE	INVERT ELEVATION
JT	JOINT
KIP	THOUSAND POUNDS
KM	KILOMETER
KW	KILOWATT
L	LENGTH
LB	POUND
PCF	POUNDS PER CUBIC FEET
LF	LINEAR FEET
LT	LEFT
LWL	LOW WATER LEVEL
M	METER
MM	MILLIMETER
MAX	MAXIMUM
MECH	MECHANICAL
MFR	MANUFACTURER
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MWS	MAXIMUM WATER SURFACE
N	NORTHING COORDINATE
NCL	NORMALLY CLOSE
NIC	NOT IN CONTRACT
NO.	NUMBER
NOP	NORMALLY OPEN
NPT	NATIONAL PIPE TREADS
NTS	NOT TO SCALE
NWL	NORMAL WATER LEVEL
OC	ON CENTER
OF	OUTSIDE FACE
OD	OUTSIDE DIAMETER
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OPNG	OPENING
OHWM	ORDINARY HIGH WATER MARK
P	PIPE
PC	POINT OF CURVATURE
PE	PLAIN END
PI	POINT OF INTERSECTION, POINT OF INFLECTION
PL	PLATE (STEEL)
POB	POINT OF BEGINING
POE	POINT OF ENDING
PSF	POUNDS PER SQUARE FOOT
PS	PUMP STATION
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAUGE
Q	FLOW
RAD	RADIUS
RDCR	REDUCER
REINF	REINFORCED, REINFORCING OR REINFORCE
REQ'D	REQUIRED
RMJ	RESTRAINED MACHANICAL JOINT
RST	REINFORCING STEEL
RTN	RETURN
RW	RAW WATER
S	SLOPE
SEC	SECONDARY,SECOND (TIME)
SECT	SECTION
SCHED	SCHEDULE
SHPO	STATE HISTORIC PRESERVATION OFFICE
SHT	SHEET
SPEC	SPECIFICATIONS
SQ	SQUARE
SQ FT	SQUARE FOOT
SQIN	SQUARE INCH
SS	STAINLESS STEEL,STORM SEWER
STA	STATION
STD	STANDARD
STRUC	STRUCTURE, STRUCTURAL
STL	STEEL CONSTRUCTION
SYMN	SYMMETRICAL
T & B	TOP AND BOTTOM
TC	TOP OF CURB
T & G	TONGUE AND GROOVE
TAN	TANGENT
TE	TOP ELEVATION
TEMP	TEMPERATURE
THD	THREAD
TP	TURNING POINT
TS	TOP OF SLAB
TT	THRUST TIE
TW	TOP OF WALL
TYP	TYPICAL
USCS	UNIFIED SOIL CLASSIFICATION SYSTEM
V	VENT, VERTICAL, VOLTS
VERT	VERTICAL
W/	WITH
WS	WATER SURFACE
WS	WATERSTOP
WTR	WATER

NOTE:

1. ABBREVIATIONS SHOWN ON THIS SHEET APPLY TO THE ENTIRE SET OF DRAWINGS. LISTING OF ABBREVIATION DOES NOT IMPLY ALL ABBREVIATIONS HAVE BEEN USED ON THIS PROJECT. FOR ADDITIONAL ABBREVIATIONS REFER TO TECHNICAL SPECIFICATION SECTION 010900.

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

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BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: LEGEND, SYMBOLS AND ABBREVIATIONS

SHEET ID. G-103

SHEET No. 3

PROJ NO. CIP NO 1-01-9000

SCALE AS SHOWN

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM

DATE JAN/28/2022

GENERAL NOTES:

1. THESE PLANS HAVE BEEN PREPARED FOLLOWING THE CONTRACT SPECIFICATIONS. IN THE EVENT OF AN OVERSIGHT, OMISSION, OR DISCREPANCY, CONTRACTOR SHALL FOLLOW ANY WRITTEN DIRECTIVE ISSUED BY PRASA.
2. ALL DISTANCES, COORDINATES AND ELEVATIONS ARE SHOWN IN METERS, UNLESS OTHERWISE INDICATED.
3. HORIZONTAL CONTROLS USED ON THESE DRAWINGS ARE REFERENCED TO NAD 83 (NA2011 EPOCH 2010).
4. VERTICAL CONTROLS ARE REFERENCED TO MEAN SEA LEVEL (PRVD 2002).
5. CONTRACTOR SHALL COORDINATE WITH ALL CONCERNING GOVERNMENT AGENCIES AND OFFICES INCLUDING BUT NOT LIMITED TO ENVIRONMENTAL QUALITY BOARD, P.R. DEPARTMENT OF NATURAL AND ENVIRONMENTAL RESOURCES AND MUNICIPAL AGENCIES, PRIOR TO STARTING ANY CONSTRUCTION ACTIVITY.
6. CONTRACTOR SHALL COMPLY WITH PUERTO RICO ENVIRONMENTAL QUALITY BOARD REGULATIONS.
7. CONTRACTOR SHALL COMPLY WITH THE OSHA STANDARD REQUIREMENTS.
8. THE CONTRACTOR SHALL OBTAIN ALL PERMITS FOR AND ABIDE BY APPLICABLE STORM WATER RUNOFF AND/OR DISCHARGE REQUIREMENTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE STATE AND FEDERAL AGENCIES. CONTRACTOR SHALL MINIMIZE AND CONTROL SOIL EROSION AND SEDIMENT RUNOFF. DISTURBED SURFACES SHALL BE RESTORED PER APPLICABLE REQUIREMENTS.
9. REMOVAL OF CONCRETE, ASPHALT OR ANY OTHER DEBRIS DISPOSAL SHALL COMPLY WITH GOVERNMENT GUIDELINES, REGULATIONS AND PERMIT CONDITIONS.
10. THE CONTRACTOR SHALL CONTACT FISH AND WILDLIFE SERVICE OFFICE OR THE HERITAGE PROGRAM OF THE DEPARTMENT OF NATURAL AND ENVIRONMENTAL RESOURCES IF ENDANGERED PLANT OR ANIMAL SPECIES ARE FOUND OR SUSPECTED TO OCCUR AT THE CONSTRUCTION SITE.
11. PROPOSED PROJECT IS LOCATED IN FLOOD SUSCEPTIBLE AREA. CONTRACTOR SHALL MAINTAIN THE FREE FLOWS OF WATER AND SHALL AVOID THE OBSTRUCTION OF RIVER FLOODWAY. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF PERSONNEL, EQUIPMENT AND MATERIAL DURING FLOOD EVENTS.
12. HEAVY EQUIPMENT TO BE USED IN CONSTRUCTION SHALL BE IN GOOD CONDITION WITH ZERO OIL LEAKAGE.
13. CONTRACTOR SHALL ENSURE THE APPROPRIATE USE AND STORAGE OF EQUIPMENT AND MATERIALS USED DURING CONSTRUCTION IN ORDER TO AVOID ACCIDENTS WITH PEOPLE RELATED AND NOT RELATED TO CONSTRUCTION PROCESS.
14. TEMPORARY STOCKPILE AREA SHALL BE COORDINATED WITH OWNER.
15. LOCATION OF UNDERGROUND UTILITIES SHOWN ON THESE PLANS ARE BASED ON A SURFACE FIELD SURVEY. IT IS THE CONTRACTOR'S OBLIGATION TO VERIFY AND INCLUDE IN THE BID PRICE, THE DEGREE OF DIFFICULTY THAT THE UTILITIES MAY REPRESENT. THE CONTRACTOR SHALL EXPECT UNDERGROUND UTILITIES NOT FOUND IN THE SURVEY. IN THE EVENT THAT ANY UTILITY IS FOUND DURING THE INSTALLATION OF THE PIPELINES, THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER AND THE UTILITY AGENCY'S REPRESENTATIVE THE WORK REQUIRED FOR THE CROSSING.
16. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR DAMAGES WHICH MIGHT OCCUR BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY UNDERGROUND UTILITY.
17. CONSTRUCTION SHALL NOT INTERFERE WITH THE FILTER PLANT NORMAL OPERATION.
18. CONTRACTOR SHALL NOT LEAVE OPEN TRENCH AFTER DAILY END OF CONSTRUCTION.
19. FENCES, GATES, ROADWAYS DRIVES, GROUND SURFACES, ETC., SHALL BE LEFT IN A CONDITION EQUAL TO OR BETTER THAN THAT FOUND.
20. UPON COMPLETION OF CONSTRUCTION, FINISHED GRADES SHALL BE BROUGHT BACK TO PRE-CONSTRUCTION CONDITION OR SHALL BE AS SPECIFIED IN CONSTRUCTION DRAWINGS, WHICH EVER THE CASE.
21. IN AREAS WITH EXCAVATION MORE THAN 20FT IN DEPTH, THE EXCAVATION SHALL BE PROTECTED BY A SYSTEM DESIGN BY A PROFESSIONAL ENGINEER. THIS SYSTEM SHALL BE SUBMITTED FOR EVALUATION PRIOR TO START ANY WORK IN THE PROJECT. ALL IN COMPLIANCE WITH THE 29 CFR 1926-6521.
22. CONTRACTOR SHALL PROVIDE EMPLOYEES WITH PROTECTION AGAINST WATER HAZARD.
23. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES WHICH WILL OR MIGHT IMPACT THE CONTRACTOR'S WORK WHETHER OR NOT SHOWN ON THE PLANS. IF THERE IS ANY DISCREPANCY BETWEEN THE PLANS AND THE ACTUAL FIELD CONDITIONS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER BEFORE PROCEEDING WITH ANY WORK AND BEFORE ORDERING ANY MATERIALS AFFECTED BY THE DISCREPANCY.
24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY, INTEGRITY AND STABILITY OF BUILDINGS, EMBANKMENTS, EXISTING PIPELINES OR ANY OTHER STRUCTURES OR UTILITIES IN THE VICINITY OF THE EXCAVATION OR ANY OTHER CONSTRUCTION OPERATION. WHERE NECESSARY, THE USE OF SHEET PILING, FENCING OR ANY OTHER DEVICES TO ENSURE THE PROTECTION OF PERSONS STRUCTURES OR UTILITIES SHALL BE INSTALLED AT CONTRACTOR'S EXPENSE.
25. AFTER COMPLETION OF THE WORK, THE CONTRACTOR SHALL SEED AND MULCH THE DISTURBED AREAS TO PROMOTE QUICK GROWTH OF GREEN TURF AND REDUCE EROSION. THE CONTRACTOR SHALL PROTECT THESE AREAS UNTIL GREEN COVER IS REESTABLISHED.
26. ALL FENCES SHALL BE REINSTALLED IN THE ORIGINAL LOCATION AND OF SAME TYPE UNLESS OTHERWISE DIRECTED BY THE RESIDENT ENGINEER.
27. CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR NECESSARY WHEN ENCOUNTERING PUBLIC OR PRIVATE ROAD REMOVAL AND REPLACEMENT, CULVERT REMOVAL AND REPLACEMENT, AND REMOVAL AND REPLACEMENT OF UTILITIES FOR THIS PROJECT.
28. CONTRACTOR SHALL CLEAN THE CONSTRUCTION AREA OF DEBRIS CREATED DURING CONSTRUCTION.
29. CONTRACTOR SHALL MAINTAIN ACCESS OF PUBLIC AND PRIVATE PROPERTIES BY OWNERS, USER AND CLIENTS.
30. CONTRACTOR SHALL ENSURE THE FREE FLOW OF STORM WATER AT ALL TIMES.
31. CONTRACTOR SHALL REPLACE EXISTING UTILITIES DAMAGED DURING CONSTRUCTION. PRIMARY SERVICES INCLUDING BUT NOT LIMITED TO POTABLE WATER, ELECTRICITY, PHONE, WASTE WATER DRAINAGE OF RESIDENTS SHALL BE MAINTAINED.
32. ALL WORKS SHALL BE IN ACCORDANCE WITH P.R.A.S.A. STANDARDS.
33. IF CULTURAL RESOURCES ARE LOCATED DURING CONSTRUCTION (ARCHAEOLOGICAL FINDINGS UNEARTHED) WORK SHALL STOP IN THAT AREA AND THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE P.R. CULTURE INSTITUTE AND THE OWNER'S REPRESENTATIVE.
34. AN UNDERWATER HISTORIC STRUCTURE LIES IN THE BOTTOM OF THE RESERVOIR, APPROXIMATELY 1KM UPSTREAM OF THE DAM. CONTRACTOR SHALL LOCATE THE STRUCTURE AND ESTABLISH A 10-METER BUFFER ZONE. THE CONTRACTOR SHALL NOT DREDGE OR ENTER THIS AREA. THE BUFFER ZONE SHALL BE DELIMITED WITH BUOYS OR ANY OTHER VISIBLE MEASURE.

GENERAL PIPING NOTES:

1. ALL PIPELINE AND PUMP STATIONS SHALL BE INSTALLED WITHIN THE DESIGNATED 12M WIDE EASEMENT.
2.
3. PIPELINE INSTALLATION SHALL BE PERFORMED WITHOUT EXCAVATION EXCEPT AS COORDINATED WITH ENGINEER AND SHPO.
4.
5. PIPELINE ROUTE SHALL BE RETURNED TO ORIGINAL OR BETTER CONDITION AT THE END OF THE PROJECT.

CONTRACTOR RESPONSIBILITY:

THESE "BASIS DESIGN" DOCUMENTS HAVE BEEN PREPARED TO PROVIDE THE CONTRACTOR WITH A BETTER UNDERSTANDING OF OWNER'S INTENT, AND PARAMETERS TO BE CONSIDERED IN PROJECT DESIGN AND EXECUTION.

THESE DRAWINGS AND SUPPORTING DOCUMENTATION ARE PROVIDED TO AID THE CONTRACTOR, BUT SHALL NOT BE USED FOR CONSTRUCTION

THE CONTRACTOR IS REQUIRED TO DEVELOP ITS OWN PROJECT DESIGN, AND SHALL BE ENTIRELY AND EXCLUSIVELY RESPONSIBLE FOR SAID DESIGN AND ITS PROPER EXECUTION.

NOTWITHSTANDING, CONTRACTOR MUST PERFORM ALL SERVICES WITHOUT EXCEEDING THE IMPACT AREAS OR EASEMENTS SPECIFIED IN THESE DRAWINGS.

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ANCHOR QEA
ENGINEERING-GROUP
748 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024184, SAN JUAN, PR
00902-4187 USA
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BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: CENTRAL NOTES

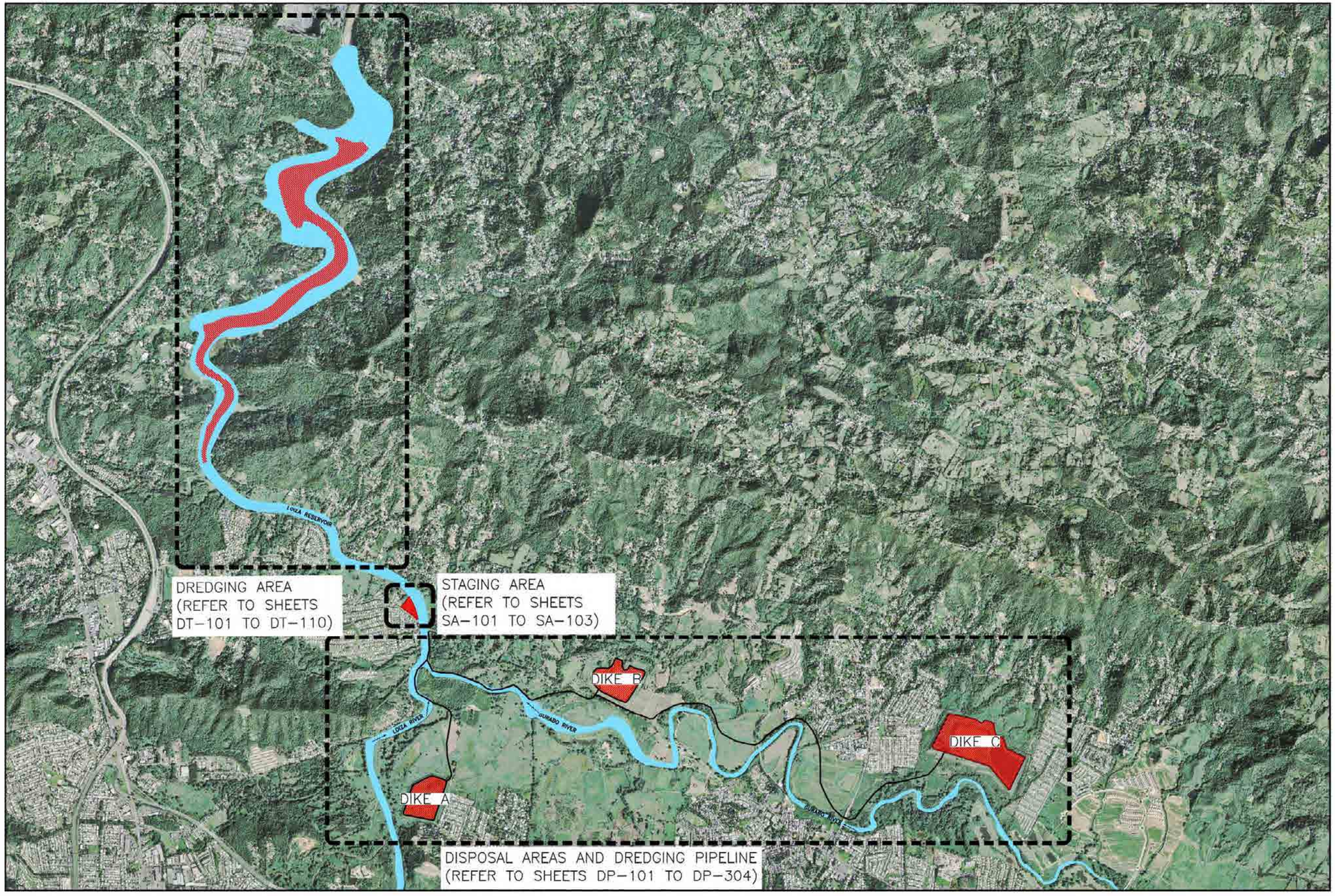
SHEET ID. G-104 | SHEET No. 4

PROJ NO. CIP NO 1-01-9000

SCALE –

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM

DATE JAN/28/2022



BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
	REVISIONS			

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
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ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA
(CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
PROJECT COMPONENTS LAYOUT

SHEET ID. G-105
SHEET No. 5
PROJ NO. CIP NO 1-01-9000
SCALE 1:20,000
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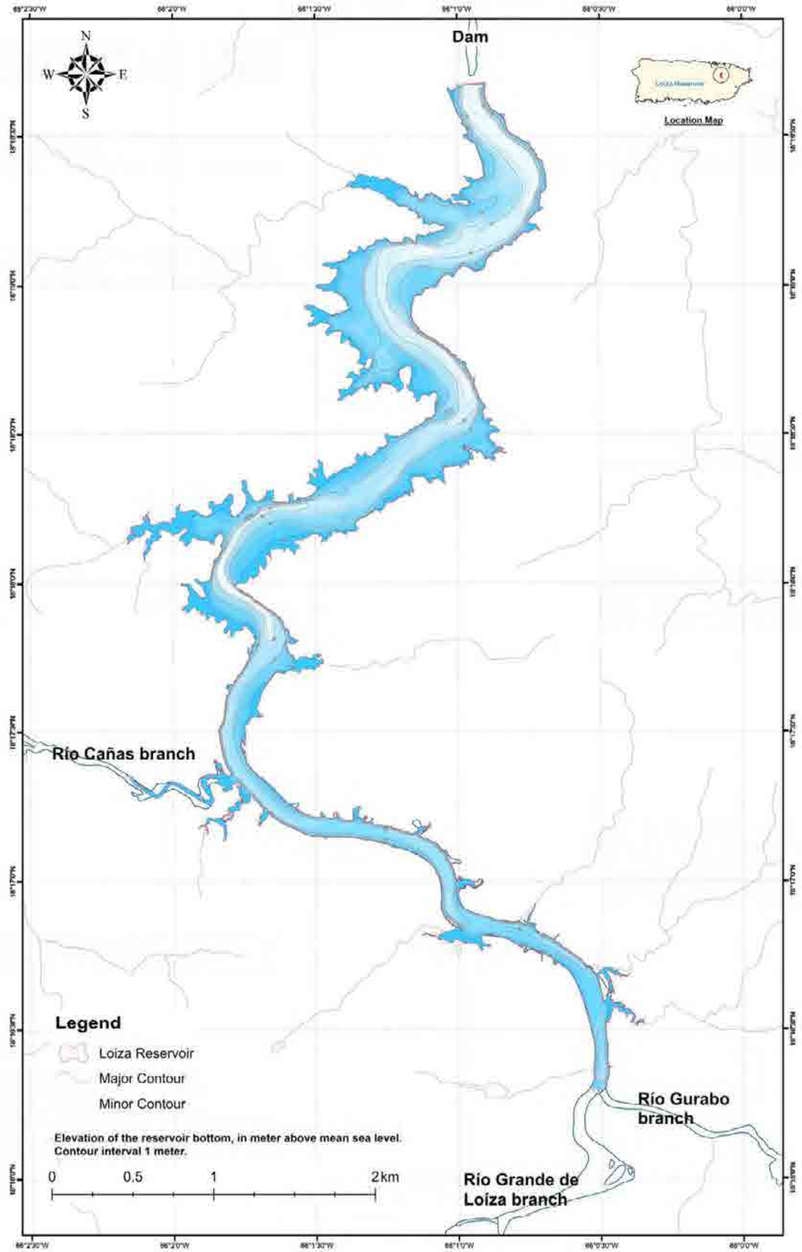
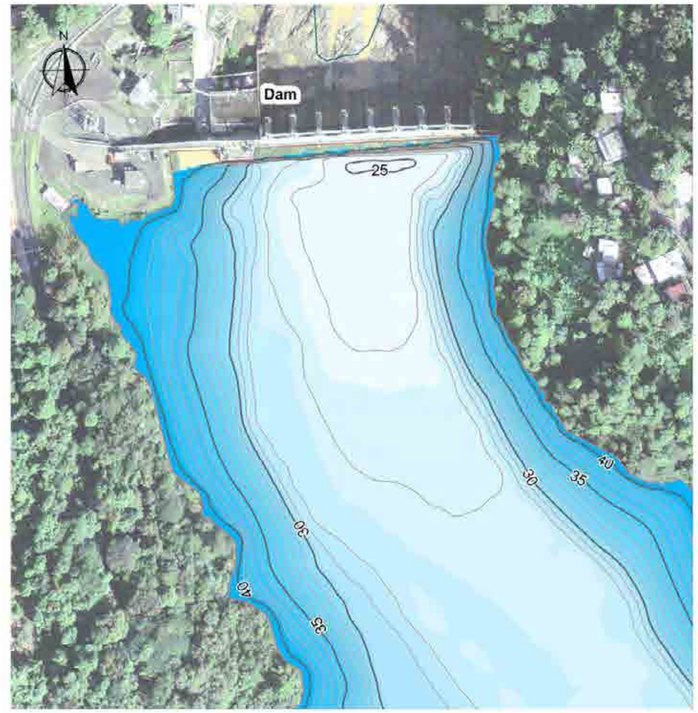
DATE JAN/28/2022



2021 BATHYMETRIC SURVEY
NTS



NEAR DAM DETAILED BATHYMETRIC SURVEY (2021)
NTS

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
	REVISIONS			

GLM ENGINEERING-GROUP
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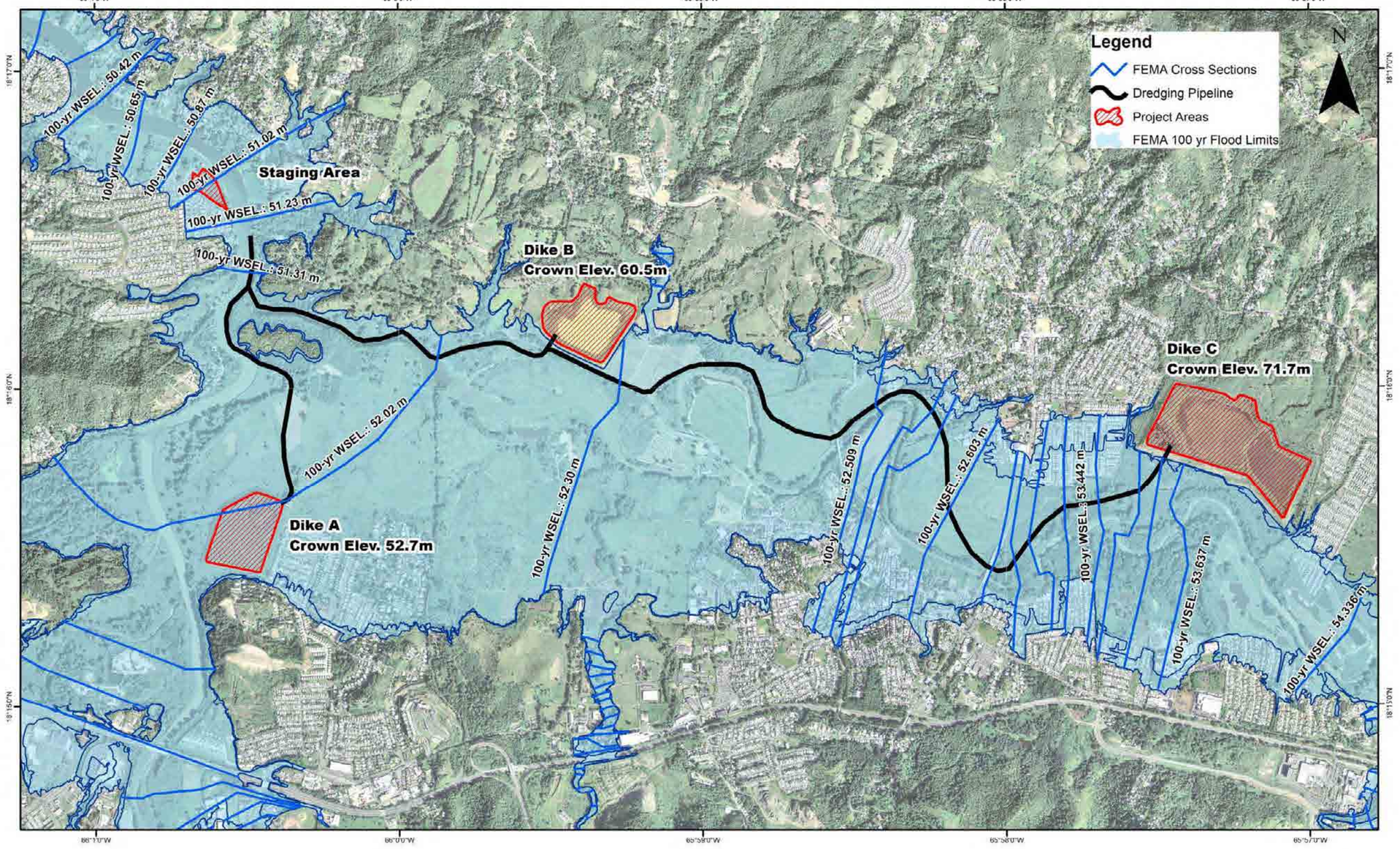
BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
LOIZA RESERVOIR
2021 BATHYMETRIC SURVEY

SHEET ID. G-106
SHEET No. 6
PROJ NO. CIP NO 1-01-9000
SCALE NTS
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY. 0 2CM
DATE JAN/28/2022



NOTE:

1. ELEVATIONS ARE IN METERS, OBTAINED FROM FEMA FLOOD ADVISORY MAP.
2. ALL THREE DIKES ARE ABOVE FEMA REGULATORY FLOOD LEVELS. DIKE A APPEARS TO BE INSIDE THE FLOODABLE AREA BUT THE DIKE CROWN ELEVATION (52.7M) IS ABOVE THE 100YR FLOOD LEVELS (52.02M).

FEMA FLOOD LEVEL AND LIMITS

SCALE: NTS

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

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REVISIONS

GLM ENGINEERING-GROUP
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BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: FEMA FLOOD ADVISORY MAP 100-YR FLOOD LEVELS AND LIMITS		SHEET ID. G-107	SHEET No. 7
		PROJ NO. CIP NO 1-01-9000	
SCALE NTS	BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM	DATE JAN/28/2022	



BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
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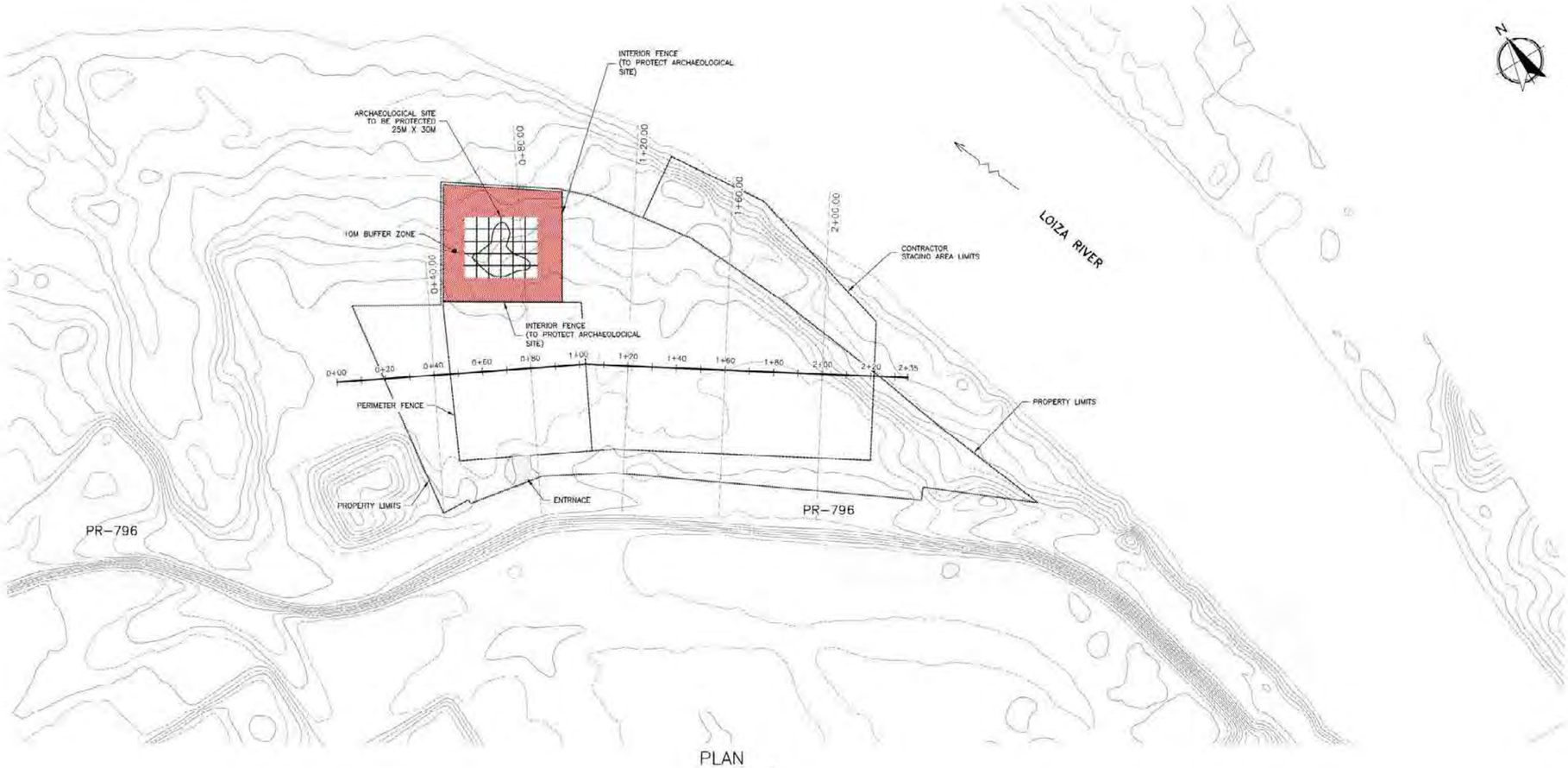
BASIS OF DESIGN FOR LAGO LOIZA
(CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
STAGING AREA

SHEET ID. SA-101
SHEET No. 8
PROJ NO. CIP NO 1-01-9000
SCALE 1:750
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY. 0 2CM
DATE JAN/28/2022

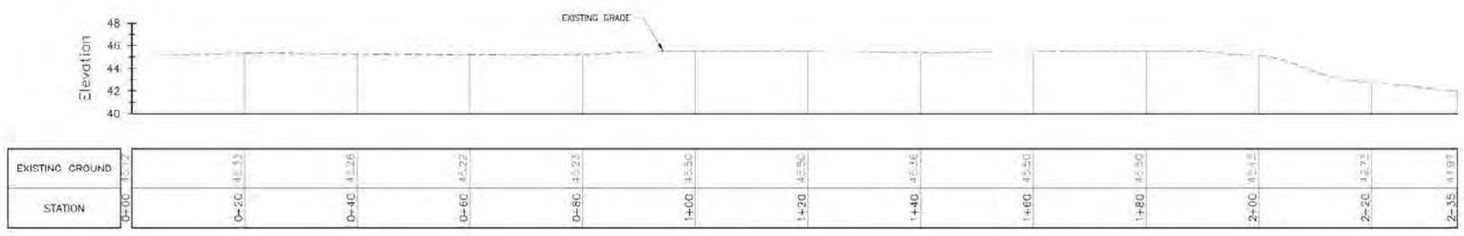


PLAN

SCALE: 1=1000

NOTE:

THE STAGING AREA IS LOWER THAN 100-YEAR FLOOD LEVEL DEFINED BY FEMA.



STAGING AREA PROFILE

SCALE H: 1=500
SCALE V: 1=250

GRAPHIC SCALE
10 0 10 20 30 40 50
SCALE: 1=1000

GRAPHIC SCALE
5 0 10 20 25
SCALE: 1=500

GRAPHIC SCALE
2.5 0 5 10
SCALE: 1=250

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

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REVISIONS

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742 PROLONGACION PAZ, SANTURCE, PR 00907
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BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: STAGING AREA PLAN AND PROFILE

SHEET ID. SA-102

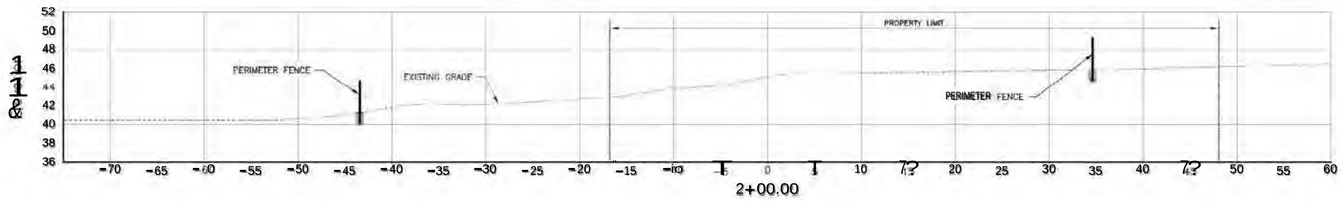
SHEET No. 9

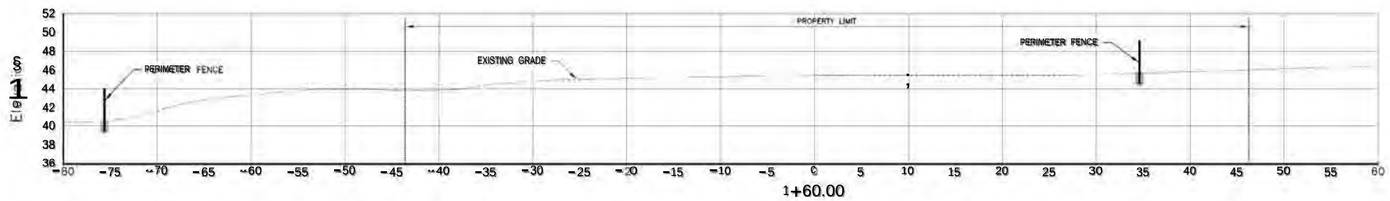
PROJ NO. CIP NO 1-01-9000

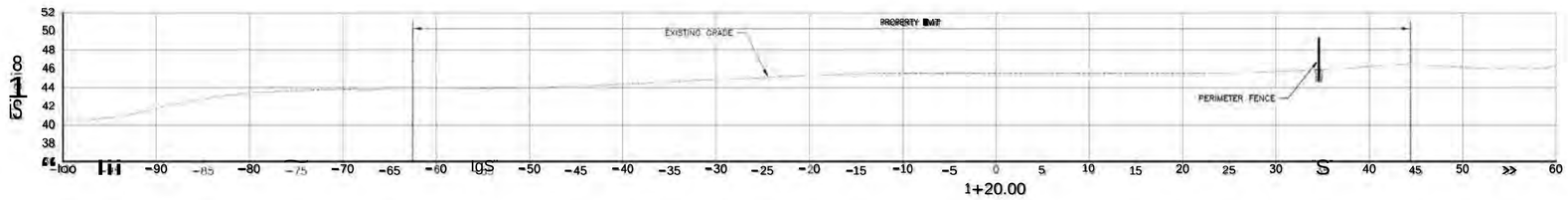
SCALE AS SHOWN

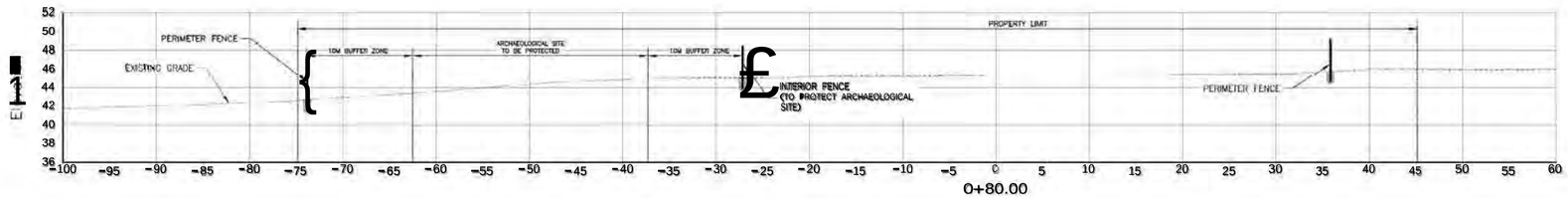
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM

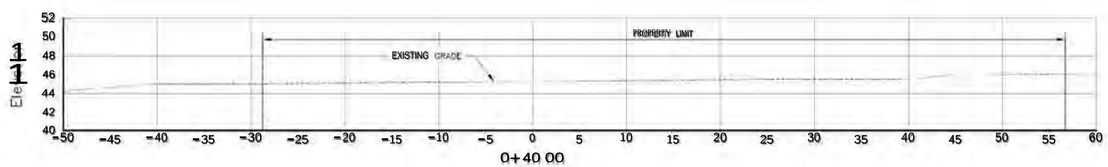
DATE JAN/28/2022











GRAPHIC SCALE

SCALE: 1=300

STAGING AREA SECTIONS

SCALE 1=300

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
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BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: STAGING AREA SECTIONS

SHEET ID. SA-103

SHEET No. 10

PROJ NO. CIP NO 1-01-9000

SCALE AS SHOWN

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY

DATE JAN/28/2022

DREDGING PARAMETERS:

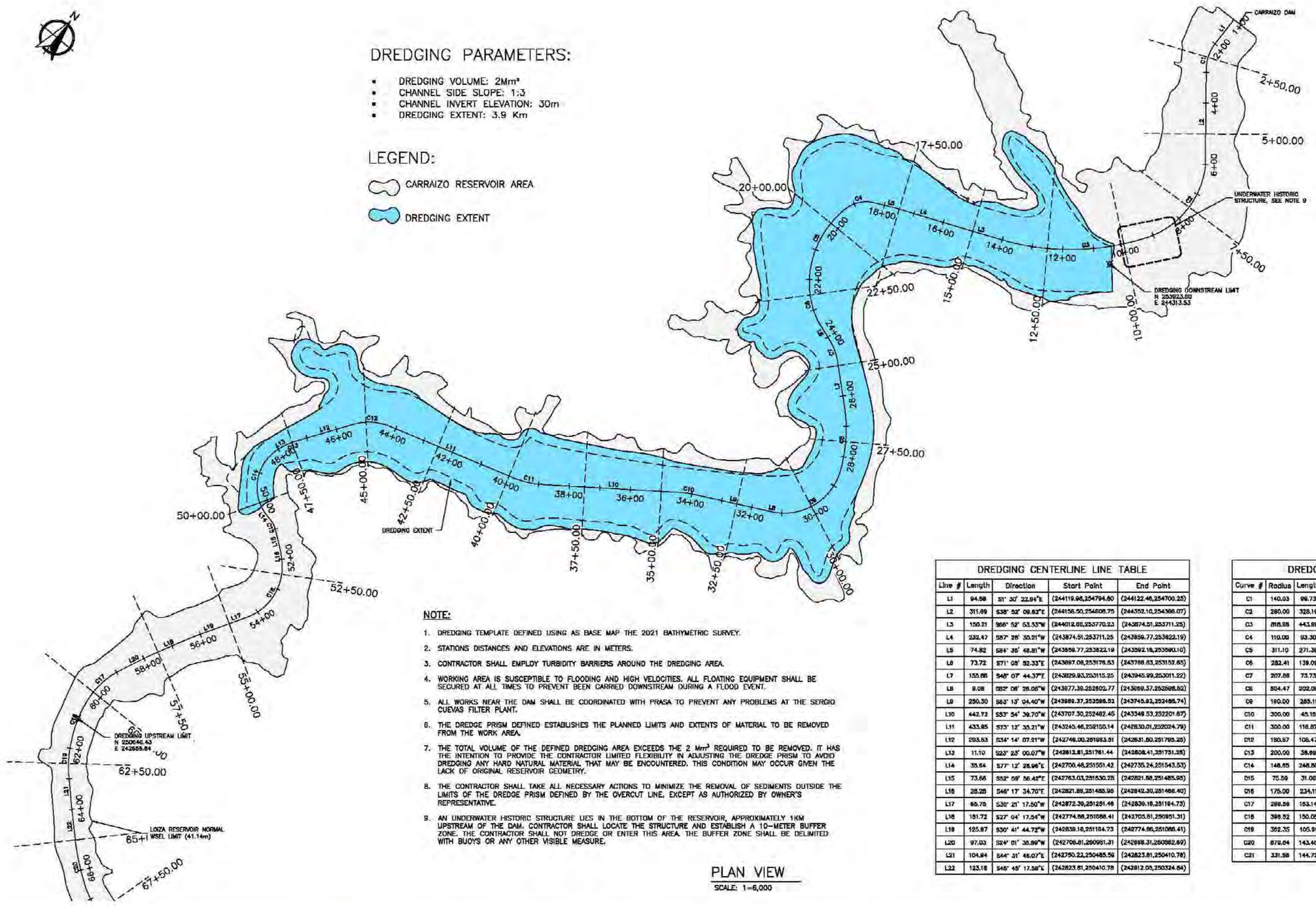
- DREDGING VOLUME: 2Mm³
- CHANNEL SIDE SLOPE: 1:3
- CHANNEL INVERT ELEVATION: 30m
- DREDGING EXTENT: 3.9 Km

LEGEND:

CARRAIZO RESERVOIR AREA

DREDGING EXTENT

GRAPHIC SCALE
100 50 0 50 100 150 200 250
SCALE: 1=8000



NOTE:

1. DREDGING TEMPLATE DEFINED USING AS BASE MAP THE 2021 BATHYMETRIC SURVEY.
2. STATIONS DISTANCES AND ELEVATIONS ARE IN METERS.
3. CONTRACTOR SHALL EMPLOY TURBIDITY BARRIERS AROUND THE DREDGING AREA.
4. WORKING AREA IS SUSCEPTIBLE TO FLOODING AND HIGH VELOCITIES. ALL FLOATING EQUIPMENT SHALL BE SECURED AT ALL TIMES TO PREVENT BEEN CARRIED DOWNSTREAM DURING A FLOOD EVENT.
5. ALL WORKS NEAR THE DAM SHALL BE COORDINATED WITH PRASA TO PREVENT ANY PROBLEMS AT THE SERGIO CUEVAS FILTER PLANT.
6. THE DREDGE PRISM DEFINED ESTABLISHES THE PLANNED LIMITS AND EXTENTS OF MATERIAL TO BE REMOVED FROM THE WORK AREA.
7. THE TOTAL VOLUME OF THE DEFINED DREDGING AREA EXCEEDS THE 2 Mm^3 REQUIRED TO BE REMOVED. IT HAS THE INTENTION TO PROVIDE THE CONTRACTOR LIMITED FLEXIBILITY IN ADJUSTING THE DREDGE PRISM TO AVOID DREDGING ANY HARD NATURAL MATERIAL THAT MAY BE ENCOUNTERED. THIS CONDITION MAY OCCUR GIVEN THE LACK OF ORIGINAL RESERVOIR GEOMETRY.
8. THE CONTRACTOR SHALL TAKE ALL NECESSARY ACTIONS TO MINIMIZE THE REMOVAL OF SEDIMENTS OUTSIDE THE LIMITS OF THE DREDGE PRISM DEFINED BY THE OVERCUT LINE, EXCEPT AS AUTHORIZED BY OWNER'S REPRESENTATIVE.
9. AN UNDERWATER HISTORIC STRUCTURE LIES IN THE BOTTOM OF THE RESERVOIR, APPROXIMATELY 1KM UPSTREAM OF THE DAM. CONTRACTOR SHALL LOCATE THE STRUCTURE AND ESTABLISH A 10-METER BUFFER ZONE. THE CONTRACTOR SHALL NOT DREDGE OR ENTER THIS AREA. THE BUFFER ZONE SHALL BE DELIMITED WITH BUOYS OR ANY OTHER VISIBLE MEASURE.

PLAN VIEW
SCALE: 1=6,000

SECTION CUT AREA	
Station	Cut Area
2+50.00	0.00
5+00.00	0.00
7+50.00	0.00
10+00.00	0.00
12+50.00	659.27
15+00.00	283.90
17+50.00	951.99
20+00.00	1135.99
22+50.00	793.23
25+00.00	435.72
27+50.00	405.05
30+00.00	1082.63
32+50.00	941.12
35+00.00	1127.79
37+50.00	1060.39
40+00.00	1003.44
42+50.00	1146.01
45+00.00	1301.48
47+50.00	601.28
50+00.00	526.67
52+50.00	0.00
55+00.00	0.00
57+50.00	0.00
60+00.00	0.00
62+50.00	0.00
65+00.00	0.00
67+50.00	0.00

DREDGING CENTERLINE LINE TABLE				
Line #	Length	Direction	Start Point	End Point
L1	94.58	S1° 30' 22.94"E	(244119.98,254794.60	(244122.46,254700.25)
L2	311.69	S38° 52' 09.62"E	(244156.50,254608.75	(244352.10,254366.07)
L3	150.21	S66° 52' 53.33"W	(244012.66,253770.23	(243874.51,253711.25)
L4	232.47	S57° 28' 30.21"W	(243874.51,253711.25	(243859.77,253822.19)
L5	74.82	S84° 35' 48.81"W	(243859.77,253822.19	(243592.18,253560.10)
L6	73.72	S71° 09' 52.33"E	(243867.08,253176.53	(243788.83,253152.65)
L7	155.66	S48° 07' 44.37"E	(243829.93,253115.25	(243945.99,253011.22)
L8	9.08	S82° 08' 28.08"W	(243977.39,252802.77	(243969.37,252698.52)
L9	250.30	S82° 13' 04.40"W	(243989.37,252698.52	(243745.82,252685.74)
L10	442.72	S83° 54' 39.70"W	(243707.30,252462.45	(243349.53,252201.67)
L11	433.85	S73° 12' 35.21"W	(243245.46,252150.14	(242830.01,252024.79)
L12	203.53	S34° 14' 07.21"W	(242746.00,251983.51	(242631.50,251795.25)
L13	11.10	S23° 23' 00.07"W	(242812.81,251761.44	(242808.41,251751.25)
L14	35.64	S77° 12' 28.96"E	(242700.46,251551.42	(242735.24,251543.53)
L15	73.66	S52° 59' 56.42"E	(242763.03,251530.28	(242821.88,251485.95)
L16	28.28	S46° 17' 34.70"E	(242821.88,251485.95	(242842.30,251486.40)
L17	65.75	S30° 21' 17.50"W	(242872.39,251251.46	(242839.16,251194.73)
L18	151.72	S27° 04' 17.54"W	(242774.86,251086.41	(242705.81,250951.31)
L19	125.87	S30° 41' 44.72"W	(242839.16,251194.73	(242774.86,251086.41)
L20	97.03	S24° 01' 35.99"W	(242705.81,250951.31	(242698.31,250862.69)
L21	104.84	S44° 31' 46.07"E	(242750.22,250485.59	(242823.81,250410.78)
L22	123.18	S45° 45' 17.58"E	(242823.81,250410.78	(242912.05,250324.84)

DREDGING CENTERLINE CURVE TABLE					
Curve #	Radius	Length	Chord Direction	Start Point	End Point
C1	140.03	99.73	S20° 24' 08.80"E	(244122.46,254700.25)	(244156.50,254608.75)
C2	280.00	328.19	S1° 18' 55.37"W	(244352.10,254366.07)	(244344.99,254056.43)
C3	818.98	443.98	S49° 15' 53.30"W	(244344.99,254056.43)	(244012.66,253770.23)
C4	110.00	93.30	S36° 10' 27.15"W	(243592.18,253560.10)	(243535.00,253319.92)
C5	311.10	271.38	S12° 01' 57.86"E	(243535.00,253319.92)	(243588.80,253282.83)
C6	282.41	139.09	S81° 11' 15.66"E	(243588.80,253282.83)	(243867.08,253176.53)
C7	207.88	73.73	S58° 20' 33.19"E	(243788.83,253152.65)	(243829.93,253115.25)
C8	804.47	202.08	S35° 23' 41.57"E	(243945.99,253011.22)	(244062.28,252847.68)
C9	180.00	285.11	S19° 07' 08.14"W	(244062.28,252847.68)	(243977.39,252802.77)
C10	300.00	45.15	S58° 34' 24.25"W	(243745.82,252685.74)	(243707.30,252462.45)
C11	300.00	116.87	S83° 39' 38.17"W	(243349.53,252201.67)	(243245.46,252150.14)
C12	180.57	108.47	S53° 53' 30.98"W	(242830.01,252024.79)	(242746.00,251983.51)
C13	200.00	38.69	S28° 55' 30.19"W	(242631.50,251795.25)	(242812.81,251761.44)
C14	148.65	248.80	S24° 44' 15.90"E	(242808.41,251751.25)	(242700.46,251551.42)
C15	75.59	31.00	S84° 30' 18.34"E	(242735.24,251543.53)	(242763.03,251530.28)
C16	175.00	234.11	S7° 58' 08.60"E	(242842.30,251486.40)	(242872.39,251251.46)
C17	288.88	153.14	S8° 56' 25.62"W	(242668.31,250862.69)	(242842.83,250713.48)
C18	398.52	150.05	S18° 08' 09.59"E	(242842.83,250713.48)	(242689.28,250571.73)
C19	362.35	105.91	S35° 17' 07.89"E	(242689.28,250571.73)	(242750.22,250485.59)
C20	878.64	143.43	S32° 23' 02.77"E	(242912.05,250324.84)	(243025.73,250237.56)
C21	331.58	144.72	S7° 34' 38.94"E	(243025.73,250237.56)	(243161.95,250192.19)

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
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00902-4157 USA

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FAX 787-721-3196
WWW.GLMENGINNERS.COM

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
LOIZA RESERVOIR
DREDGING TEMPLATE
PLAN

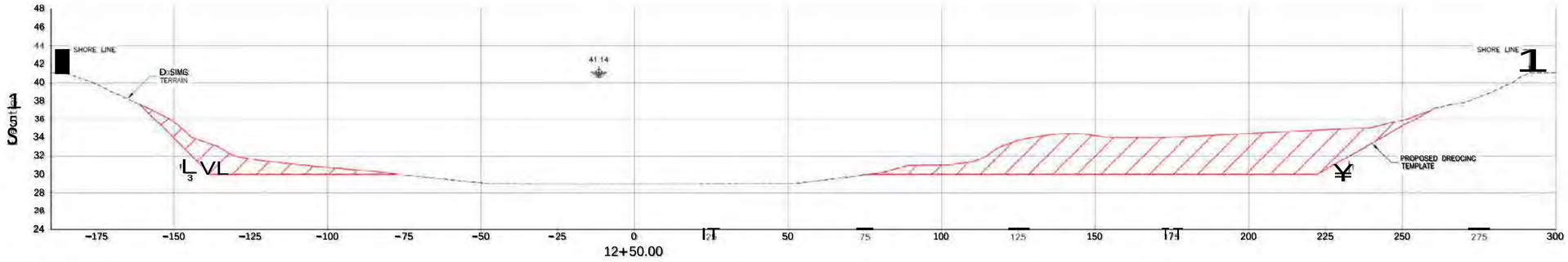
SHEET ID.	SHEET No.
DT-101	11

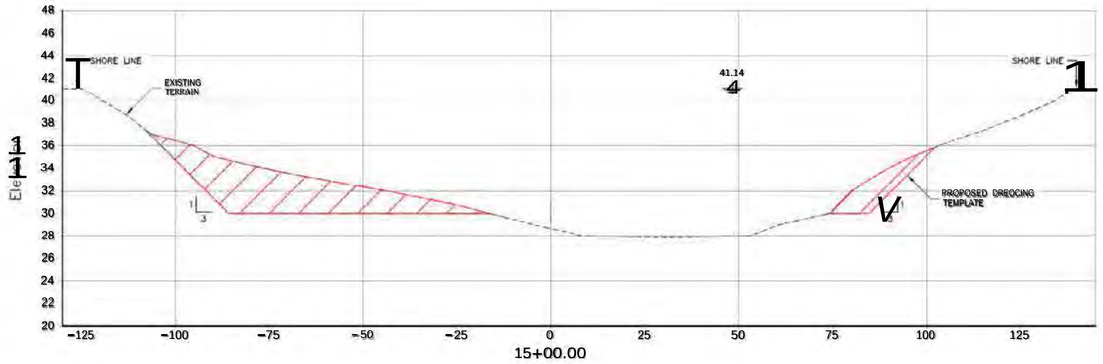
PROJ NO.
CIP NO 1-01-9000

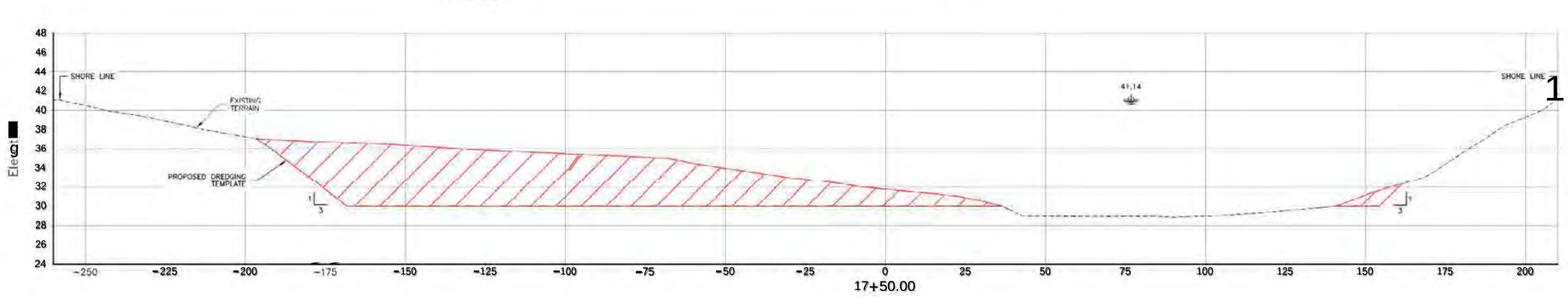
SCALE
1:6,000

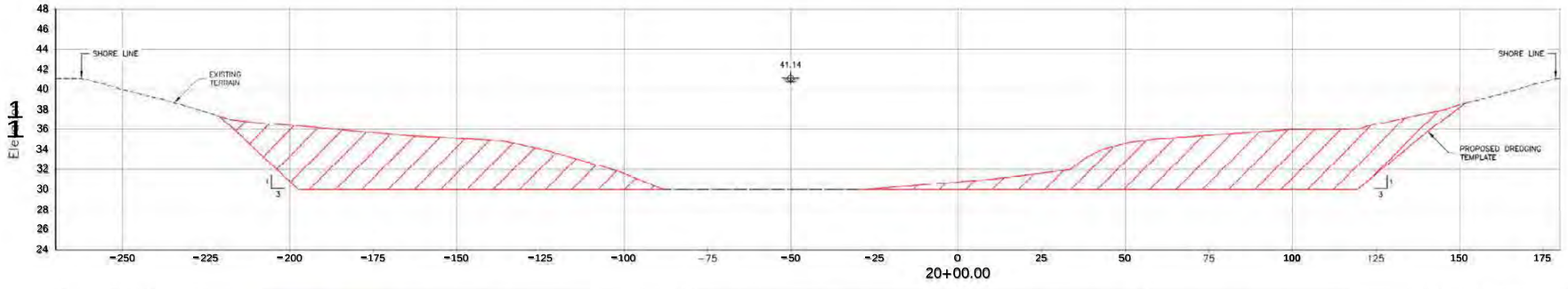
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2CM

DATE
JAN/28/2022









NOTES:

1. ALL DIMENSIONS AND ELEVATIONS IN METERS OR OTHERWISE INDICATED.
2. CUT AREA SIDES SLOPES SHALL BE TAKEN AS A GUIDE. IT IS NOT REQUIRED TO PROVIDE THE EXACT DREDGING CHANNEL GEOMETRY PRESENTED.
3. THE MAXIMUM NORMAL WATER LEVEL IS 41.14m. WATER LEVELS AT THE RESERVOIR VARIES DAILY.
4. OVER DREDGING TOLERANCE: 0.3m MAX BELOW DREDGING CUT LINES PRESENTED IN DRAWINGS.

SECTIONS

HOR SCALE: 1"=750
VER SCALE: 1:250

GRAPHIC SCALE
10 0 10 20 30
SCALE: 1"=750

GRAPHIC SCALE
2.5 0 5 10
SCALE: 1"=250

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
	REVISIONS			

AJILVA ENGINEERING-GROUP
742 PROLONCACION PAZ. SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR 00902-4157 USA

ANCHOR QEA
TEL. 787-723-8005
FAX 787-721-3196
www.GLMENGINNERS.COM

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

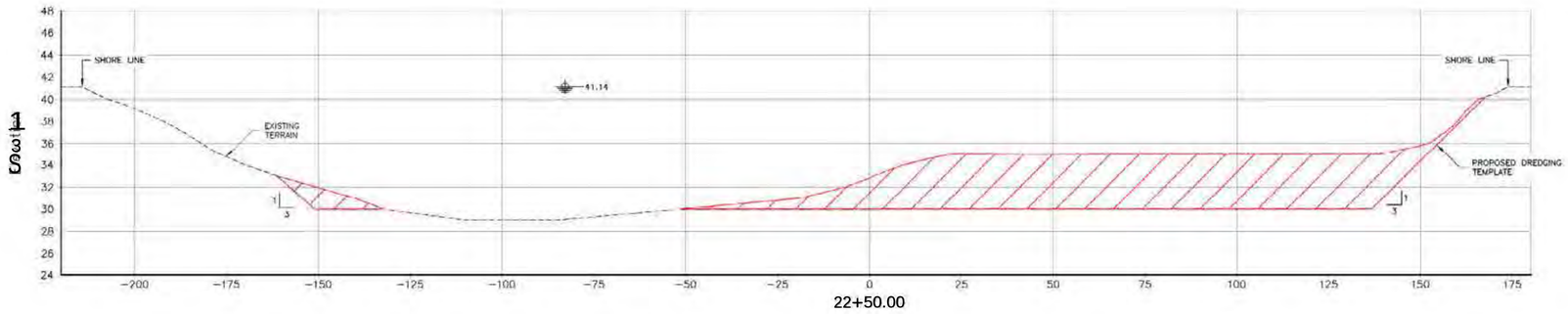
TRUJILLO ALTO, PUERTO RICO

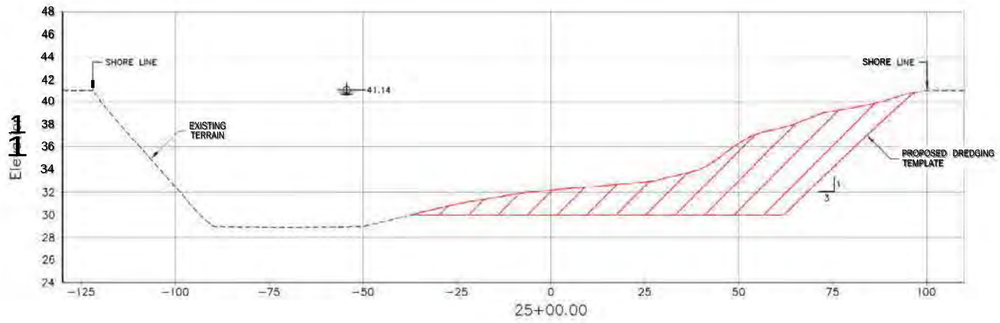
CIP NO. 1-01-9000

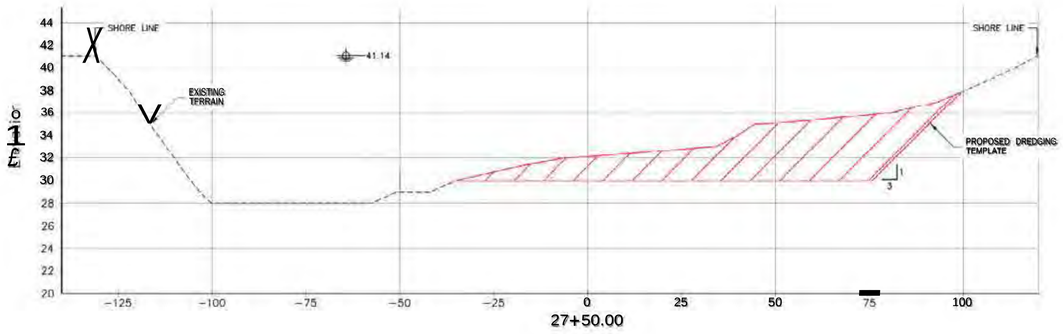
Autoridad de Acueductos y Alcantarillados

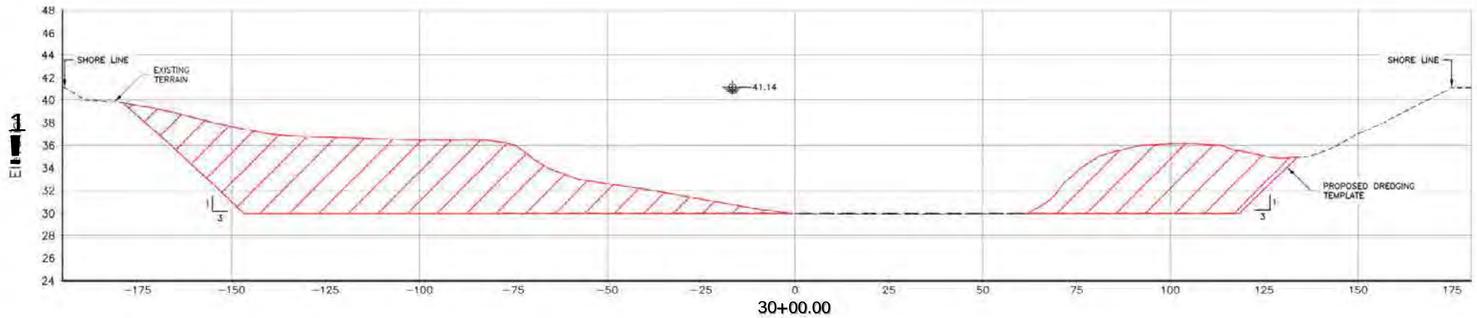
SHEET TITLE: LOIZA RESERVOIR DREDGING TEMPLATE SECTIONS (1 OF 4)	SHEET ID. DT-102 / SHEET No. 12
	PROJ NO. CIP NO 1-01-9000
SCALE AS SHOWN	DATE JAN/28/2022

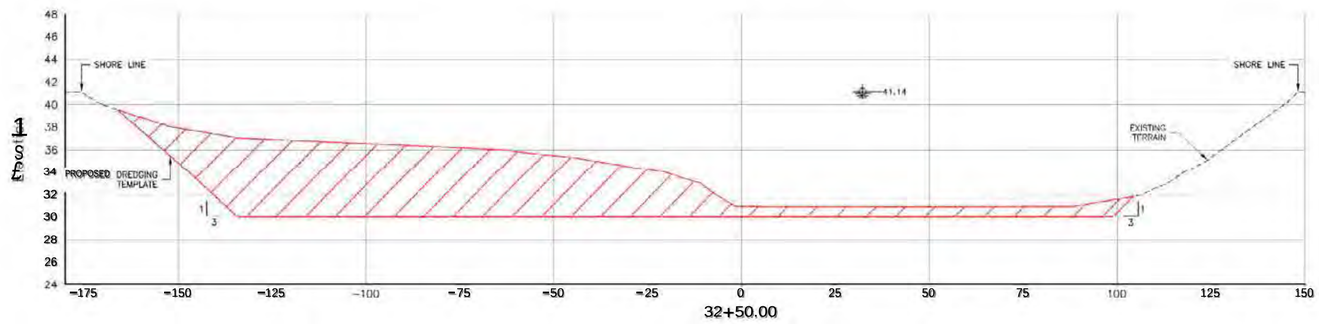
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY. 0 2CM











NOTES:

1. ALL DIMENSIONS AND ELEVATIONS IN METERS OR OTHERWISE INDICATED.
2. CUT AREA SIDES SLOPES SHALL BE TAKEN AS A GUIDE. IT IS NOT REQUIRED TO PROVIDE THE EXACT DREDGING CHANNEL GEOMETRY PRESENTED.
3. THE MAXIMUM NORMAL WATER LEVEL IS 41.14m. WATER LEVELS AT THE RESERVOIR VARIES DAILY.
4. OVER DREDGING TOLERANCE: 0.3m MAX BELOW DREDGING CUT LINES PRESENTED IN DRAWINGS.

SECTIONS

HOR SCALE: 1=750
VER SCALE: 1:250

GRAPHIC SCALE
10 0 10 20 30
SCALE: 1=750

GRAPHIC SCALE
2.5 0 5 10
SCALE: 1=250

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

AJLVM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR 00902-4157 USA
TEL. 787-723-8005
FAX. 787-721-3196
www.GLMENGINNERS.COM

ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
LOIZA RESERVOIR
DREDGING TEMPLATE
SECTIONS (2 OF 4)

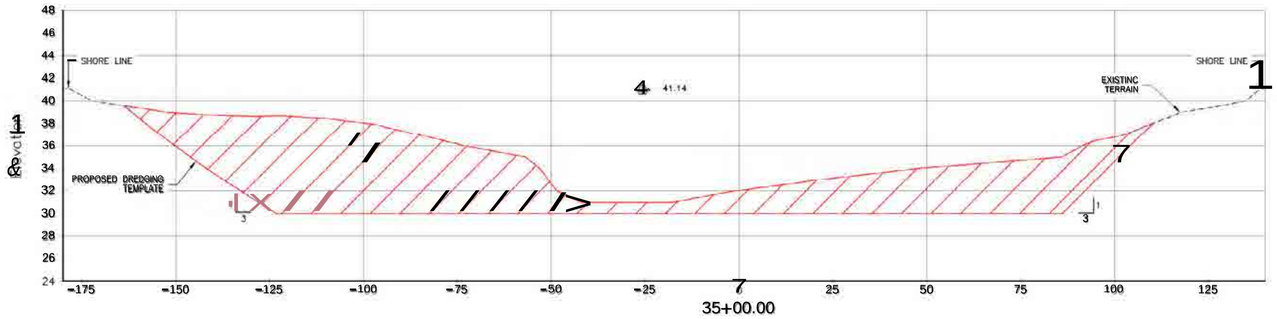
SHEET ID.	SHEET No.
DT-103	13

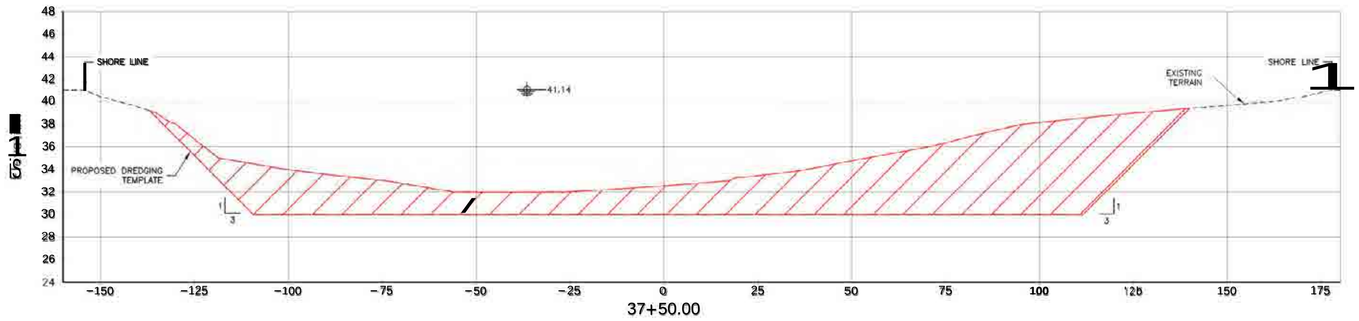
PROJ NO.
CIP NO 1-01-9000

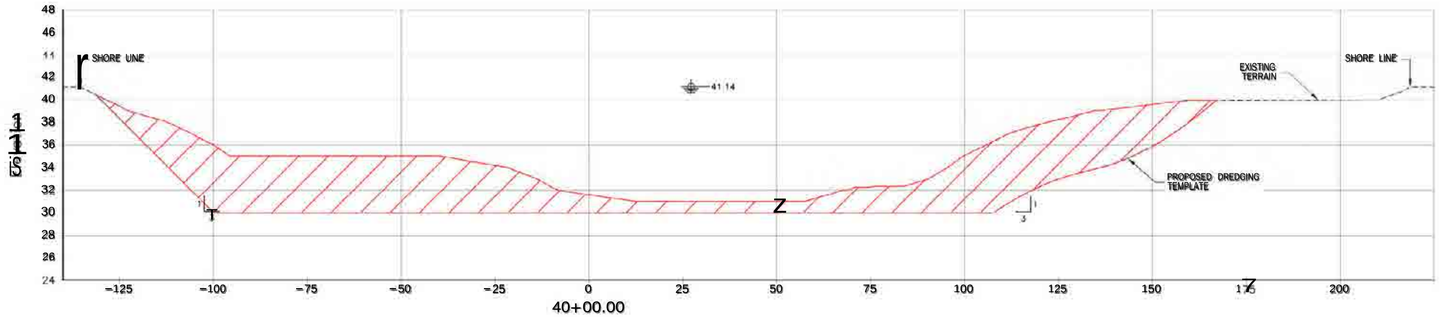
SCALE
AS SHOWN

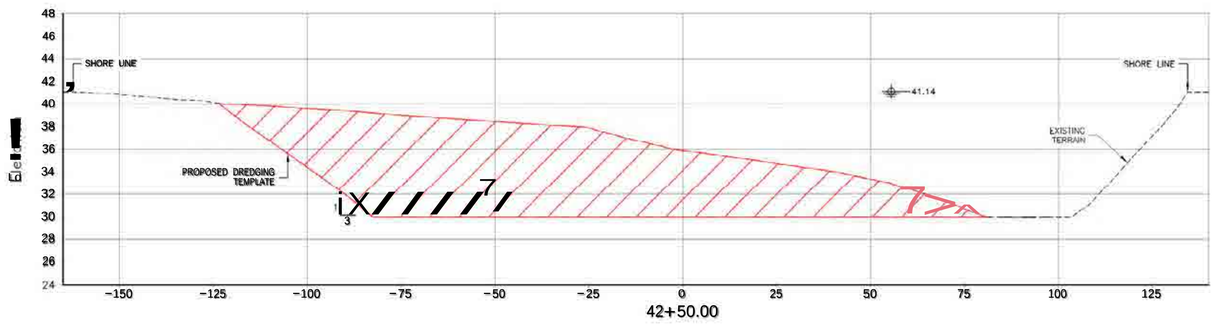
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2CM

DATE
JAN/28/2022









NOTES:

1. ALL DIMENSIONS AND ELEVATIONS IN METERS OR OTHERWISE INDICATED.
2. CUT AREA SIDES SLOPES SHALL BE TAKEN AS A GUIDE. IT IS NOT REQUIRED TO PROVIDE THE EXACT DREDGING CHANNEL GEOMETRY PRESENTED.
3. THE MAXIMUM NORMAL WATER LEVEL IS 41.14m. WATER LEVELS AT THE RESERVOIR VARIES DAILY.
4. OVER DREDGING TOLERANCE: 0.3m MAX OCLOW DRCDGING CUT LINES PRCSCNTCD IN DRAWINGS.

SECTIONS

HOR SCALE: 1=750
VER SCALE: 1:250

GRAPHIC SCALE
10 0 10 20 30
SCALE: 1=750

GRAPHIC SCALE
2.5 0 5 10
SCALE: 1=250

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

AJLVM ENGINEERING-GROUP
742 PROLONCACION PAZ. SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR 00902-4157 USA
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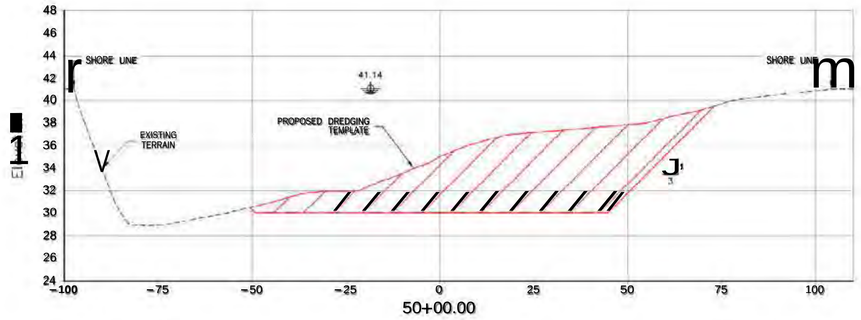
TEL. 787-723-8005
FAX 787-721-3196
www.GLMENGINNERS.COM

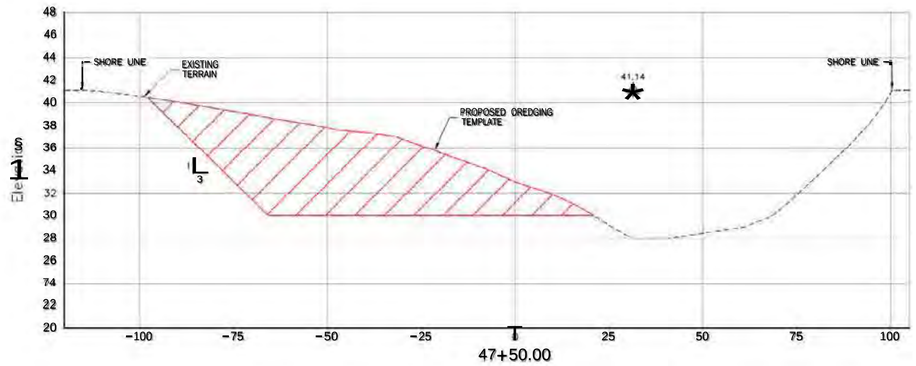
BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

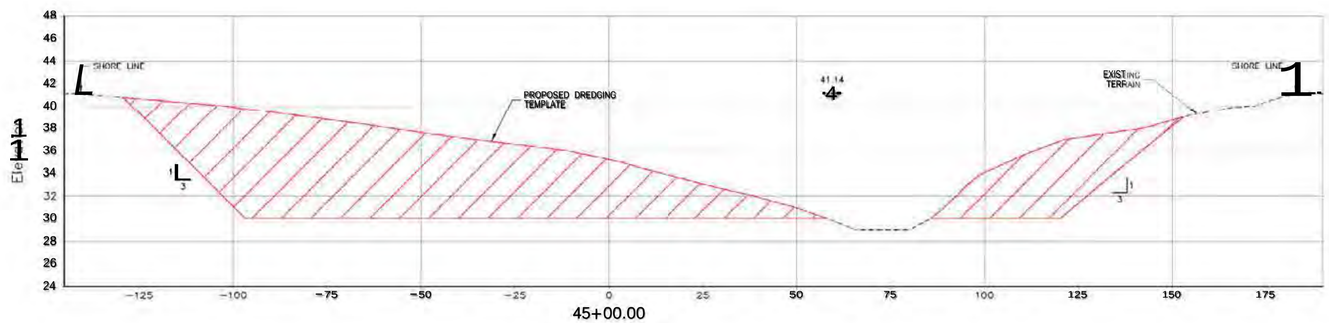
Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
LOIZA RESERVOIR
DREDGING TEMPLATE
SECTIONS (3 OF 4)

SHEET ID. DT-104
SHEET No. 14
PROJ NO. CIP NO 1-01-9000
SCALE AS SHOWN
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES. 0 2CM
DATE JAN/28/2022







SECTIONS

HOR SCALE: 1=750
VER SCALE: 1:250

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS IN METERS OR OTHERWISE INDICATED.
2. CUT AREA SIDES SLOPES SHALL BE TAKEN AS A GUIDE. IT IS NOT REQUIRED TO PROVIDE THE EXACT DREDGING CHANNEL GEOMETRY PRESENTED.
3. THE MAXIMUM NORMAL WATER LEVEL IS 41.14m. WATER LEVELS AT THE RESERVOIR VARIES DAILY.
4. OVER DREDGING TOLERANCE: 0.3m MAX BELOW DREDCINC CUT LINES PRESENTED IN DRAWINGS.

GRAPHIC SCALE
SCALE 1=750

GRAPHIC SCALE
SCALE 1=250

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
REVISIONS				

AJLVM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR
00902-4157 USA

ANCHOR QEA
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FAX 787-721-3196
www.GLMENGINNERS.COM

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
LOIZA RESERVOIR
DREDGING TEMPLATE
SECTIONS (4 OF 4)

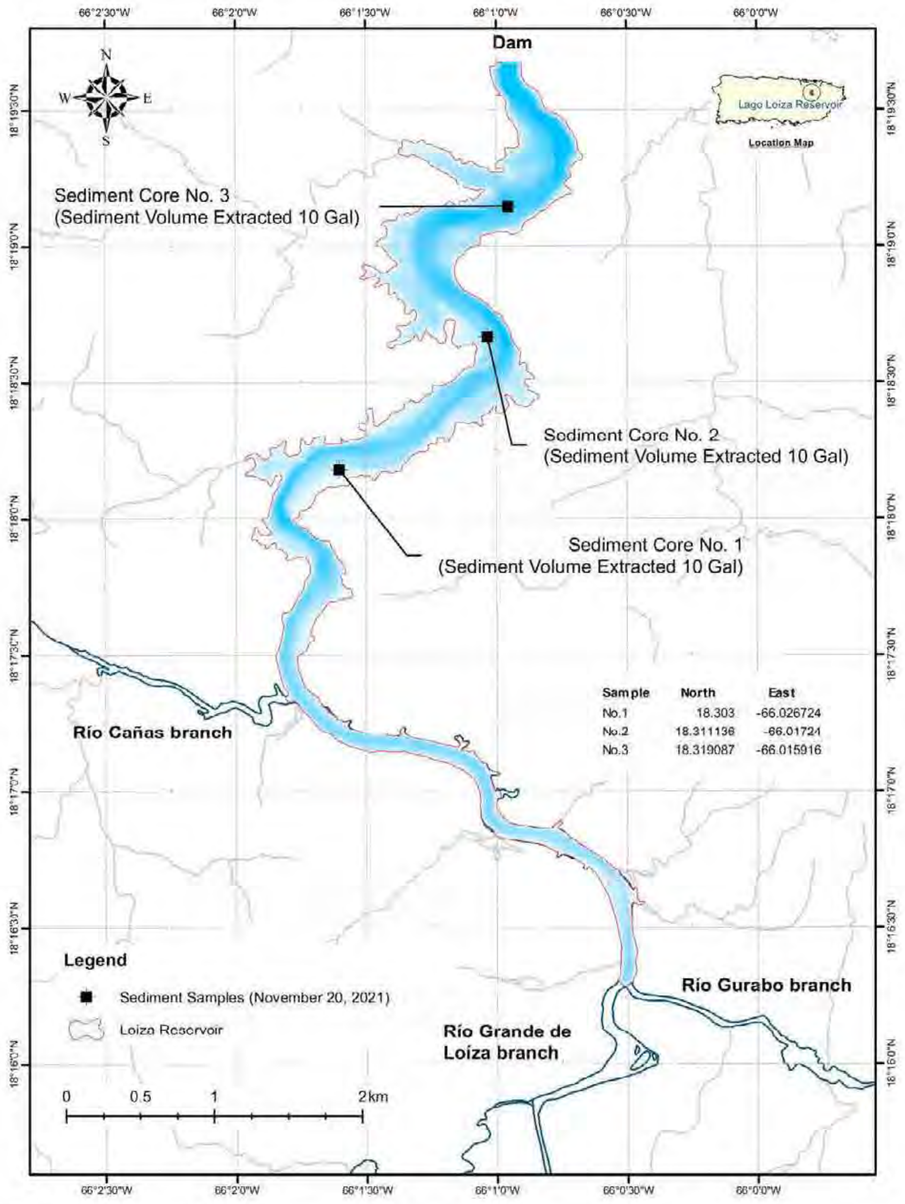
SHEET ID.	SHEET No.
DT-105	15

PROJ NO.
CIP NO 1-01-9000

SCALE
AS SHOWN

BAR IS TWO CM OH ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET ADJUST SCALES ACCORDINGLY
0 2CM

DATE
JAN/28/2022

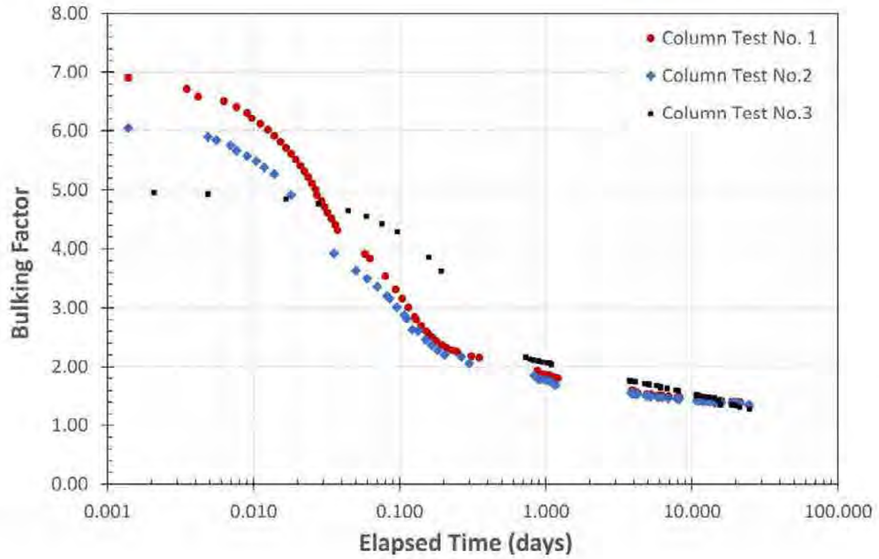


SAMPLE LOCATION MAP

SCALE: N.T.S

NOTES:

1. COLUMN SETTLING TEST WERE PERFORMED USING SEDIMENT SAMPLES OBTAINED FROM THE RESERVOIR AS PRESENTED IN THE LOCATION MAP.
2. TOTAL SUSPENDED SEDIMENT CONCENTRATION WAS MEASURED AT THREE LEVELS AT EACH COLUMN SETTLING TEST. POINT No.1 REFERS TO THE UPPER (NEAR WATER SURFACE) LOCATION, POINT No.2 CORRESPOND TO AN INTERMEDIATE LEVEL, AND POINT No.3 REFERS TO THE CLOSEST TO THE SEDIMENT SURFACE



BULKING FACTOR

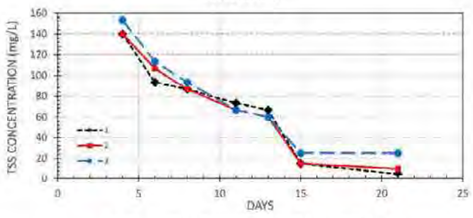
SCALE: N.T.S

BULKING FACTOR TABLE

ELAPSED TIMES (DAYS)	COLUMN 1	COLUMN 2	COLUMN 3
0.00	7.04	6.27	5.00
1.00	1.87	1.78	2.08
4.00	1.57	1.55	1.75
5.00	1.54	1.52	1.71
6.00	1.52	1.48	1.68
7.00	1.50	1.47	1.63
8.00	1.49	1.46	1.61
9.00	1.49	1.46	1.60
10.00	1.49	1.46	1.60
12.00	1.45	1.43	1.50
14.00	1.44	1.42	1.49
16.00	1.43	1.39	1.36
18.00	1.43	1.39	1.36
20.00	1.42	1.39	1.35
22.00	1.40	1.38	1.32
23.00	1.40	1.38	1.32
24.00	1.40	1.38	1.32

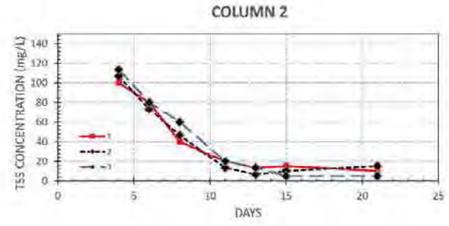
BULKING FACTOR DATA

SCALE: N.T.S.



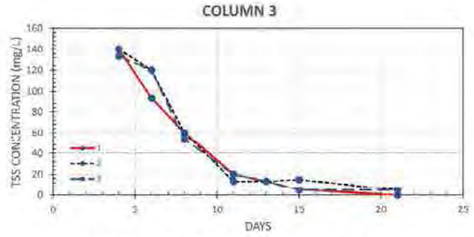
TSS CONCENTRATION GRAPH FOR COLUMN 1

SCALE: N.T.S



TSS CONCENTRATION GRAPH FOR COLUMN 2

SCALE: N.T.S



TSS CONCENTRATION GRAPH FOR COLUMN 3

SCALE: N.T.S

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR
00902-4157 USA

ANCHOR QEA

TEL. 787-723-8005
FAX 787-721-3196
WWW.GLMENGINNERS.COM

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: COLUMN SETTLING TEST RESULTS

SHEET ID. DT-110

SHEET No. 16

PROJ NO. CIP NO 1-01-9000

SCALE N.T.S.

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM

DATE JAN/28/2022



DREDGING PIPELINE LAYOUT

SCALE: 1=10000

GRAPHIC SCALE
100 0 100 200 300 400 500
SCALE: 1=10,000

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR
00902-4157 USA
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FAX 787-721-3196
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ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: DREDGING PIPELINE LAYOUT

SHEET ID. DP-100

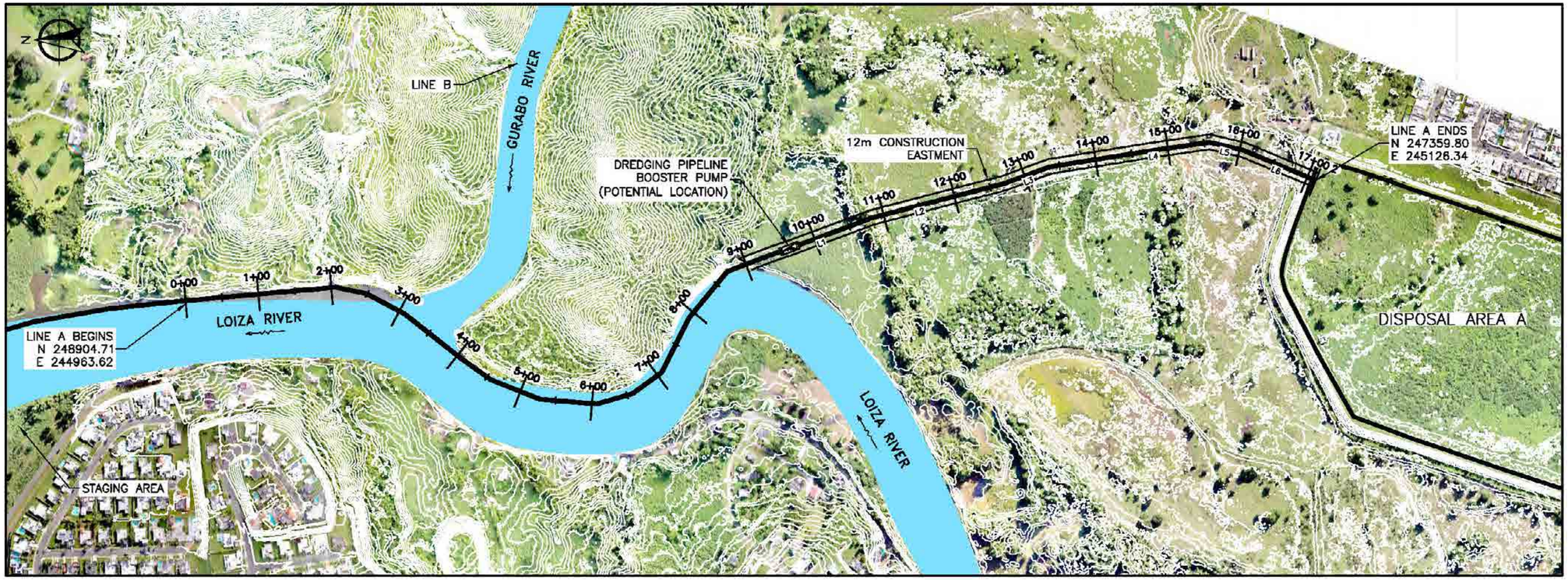
SHEET No. 17

PROJ NO. CIP NO 1-01-9000

SCALE 1:10,000

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY. 0 2CM

DATE JAN/28/2022



GRAPHIC SCALE
4 2 0 2 4 6 8 10 12 14
SCALE: 1=300

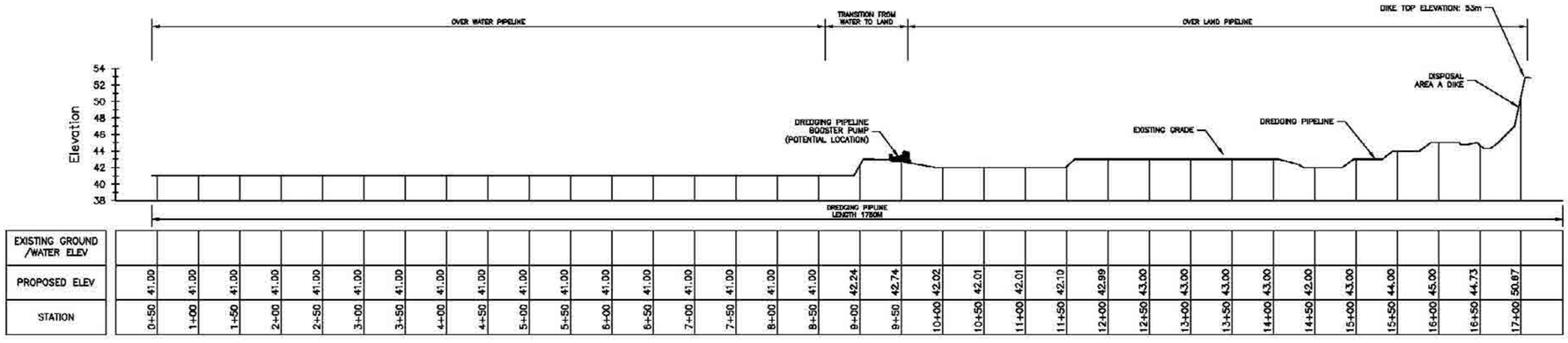
GRAPHIC SCALE
40 0 20 60 100 140
SCALE: 1=3000

NOTES:

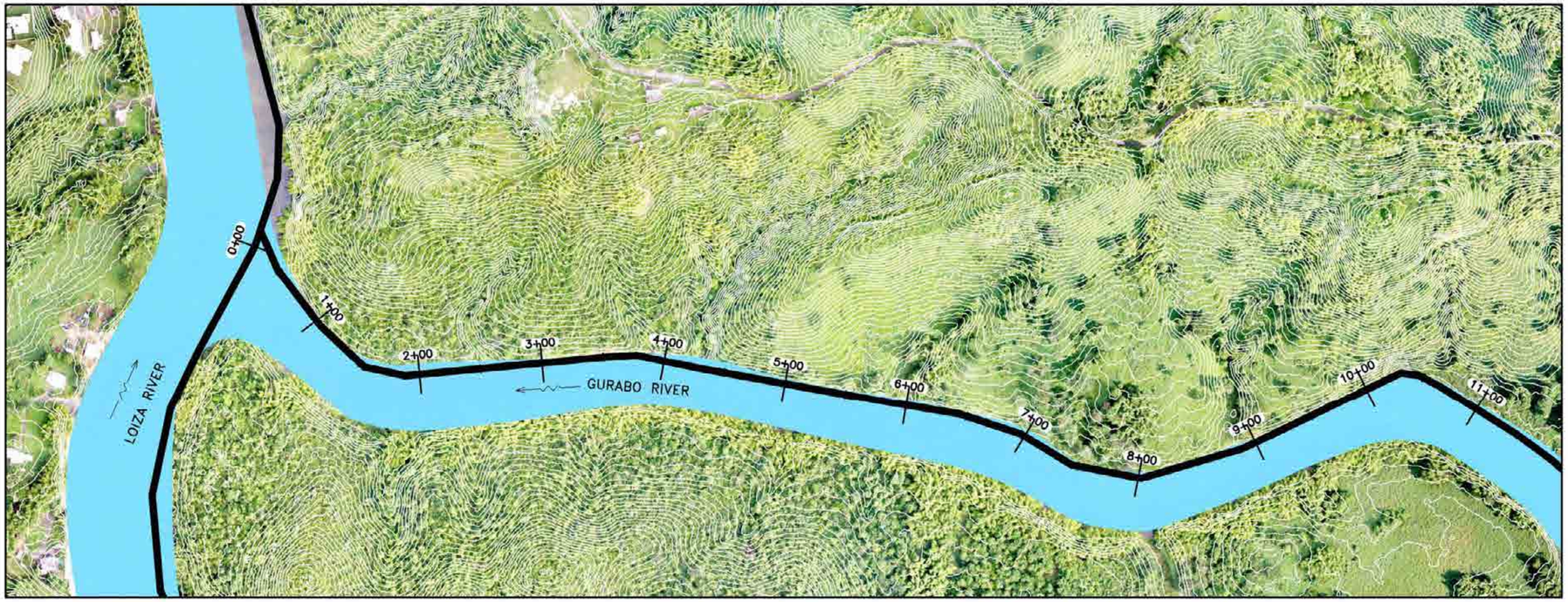
1. DISTANCE, STATIONS AND ELEVATIONS ARE IN METERS.
2. CONTRACTOR SHALL PROVIDE A CROSSING METHOD THAT DOES NOT INVOLVE EXCAVATION EACH ACCESS AND DIRT ROADS CROSSING. IF EXCAVATION IS REQUIRED CONTRACTOR SHALL OBTAIN THE ENDORSEMENT FROM ALL THE CONCERNING AGENCIES.
3. CONTRACTOR SHALL MOVE PIPELINE ALIGNMENT WITHIN THE DISPOSAL AREA AS REQUIRED FROM PROPER MANAGEMENT.
4. ANY PIPE AND/OR PUMP STATION ANCHORAGE SHALL BE NON-INVASIVE, METHODS REQUIRING EXCAVATION OR GROUND DISTURBANCE ARE NO ALLOWED UNLESS APPROVAL IS OBTAINED FROM ALL THE CONCERNING AGENCIES.

LINE A PLAN VIEW

SCALE: 1=3000

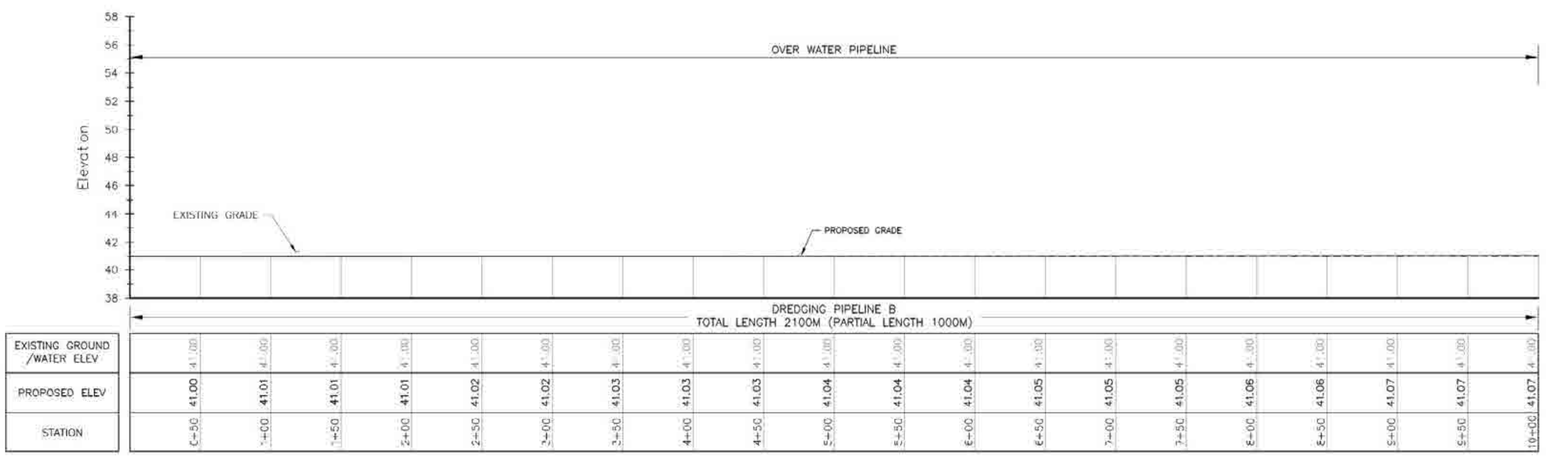


| | | |



LINE B PLAN VIEW

SCALE. 1=2000



EXISTING GROUND /WATER ELEV	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.00
PROPOSED ELEV	41.00	41.01	41.01	41.01	41.02	41.02	41.03	41.03	41.03	41.04	41.04	41.04	41.05	41.05	41.05	41.06	41.06	41.07	41.07	41.07	41.07
STATION	0+50	1+00	1+50	2+00	2+50	3+00	3+50	4+00	4+50	5+00	5+50	6+00	6+50	7+00	7+50	8+00	8+50	9+00	9+50	10+00	10+50

LINE B PROFILE

HOR SCALE: 1:2000
VER SCALE: 1:200

NOTES:

1. DISTANCE, STATIONS AND ELEVATIONS ARE IN METERS.
2. CONTRACTOR SHALL MOVE PIPELINE ALIGNMENT WITHIN THE DISPOSAL AREA AS REQUIRED FOR PROPER MANAGEMENT.
3. ANY PIPE AND/OR PUMP STATION ANCHORAGE SHALL BE NON-INVASIVE. METHODS REQUIRING EXCAVATION OR GROUND DISTURBANCE ARE NO ALLOWED UNLESS APPROVAL IS OBTAINED FROM ALL THE CONCERNING AGENCIES.

GRAPHIC SCALE
2 1 0 2 4 6 8 10
SCALE: 1=200

GRAPHIC SCALE
20 10 0 20 40 60 80 100
SCALE: 1=2000

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR 00902-4157 USA
TEL. 787-723-8005
FAX 787-721-3196
WWW.GLMENGINNERS.COM

ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

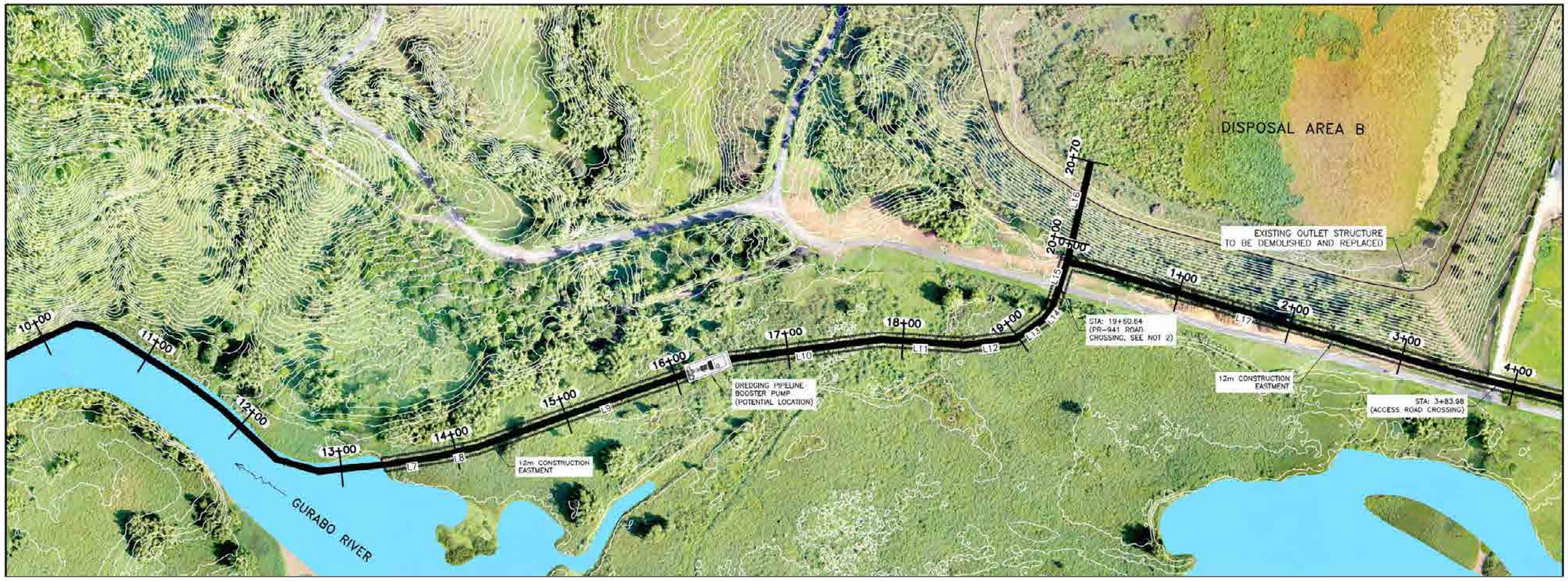
Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DREDGING PIPELINE
RESERVOIR TO DISPOSAL AREA B
PLAN AND PROFILE (1 OF 2)

SHEET ID. DP-201
SHEET No. 19
PROJ NO. CIP NO 1-01-9000
DATE JAN/28/2022

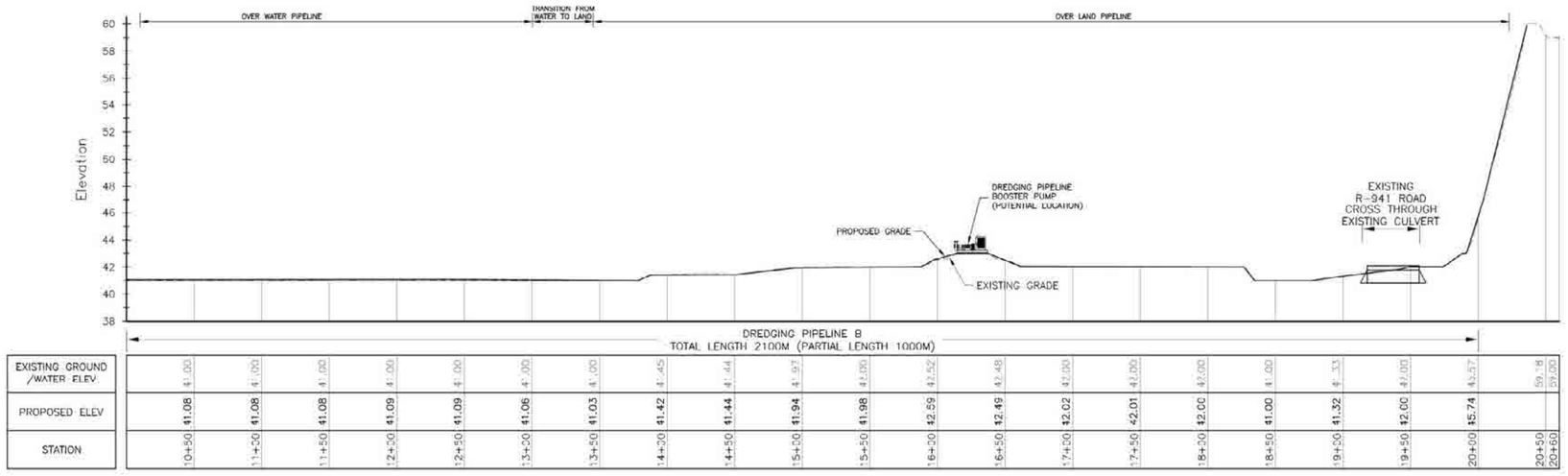
SCALE AS SHOWN

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2CM



LINE B PLAN VIEW

SCALE: 1=2000



EXISTING GROUND /WATER ELEV	41.00	41.00	41.00	41.00	41.00	41.00	41.00	41.45	41.44	41.97	42.00	42.52	42.48	42.00	42.00	42.00	42.00	41.33	41.00	43.37	59.18	59.00
PROPOSED ELEV	41.08	41.08	41.08	41.09	41.09	41.06	41.03	41.42	41.44	41.94	41.98	42.59	42.49	42.02	42.01	42.00	42.00	41.00	41.32	42.00	45.74	
STATION	10+50	11+20	11+50	12+30	12+50	13+20	13+50	14+20	14+50	15+20	15+50	16+20	16+50	17+00	17+50	18+20	18+50	19+00	19+50	20+00	20+50	20+60

LINE B PROFILE

HOR SCALE: 1=2000
VER SCALE: 1:200

N

GRAPHIC SCALE
2 1 0 2 4 6 8 10
SCALE: 1=200

GRAPHIC SCALE
20 10 0 20 40 60 80 100
SCALE: 1=2000

NOTES:

1. DISTANCE, STATIONS AND ELEVATIONS ARE IN METERS.
2. PR-941 ROAD CROSSING WILL BE PERFORMED THROUGH AN EXISTING BOX CULVERT. EXISTING CULVERT IS PARTIALLY FILLED WITH SEDIMENT. CONTRACTOR SHALL REMOVE DEPOSITED SEDIMENT IN ORDER TO BE ABLE TO INSTALL THE PIPELINE.
3. CONTRACTOR SHALL MOVE PIPELINE ALIGNMENT WITHIN THE DISPOSAL AREA AS REQUIRED FOR PROPER MANAGEMENT.
4. ANY PIPE AND/OR PUMP STATION ANCHORAGE SHALL BE NON-INVASIVE, METHODS REQUIRING EXCAVATION OR GROUND DISTURBANCE ARE NO ALLOWED UNLESS APPROVAL IS OBTAINED FROM ALL THE CONCERNING AGENCIES.

DISPOSAL AREA B PIPELINE TABLE

Line #	Length	Direction	Start Point	End Point
L7	46.28	S88° 39' 24.25"E	(246088.52,248176.70	(246135.78,248175.62)
L8	35.40	N86° 26' 37.31"E	(246135.78,248175.62	(246171.11,248177.82)
L9	230.56	N80° 54' 28.46"E	(246171.11,248177.82	(246398.78,248214.25)
L10	131.64	S87° 21' 01.35"E	(246398.78,248214.25	(246530.27,248208.16)
L11	71.17	S76° 00' 55.52"E	(246530.27,248208.16	(246599.33,248190.96)
L12	44.78	S86° 57' 05.85"E	(246599.33,248190.96	(246644.04,248188.58)
L13	30.26	N64° 13' 08.42"E	(246644.04,248188.58	(246671.30,248201.75)
L14	10.90	N48° 53' 09.62"E	(246671.30,248201.75	(246679.51,248208.92)
L15	42.80	N28° 03' 34.80"E	(246679.51,248208.92	(246699.64,248246.69)
L16	88.83	N23° 16' 59.27"E	(246699.64,248246.69	(246734.76,248328.28)

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR 00902-4157 USA
TEL. 787-723-8005
FAX 787-721-3196
WWW.GLMENGINNERS.COM

ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DREDGING PIPELINE
RESERVOIR TO DISPOSAL AREA B
PLAN AND PROFILE (1 OF 2)

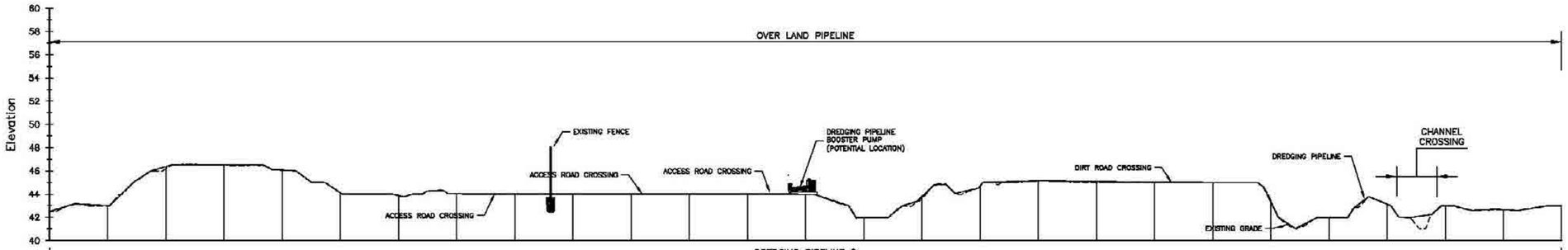
SHEET ID. DP-202
SHEET No. 20
PROJ NO. CIP NO 1-01-9000
SCALE AS SHOWN
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM
DATE JAN/28/2022



LINE C PLAN VIEW

SCALE: 1=2000

DISPOSAL AREA C PIPELINE TABLE				
Line #	Length	Direction	Start Point	End Point
L17	353.07	S84° 02' 19.58"E	(246699.38,248246.19	(247016.82,248091.83)
L18	313.87	S65° 29' 42.78"E	(247016.82,248091.83	(247302.51,247981.41)
L19	19.73	N76° 25' 48.44"E	(247302.51,247981.41	(247321.70,247986.04)
L20	14.45	N45° 00' 00.00"E	(247321.70,247986.04	(247331.92,247976.26)
L21	23.99	N30° 21' 15.20"E	(247331.92,247976.26	(247344.04,247996.96)
L22	35.47	N23° 18' 33.91"E	(247344.04,247996.96	(247358.08,248029.54)
L23	44.58	N29° 35' 15.95"E	(247358.08,248029.54	(247380.24,248068.56)
L24	20.12	N43° 40' 04.01"E	(247380.24,248068.56	(247394.13,248083.11)
L25	108.41	N58° 48' 09.11"E	(247394.13,248083.11	(247486.07,248136.69)
L26	31.17	N74° 46' 15.81"E	(247486.07,248136.69	(247516.15,248144.88)
L27	16.22	N87° 46' 47.61"E	(247516.15,248144.88	(247532.36,248145.51)
L28	49.06	N89° 04' 22.67"E	(247532.36,248145.51	(247581.41,248146.30)
L29	65.31	N80° 47' 52.18"E	(247581.41,248146.30	(247645.88,248158.75)
L30	95.84	N88° 45' 02.41"E	(247645.88,248158.75	(247741.37,248162.17)
L31	51.70	S83° 23' 28.67"E	(247741.37,248162.17	(247792.73,248156.22)
L32	36.67	S76° 29' 49.24"E	(247792.73,248156.22	(247828.38,248147.88)
L33	75.55	S80° 01' 50.98"E	(247828.38,248147.88	(247893.83,248109.92)



STATION	PROPOSED ELEV	EXISTING GROUND /WATER ELEV
0+50	43.00	43.00
1+00	46.19	46.19
1+50	46.51	46.51
2+00	46.07	46.07
2+50	44.13	44.13
3+00	43.85	43.85
3+50	44.02	44.02
4+00	44.00	44.00
4+50	44.00	44.00
5+00	44.00	44.00
5+50	44.00	44.00
6+00	44.00	44.00
6+50	44.00	44.00
7+00	41.98	41.99
7+50	43.58	43.58
8+00	44.67	44.67
8+50	45.12	45.12
9+00	45.00	45.00
9+50	45.00	45.00
10+00	45.00	45.00
10+50	43.45	43.45
11+00	42.00	42.00
11+50	43.11	43.11
12+00	43.00	43.00
12+50	42.66	42.66
13+00	43.00	43.00

LINE C PROFILE

HOR SCALE: 1=2000
VER SCALE: 1:200

NOTES:

1. DISTANCE, STATIONS AND ELEVATIONS ARE IN METERS.
2. CONTRACTOR SHALL PROVIDE A CROSSING METHOD THAT DOES NOT INVOLVE EXCAVATION AT EACH ACCESS AND DIRT ROADS CROSSING IF EXCAVATION IS REQUIRED CONTRACTOR SHALL OBTAIN THE ENDORSEMENT FROM ALL THE CONCERNING AGENCIES.
3. ANY PIPE AND/OR PUMP STATION ANCHORAGE SHALL BE NON-INVASIVE, METHODS REQUIRING EXCAVATION OR GROUND DISTURBANCE ARE NO ALLOWED UNLESS APPROVAL IS OBTAINED FROM ALL THE CONCERNING AGENCIES.

GRAPHIC SCALE
2 1 0 2 4 6 8 10
SCALE: 1=200

GRAPHIC SCALE
20 10 0 20 40 60 80 100
SCALE: 1=2000

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
	REVISIONS			

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR 00902-4157 USA
ANCHOR QEA
TEL. 787-723-8005
FAX 787-721-3196
WWW.GLMENGINNERS.COM

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:

DREDGING PIPELINE
DISPOSAL AREA B TO DISPOSAL AREA C
PLAN AND PROFILE (1 OF 4)

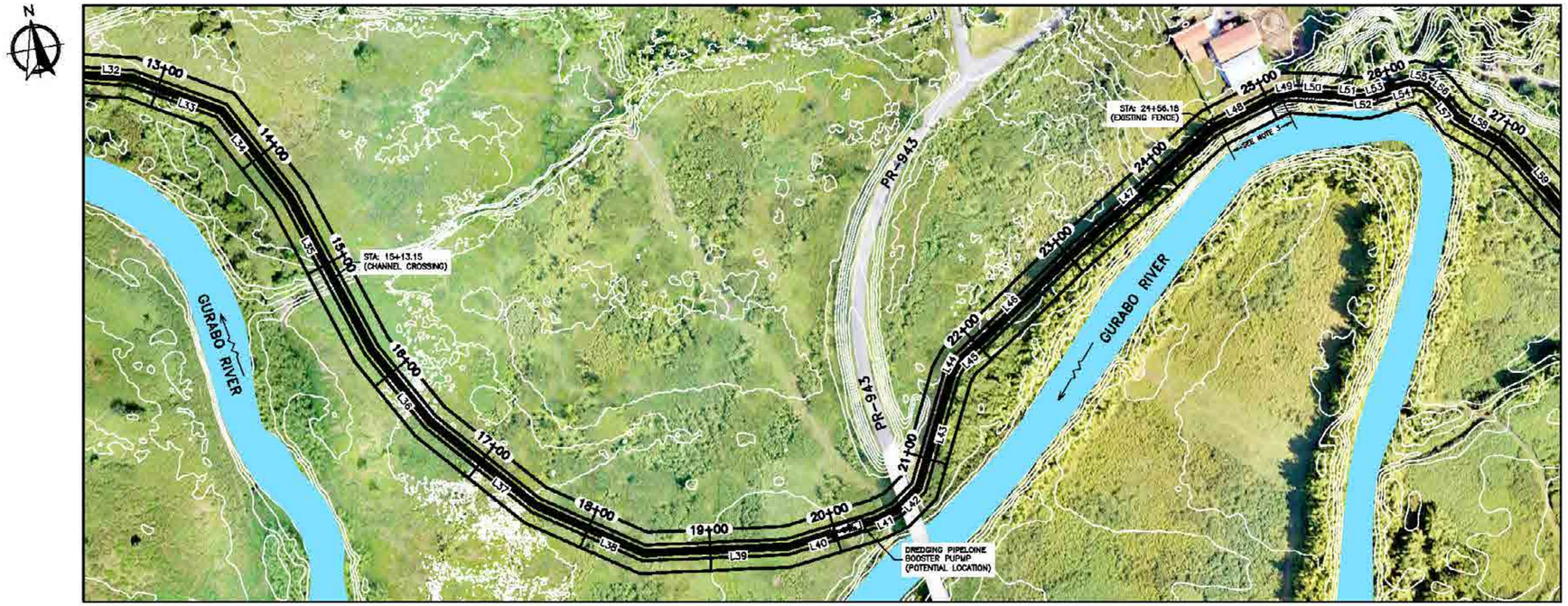
SHEET ID.	SHEET No.
DP-301	21

PROJ NO.
CIP NO 1-01-9000

SCALE
AS SHOWN

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2CM

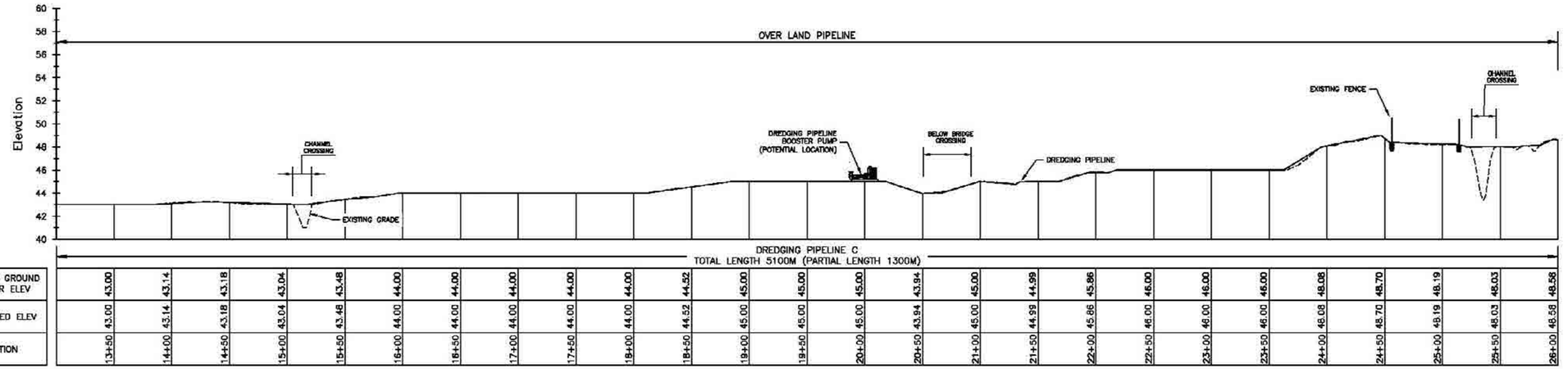
DATE
JAN/28/2022



LINE C PLAN VIEW

SCALE: 1=2000

DISPOSAL AREA C PIPELINE TABLE				
Line #	Length	Direction	Start Point	End Point
L33	75.55	S60° 01' 50.98"E	(247826.38,248147.66	(247893.63,248109.92)
L34	88.66	S28° 13' 11.48"E	(247893.63,248109.92	(247934.81,248033.56)
L35	135.79	S18° 03' 07.48"E	(247934.81,248033.56	(247976.89,247904.45)
L36	73.20	S29° 16' 34.17"E	(247976.89,247904.45	(248012.69,247840.80)
L37	105.69	S41° 33' 00.50"E	(248012.69,247840.80	(248082.72,247761.58)
L38	93.05	S56° 07' 45.06"E	(248082.72,247761.58	(248159.98,247709.72)
L39	113.16	S82° 28' 34.25"E	(248159.98,247709.72	(248272.16,247694.90)
L40	72.15	N83° 05' 23.60"E	(248272.16,247694.90	(248343.79,247703.58)
L41	18.38	N74° 16' 53.14"E	(248343.79,247703.58	(248381.47,247708.56)
L42	24.75	N54° 44' 49.52"E	(248381.47,247708.56	(248381.68,247722.84)
L43	92.10	N28° 14' 44.13"E	(248381.68,247722.84	(248422.41,247805.45)
L44	11.91	N38° 46' 44.58"E	(248422.41,247805.45	(248429.87,247814.74)
L45	13.50	N57° 31' 18.84"E	(248429.87,247814.74	(248441.28,247821.98)
L46	105.62	N56° 20' 10.79"E	(248441.28,247821.98	(248528.17,247880.53)
L47	152.52	N58° 13' 24.76"E	(248529.17,247880.53	(248658.83,247960.85)
L48	58.52	N73° 25' 52.24"E	(248658.83,247960.85	(248714.92,247977.54)
L49	7.73	N89° 12' 54.63"E	(248714.92,247977.54	(248722.64,247977.65)
L50	35.71	S76° 52' 23.38"E	(248722.84,247977.65	(248757.42,247969.54)
L51	17.42	S72° 54' 59.78"E	(248757.42,247969.54	(248774.06,247964.42)
L52	8.55	S82° 47' 22.91"E	(248774.06,247964.42	(248782.56,247963.34)
L53	12.77	N83° 16' 23.20"E	(248782.56,247963.34	(248795.25,247964.84)
L54	27.05	N81° 54' 05.78"E	(248795.25,247964.84	(248822.02,247968.65)
L55	7.80	S69° 21' 10.63"E	(248822.02,247968.65	(248829.32,247965.90)
L56	11.71	S40° 36' 04.68"E	(248829.32,247965.90	(248836.84,247957.01)
L57	24.42	S29° 33' 58.05"E	(248836.94,247857.01	(248848.12,247835.84)
L58	40.60	S50° 11' 53.71"E	(248849.12,247835.84	(248880.30,247909.85)



STATION	13+50	14+00	14+50	15+00	15+50	16+00	16+50	17+00	17+50	18+00	18+50	19+00	19+50	20+00	20+50	21+00	21+50	22+00	22+50	23+00	23+50	24+00	24+50	25+00	25+50	26+00
EXISTING GROUND /WATER ELEV	43.00	43.14	43.18	43.04	43.48	44.00	44.00	44.00	44.00	44.00	44.52	45.00	45.00	45.00	43.94	45.00	44.99	45.86	46.00	46.00	46.00	46.08	48.70	48.19	45.03	48.58
PROPOSED ELEV	43.00	43.14	43.18	43.04	43.48	44.00	44.00	44.00	44.00	44.00	44.52	45.00	45.00	45.00	43.94	45.00	44.99	45.86	46.00	46.00	46.00	46.08	48.70	48.19	45.03	48.58

LINE C PROFILE

HOR SCALE: 1=2000
VER SCALE: 1:200

NOTES:

1. DISTANCE, STATIONS AND ELEVATIONS ARE IN METERS.
2. CONTRACTOR SHALL PROVIDE A CROSSING METHOD THAT DOES NOT INVOLVE EXCAVATION AT EACH ACCESS AND DIRT ROADS CROSSING IF EXCAVATION IS REQUIRED CONTRACTOR SHALL OBTAIN THE ENDORSEMENT FROM ALL THE CONCERNING AGENCIES.
3. ANY PIPE AND/OR PUMP STATION ANCHORAGE SHALL BE NON-INVASIVE, METHODS REQUIRING EXCAVATION OR GROUND DISTURBANCE ARE NO ALLOWED UNLESS APPROVAL IS OBTAINED FROM ALL THE CONCERNING AGENCIES.

GRAPHIC SCALE
2 1 0 2 4 6 8 10
SCALE: 1=200

GRAPHIC SCALE
20 10 0 20 40 60 80 100
SCALE: 1=2000

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR
00902-4157 USA
TEL. 787-723-8005
FAX 787-721-3196
WWW.GLMENGINNERS.COM

ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

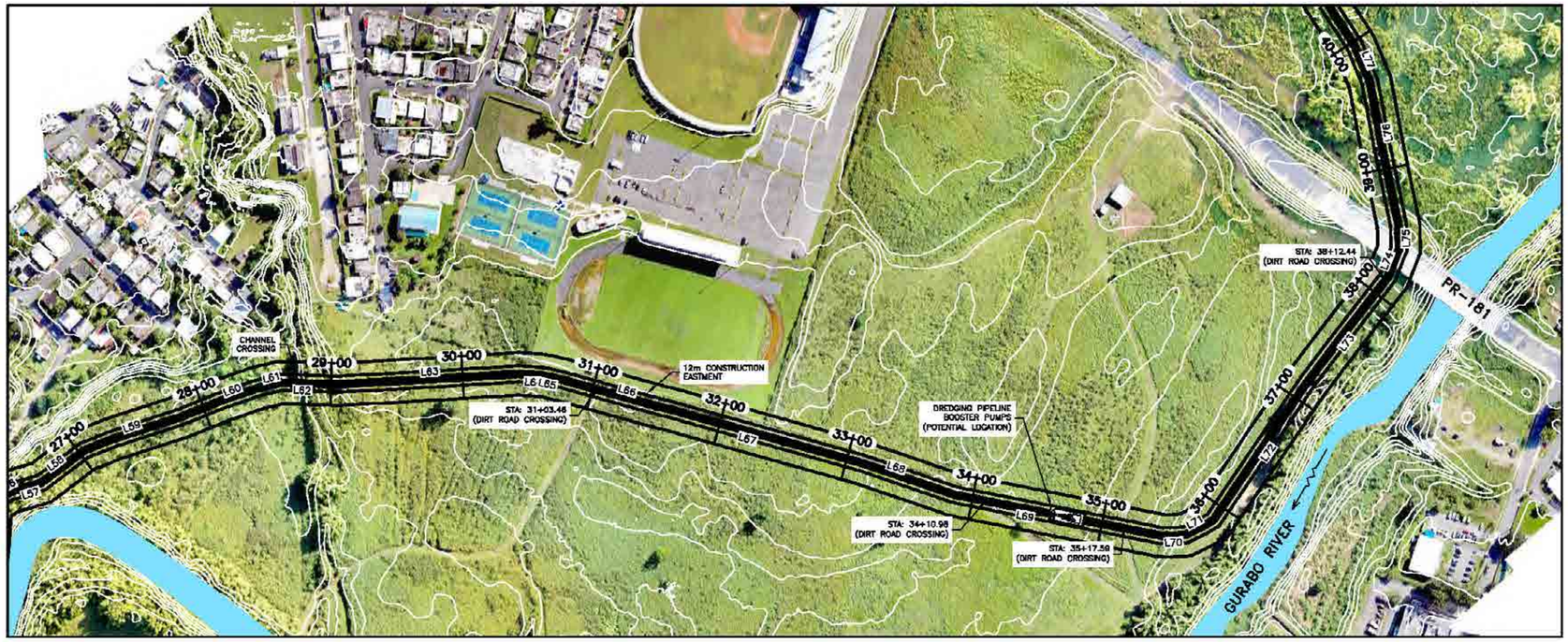
Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DREDGING PIPELINE
DISPOSAL AREA B TO DISPOSAL AREA C
PLAN AND PROFILE (2 OF 4)

SHEET ID. DP-302
SHEET No. 22
PROJ NO. CIP NO 1-01-9000
DATE JAN/28/2022

SCALE AS SHOWN

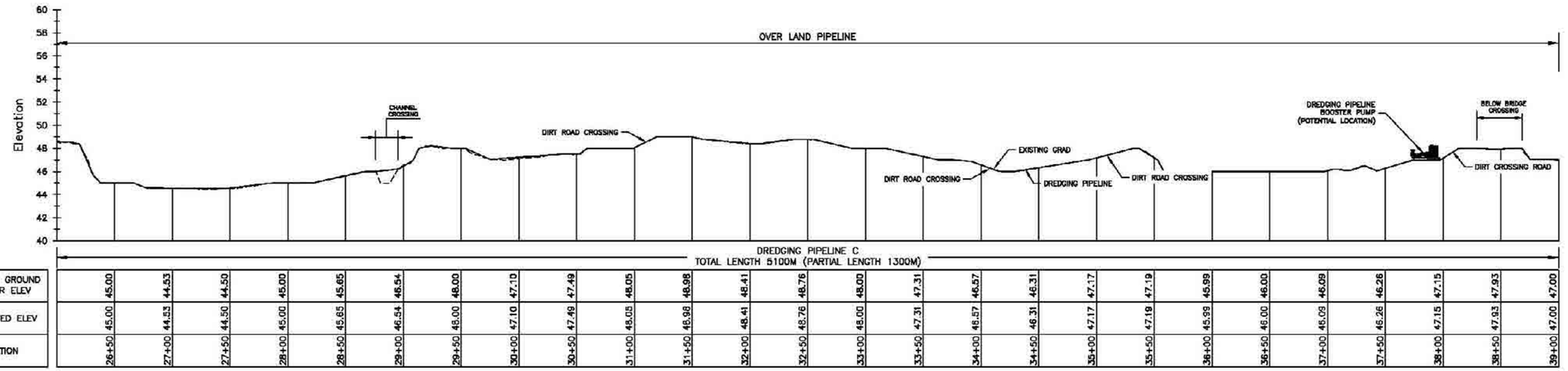
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY. 0 2CM



LINE C PLAN VIEW

SCALE: 1=2000

DISPOSAL AREA C PIPELINE TABLE				
Line #	Length	Direction	Start Point	End Point
L58	40.60	S50° 11' 53.71"E	(248848.12,247935.84	(248880.30,247908.85)
L59	77.47	S32° 11' 31.40"E	(248880.30,247908.85	(248921.58,247844.29)
L60	62.23	S33° 43' 50.19"E	(248921.58,247844.29	(248956.13,247792.54)
L61	18.22	S26° 33' 54.18"E	(248956.13,247792.54	(248964.28,247776.24)
L62	43.17	S11° 27' 11.42"E	(248964.28,247776.24	(248972.88,247733.93)
L63	137.01	S16° 23' 09.49"E	(248972.88,247733.93	(249011.51,247602.48)
L64	18.03	S9° 37' 41.36"E	(249011.51,247602.48	(249014.52,247584.70)
L65	14.09	S0° 45' 33.81"E	(249014.52,247584.70	(249014.71,247570.61)
L66	76.40	S2° 22' 54.53"W	(249014.71,247570.61	(249011.54,247494.28)
L67	160.88	S2° 23' 48.89"W	(249011.54,247494.28	(249004.80,247333.48)
L68	74.77	S5° 48' 28.53"W	(249004.80,247333.48	(248997.30,247259.07)
L69	160.11	S1° 55' 35.08"E	(248997.30,247259.07	(249002.88,247099.05)
L70	18.18	S18° 00' 02.62"E	(249002.88,247099.05	(249007.70,247081.57)
L71	23.54	S41° 14' 44.62"E	(249007.70,247081.57	(249023.22,247063.87)
L72	128.01	S68° 55' 20.66"E	(249023.22,247063.87	(249140.80,247018.55)
L73	100.75	S85° 34' 19.13"E	(249140.80,247018.55	(249232.56,246976.87)
L74	22.69	S81° 24' 58.96"E	(249232.56,246976.87	(249254.99,246973.49)
L75	17.87	N78° 17' 34.94"E	(249254.99,246973.49	(249272.35,246977.72)
L76	111.53	N65° 35' 39.41"E	(249272.35,246977.72	(249373.91,247023.81)
L77	30.38	N54° 02' 06.18"E	(249373.81,247023.81	(249398.50,247041.65)



STATION	EXISTING GROUND /WATER ELEV	PROPOSED ELEV
26+50	45.00	45.00
27+00	44.53	44.53
27+50	44.50	44.50
28+00	45.00	45.00
28+50	45.65	45.65
29+00	46.54	46.54
29+50	48.00	48.00
30+00	47.10	47.10
30+50	47.49	47.49
31+00	48.05	48.05
31+50	48.98	46.98
32+00	48.41	48.41
32+50	48.76	48.76
33+00	48.00	48.00
33+50	47.31	47.31
34+00	46.57	46.57
34+50	46.31	46.31
35+00	47.17	47.17
35+50	47.19	47.19
36+00	45.99	45.99
36+50	46.00	46.00
37+00	46.09	46.09
37+50	46.26	46.26
38+00	47.15	47.15
38+50	47.93	47.93
39+00	47.00	47.00

LINE C PROFILE

HOR SCALE: 1=2000
VER SCALE: 1:200

NOTES:

1. DISTANCE, STATIONS AND ELEVATIONS ARE IN METERS.
2. CONTRACTOR SHALL PROVIDE A CROSSING METHOD THAT DOES NOT INVOLVE EXCAVATION AT EACH ACCESS AND DIRT ROADS CROSSING IF EXCAVATION IS REQUIRED CONTRACTOR SHALL OBTAIN THE ENDORSEMENT FROM ALL THE CONCERNING AGENCIES.
3. ANY PIPE AND/OR PUMP STATION ANCHORAGE SHALL BE NON-INVASIVE, METHODS REQUIRING EXCAVATION OR GROUND DISTURBANCE ARE NO ALLOWED UNLESS APPROVAL IS OBTAINED FROM ALL THE CONCERNING AGENCIES.

GRAPHIC SCALE
2 1 0 2 4 6 8 10
SCALE: 1=200

GRAPHIC SCALE
20 10 0 20 40 60 80 100
SCALE: 1=2000

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR 00902-4157 USA
TEL. 787-723-8005
FAX 787-721-3196
WWW.GLMENGINNERS.COM

ANCHOR QEA

Autoridad de Acueductos y Alcantarillados

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

SHEET TITLE:

DREDGING PIPELINE
DISPOSAL AREA B TO DISPOSAL AREA C
PLAN AND PROFILE (3 OF 4)

SHEET ID.	SHEET No.
DP-303	23

PROJ NO.
CIP NO 1-01-9000

SCALE: AS SHOWN

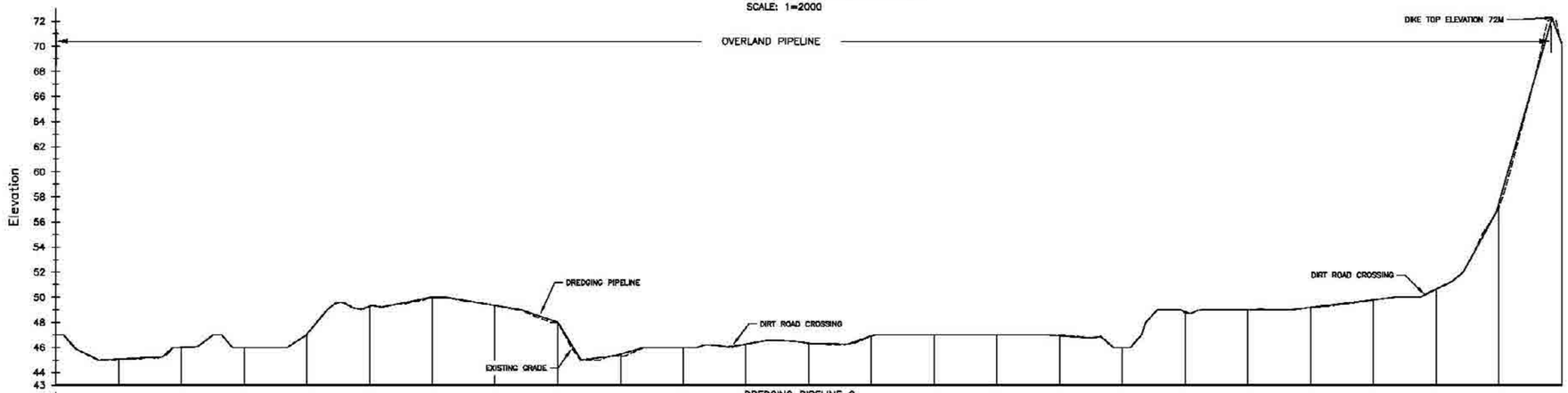
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM

DATE: JAN/28/2022



LINE C PLAN VIEW

SCALE: 1=2000



EXISTING GROUND /WATER ELEV	45.03	46.01	46.00	47.03	49.29	50.00	49.35	48.00	45.25	46.00	46.25	46.32	46.90	47.00	47.00	47.00	46.00	48.79	49.03	49.17	49.77	50.64	57.19	70.21
PROPOSED ELEV	45.03	46.01	46.00	47.03	49.29	50.00	49.35	48.00	45.25	46.00	46.25	46.32	46.90	47.00	47.00	47.00	46.00	48.79	49.03	49.17	49.77	50.64	57.19	70.21
STATION	39+50	40+00	40+50	41+00	41+50	42+00	42+50	43+00	43+50	44+00	44+50	45+00	45+50	46+00	46+50	47+00	47+50	48+00	48+50	49+00	49+50	50+00	50+50	51+00

LINE C PROFILE

HOR SCALE: 1=2000
VER SCALE: 1:200

NOTES:

1. DISTANCE, STATIONS AND ELEVATIONS ARE IN METERS.
2. CONTRACTOR SHALL PROVIDE A CROSSING METHOD THAT DOES NOT INVOLVE EXCAVATION AT EACH ACCESS AND DIRT ROADS CROSSING IF EXCAVATION IS REQUIRED CONTRACTOR SHALL OBTAIN THE ENDORSEMENT FROM ALL THE CONCERNING AGENCIES.
3. CONTRACTOR SHALL MOVE PIPELINE ALIGNMENT WITHIN THE DISPOSAL AREA AS REQUIRED FOR PROPER MANAGEMENT.
4. ANY PIPE AND/OR PUMP STATION ANCHORAGE SHALL BE NON-INVASIVE. METHODS REQUIRING EXCAVATION OR GROUND DISTURBANCE ARE NO ALLOWED UNLESS APPROVAL IS OBTAINED FROM ALL THE CONCERNING AGENCIES.

GRAPHIC SCALE
20 10 0 20 40 60 80 100
SCALE: 1=2000

GRAPHIC SCALE
2 1 0 2 4 6 8 10
SCALE: 1=200

GRAPHIC SCALE
20 10 0 20 40 60 80 100
SCALE: 1=2000

DISPOSAL AREA C PIPELINE TABLE

Line #	Length	Direction	Start Point	End Point
L77	30.38	N54° 02' 08.18"E	(249373.91,247023.61	(249396.50,247041.65)
L78	99.43	N43° 37' 14.15"E	(249396.50,247041.65	(249467.10,247113.83)
L79	143.16	N51° 04' 33.33"E	(249467.10,247113.83	(249578.47,247203.57)
L80	101.67	N84° 27' 21.31"E	(249578.47,247203.57	(249670.21,247247.41)
L81	79.34	N70° 06' 53.41"E	(249670.21,247247.41	(249744.82,247274.40)
L82	327.39	N87° 48' 30.97"E	(249744.82,247274.40	(250047.98,247398.06)
L83	18.99	N57° 15' 04.25"E	(250106.19,247420.70	(250122.16,247430.97)
L84	19.10	N40° 12' 43.63"E	(250122.16,247430.97	(250134.49,247445.58)
L85	83.78	N28° 31' 40.59"E	(250134.49,247445.58	(250174.50,247519.16)
L86	135.28	N25° 00' 21.82"E	(250174.50,247519.16	(250231.68,247641.75)
L87	46.56	N23° 04' 13.48"E	(250231.68,247641.75	(250249.93,247684.61)

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
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00902-4157 USA

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FAX 787-721-3196
WWW.GLMENGINNERS.COM

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DREDGING PIPELINE
DISPOSAL AREA B TO DISPOSAL AREA C
PLAN AND PROFILE (4 OF 4)

SHEET ID.	SHEET No.
DP-304	24

PROJ NO.
CIP NO 1-01-9000

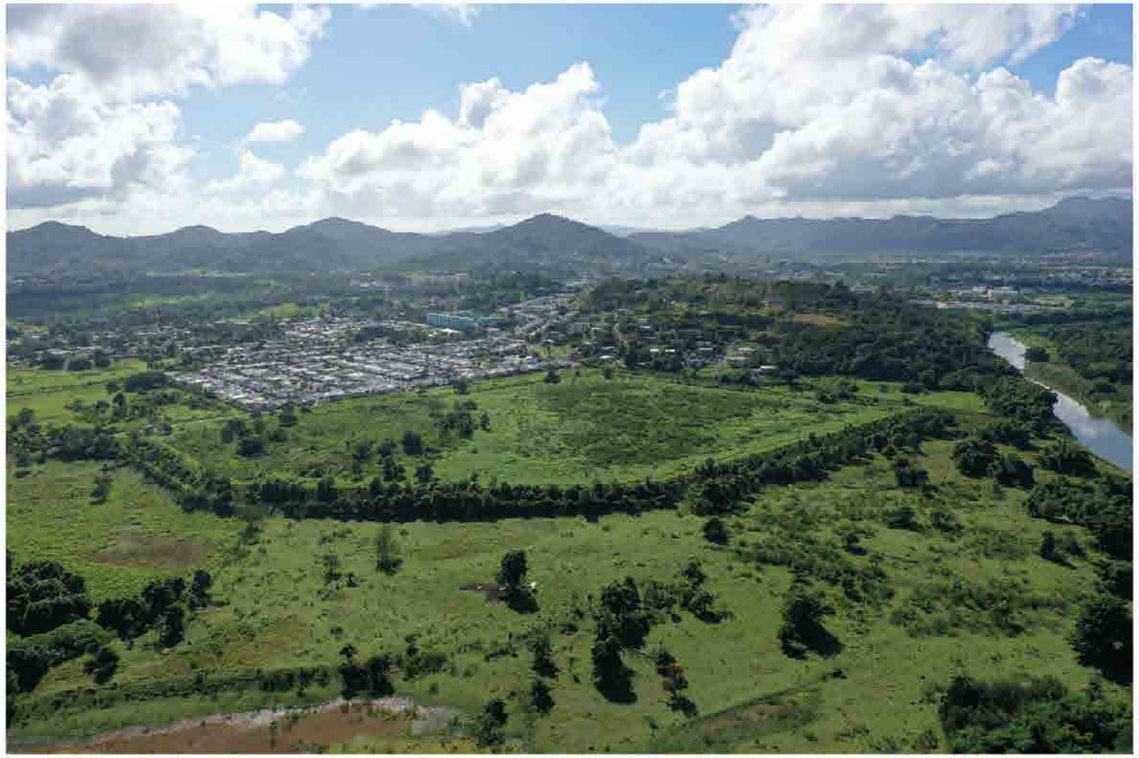
SCALE
AS SHOWN

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2CM

DATE
JAN/28/2022



VIEW TOWARD SOUTH WITH LOIZA RIVER
SCALE: N.T.S.



VIEW TOWARD SOUTHEAST
SCALE: N.T.S.

NOTES:

1. PHOTO COLLECTED USING DJI MAVIC PRO 2 ON DECEMBER 2, 2021.

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
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BASIS OF DESIGN FOR LAGO LOIZA
(CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

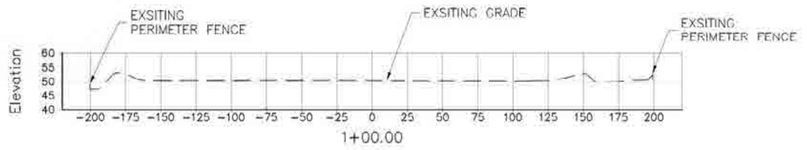
SHEET TITLE:
DISPOSAL AREA A
PANORAMIC PHOTO

SHEET ID. C-100
SHEET No. 25
PROJ NO. CIP NO 1-01-9000
SCALE N.T.S.
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM
DATE JAN/28/2022



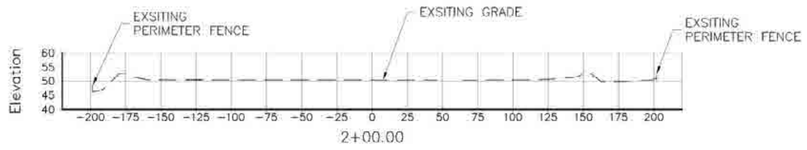
PLAN

SCALE: 1=2500



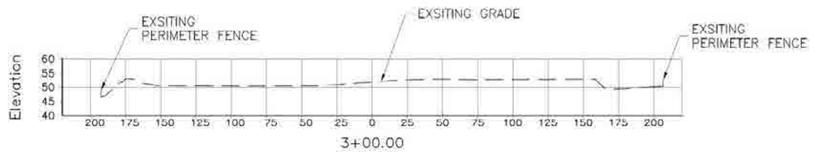
SECTION 1+00

SCALE H: 1=2000
SCALE V: 1=200



SECTION 2+00

SCALE H: 1=2000
SCALE V: 1=200



SECTION 3+00

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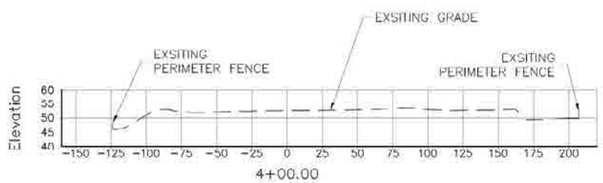
SCALE V: 1=200



SECTION 4+00

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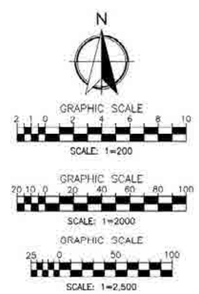
SCALE V: 1=200



BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NOTES:

1. DISTANCE, STATIONS AND ELEVATIONS ARE IN METERS.
2. THE TOPOGRAPHIC SURVEY DATA DEPICTED ON THE MAP WAS OBTAINED DURING THE PERIOD OF MAY 26, 2021 AND JUNE 25, 2021.
3. PLANE COORDINATES ARE BASED ON THE LAMBERT PROJECTION FOR PUERTO RICO AND THE US VIRGIN ISLAND AND REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83 2011) EPOCH 2010.00 ADJUSTMENT IN METERS.
4. ELEVATION ARE ORTHOMETRICS, IN METERS AND REFERENCED TO THE PUERTO RICO VERTICAL DATUM 2002, (PRVD2002) GEOID 2018.
5. THIS TOPOGRAPHIC SURVEY WAS PERFORMED USING VIRTUAL REFERENCE NETWORK (vrs) TO OBTAIN REAL TIME KINEMATIC (RTK) SOLUTIONS, AND WERE VERIFIED EVERY DAY FOR HORIZONTAL AND VERTICAL POSITIONING IN NGS CONTROL POINT A1016 (DO1102) AND Z1015 (DO1104).
6. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE COMPLETE RESULTS OF LAND SURVEYORS MADE ON THE AFOREMENTIONED DATES AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS AT THE TIME THE SURVEY WERE CONDUCTED.

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
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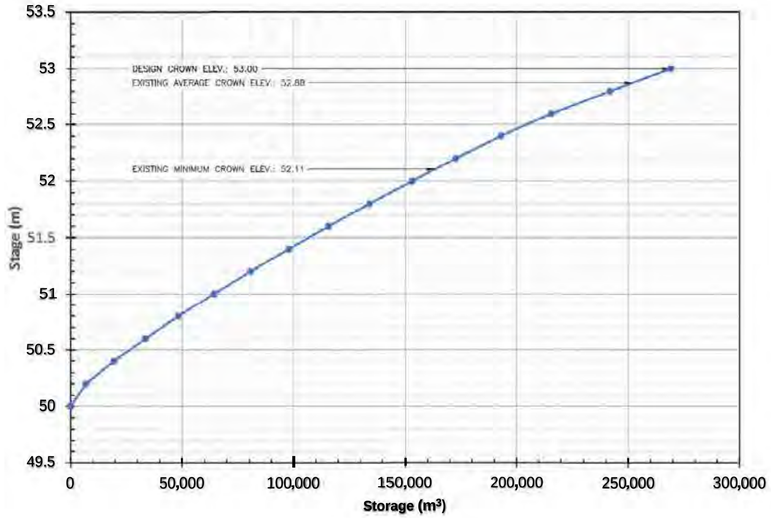
ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

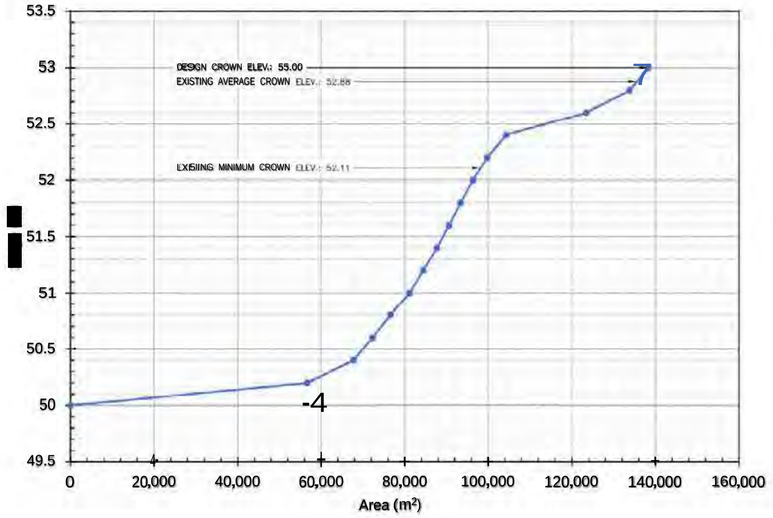
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: DISPOSAL AREA A EXISTING CONFIGURATION PLAN AND SECTIONS		SHEET ID. C-101	SHEET No. 26
		PROJ NO. CIP NO 1-01-9000	
SCALE AS SHOWN	BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY. 0 2CM	DATE JAN/28/2022	



DISPOSAL AREA A
STAGE–STORAGE
SCALE: N.T.S.



DISPOSAL AREA A
STAGE–AREA
SCALE: N.T.S.

DIKE A, TABLE OF STAGE VOLUME AND AREA.

STAGE (M)	VOLUME (m³)	AREA (m²)
50.0	0.000	0.000
50.2	6,736	56,626
50.4	19,398	67,758
50.6	33,431	72,278
50.8	48,308	78,551
51.0	64,077	81,142
EXISTING MINIMUM CROWN ELEV.: 52.11 → 51.2	80,640	84,432
51.4	97,848	87,667
51.6	115,689	90,617
51.8	134,082	93,328
52.0	153,041	96,313
52.2	172,645	99,715
52.4	192,998	104,270
52.6	215,731	123,396
EXISTING AVERAGE CROWN ELEV: 52.88 → 52.8	241,734	133,788
DESIGN CROWN ELEV.: 53.00 → 53.0	269,153	138,285

NOTES:

1. DISTANCE, STATIONS AND ELEVATIONS ARE IN METCRS.
2. STAGE STORAGE DATA HAS BEEN DEFINED FROM TOPOGRAPHIC SURVEY.

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
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BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: DISPOSAL AREA A STAGE STORAGE AND AREA		SHEET ID. C-102	SHEET No. 27
		PROJ NO. CIP NO 1-01-9000	
SCALE N.T.S	BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM	DATE JAN/28/2022	



INTERIOR VIEW



DIKE VIEW



OUTLET STRUCTURE AT SW CORNER



OUTLET STRUCTURE

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
	REVISIONS			

GLM ENGINEERING-GROUP
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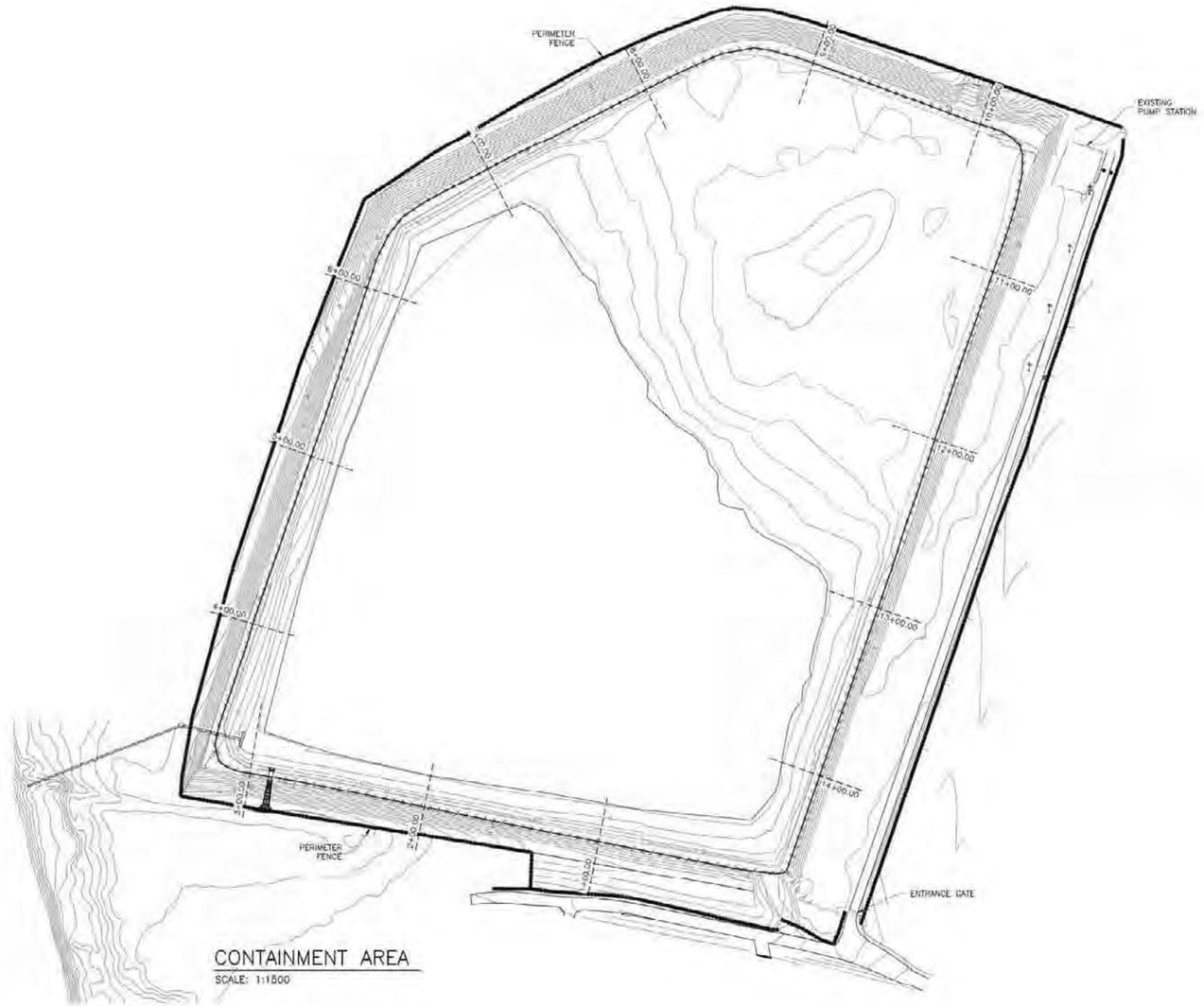
ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA
(CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DISPOSAL AREA A
PHOTOS

SHEET ID. C-103
SHEET No. 28
PROJ NO. CIP NO 1-01-9000
SCALE N.T.S
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM
DATE JAN/28/2022



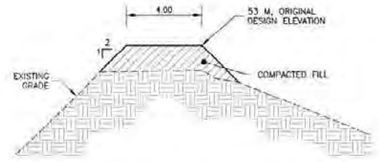
CONTAINMENT AREA
SCALE: 1:1500

N

GRAPHIC SCALE
10 0 10 20 30 40 50
SCALE: 1=1000

GRAPHIC SCALE
20 10 0 20 40 60
SCALE: 1=1500

GRAPHIC SCALE
20 10 0 20 40 60 80 100
SCALE: 1=2000



DIKE REPAIR TYPICAL SECTION (IF REQUIRED)
NTS

NOTES:

1. DISTANCE, STATIONS, AND ELEVATIONS ARE IN METERS.
2. RAISING THE DIKES UP TO THE DESIGN LEVEL OF 61m WILL INCREASE THE STORAGE. CONTRACTOR SHALL DEFINE IF RAISING THE DIKE ELEVATION TO THE DESIGN LEVEL IS REQUIRED UNDER THE PROPOSED PROJECT CONFIGURATION.
3. FILL MATERIAL SHALL BE A-2-4 COMPACTED TO 95% PROCTOR TEST OR BETTER.



STATION	PROPOSED ELEV	EXISTING GROUND
0+50	53.00	50.19
1+00	53.00	49.91
1+50	53.00	50.76
2+00	53.00	52.27
2+50	53.00	52.25
3+00	53.00	52.55
3+50	53.00	52.17
4+00	53.00	53.03
4+50	53.00	52.95
5+00	53.00	52.81
5+50	53.00	52.73
6+00	53.00	52.85
6+50	53.00	52.78
7+00	53.00	52.65
7+50	53.00	52.77
8+00	53.00	52.79
8+50	53.00	52.69
9+00	53.00	52.57
9+50	53.00	52.77
10+00	53.00	52.92
10+50	53.00	52.90
11+00	53.00	52.96
11+50	53.00	52.84
12+00	53.00	52.72
12+50	53.00	52.63
13+00	53.00	52.70
13+50	53.00	52.78
14+00	53.00	52.75
14+50	53.00	52.88

DIKE A TOP ELEVATION PROFILE
HOR SCALE: 1:2000
VER SCALE: 1:1000

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
	REVISIONS			

GLM ENGINEERING-GROUP
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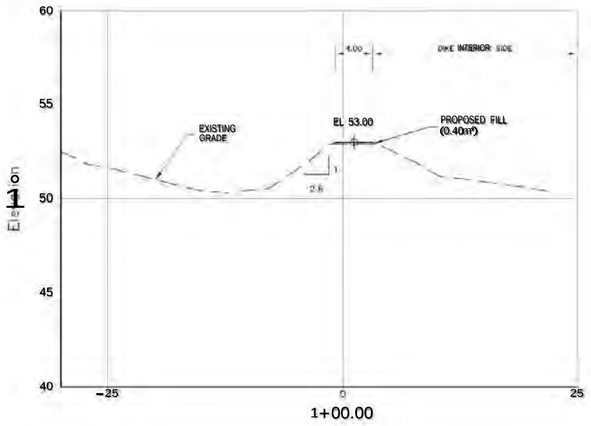
ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DISPOSAL AREA A
PLAN, PROFILE
AND TYPICAL SECTION

SHEET ID. C-104
SHEET No. 29
PROJ NO. CIP NO 1-01-9000
SCALE AS SHOWN
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY. 0 2CM
DATE JAN/28/2022



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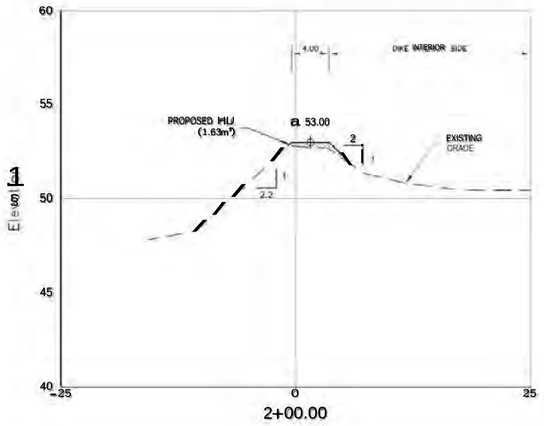

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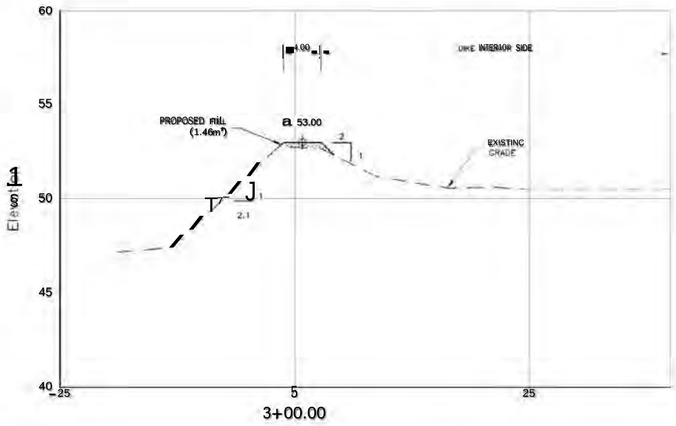

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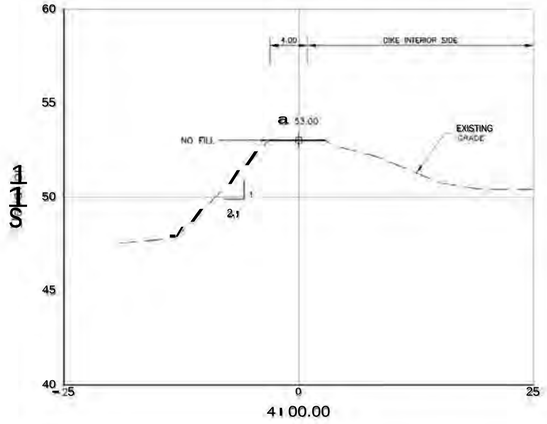

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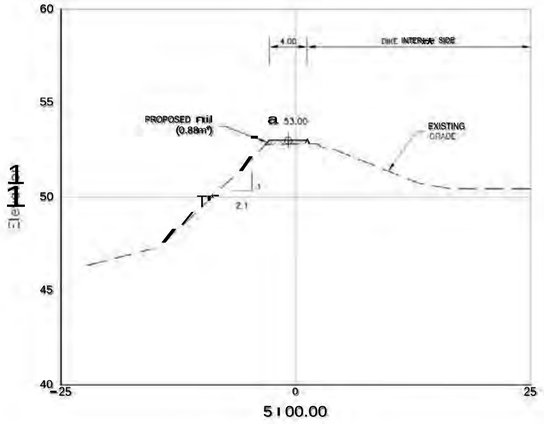

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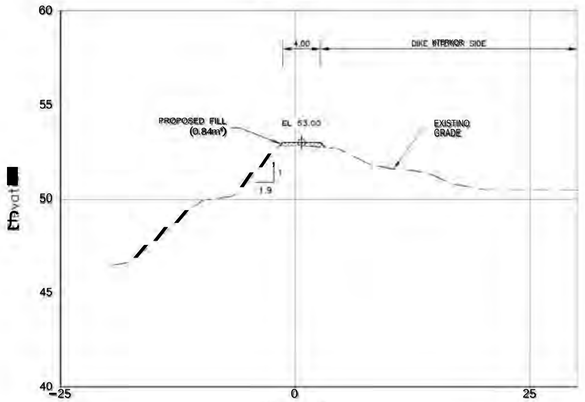

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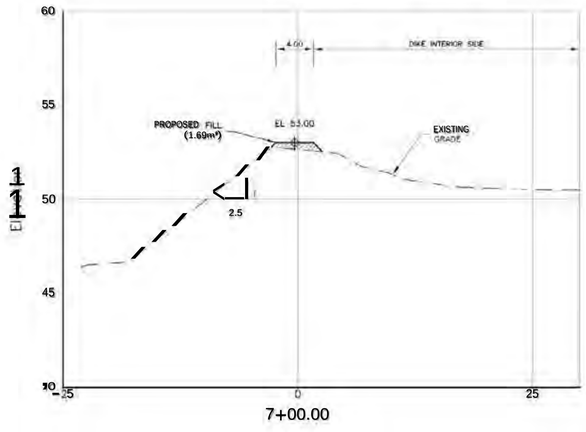

7+00.00

SECTIONS

SSHIS

LEGEND:

EXISTING GRADE

PROPOSED FILL

GRAPHIC SCALE

SCALE 1=150

GRAPHIC SCALE

SCALE 1=300

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
REVISIONS				

GLM ENGINEERING-GROUP

ANCHOR QEA

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BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: DISPOSAL AREA A DIKE SECTIONS (1 of 2)

SHEET ID. C-105

SHEET No. 30

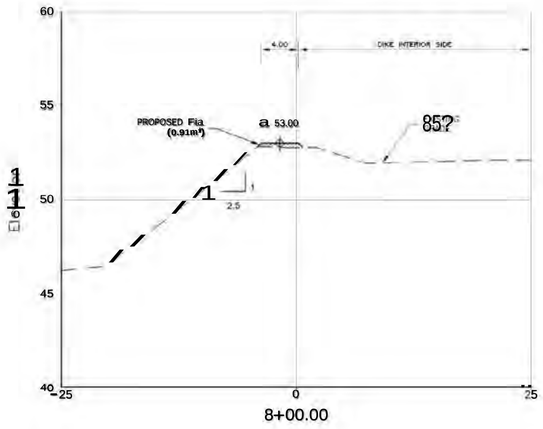
PROJ NO. CIP NO 1-01-9000

SCALE AS SHOWN

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY

0 2CM

DATE JAN/28/2022



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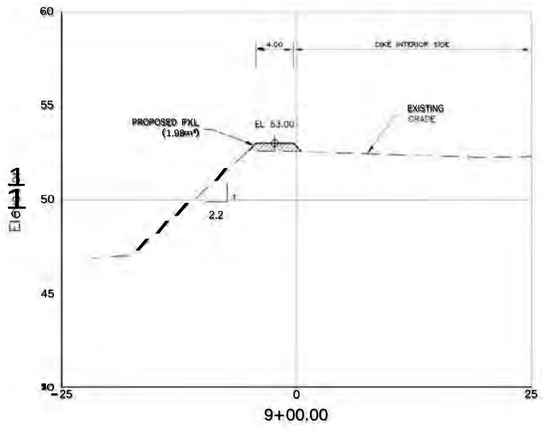

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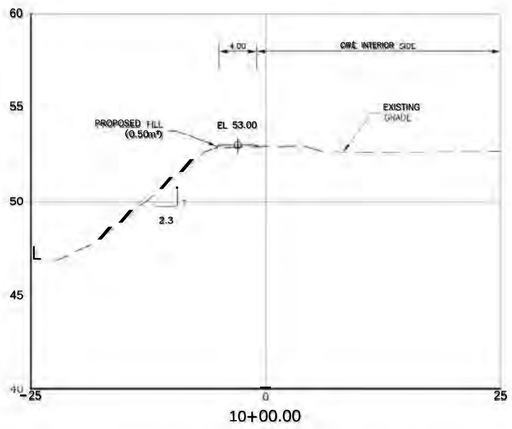
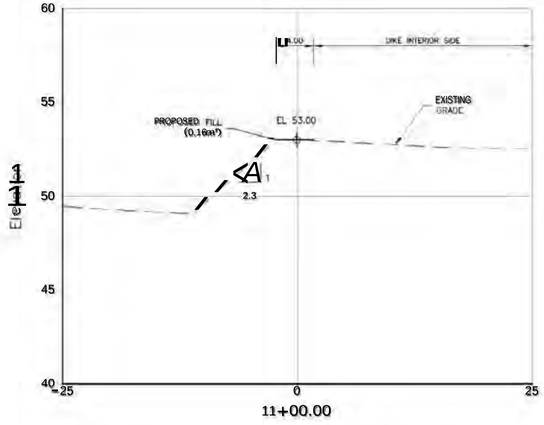
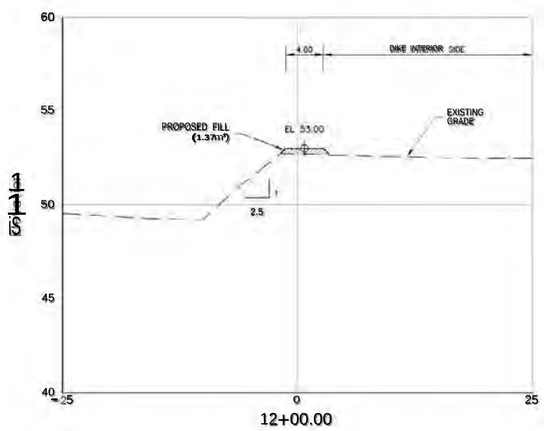


10+00.00



11+00.00



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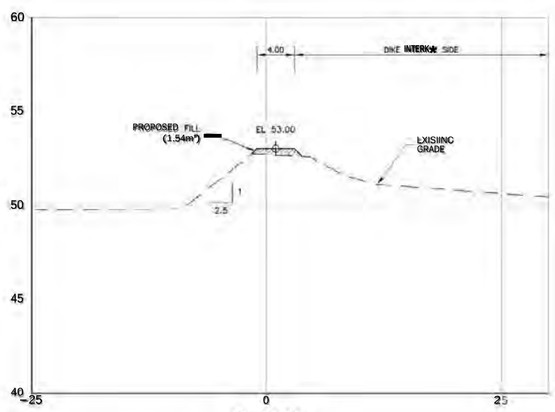
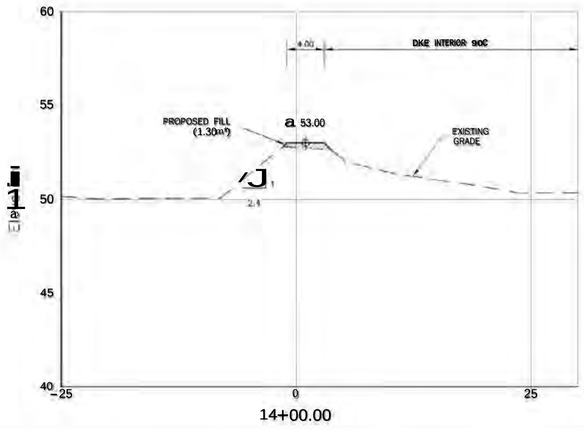


13+00.00



14+00.00

SECTIONS

LEGEND:

EXISTING GRADE

PROPOSED FILL

GRAPHIC SCALE

SCALE: 1=150

GRAPHIC SCALE

SCALE: 1=300

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

TBL VJILVV ENGINEERING-GROUP
742 PROLONCACOR P42, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR
00902-4157 USA

ANCHOR QEA

TEL. 787-723-6005
FAX 787-721-3196
WWW.GLMENGINNERS.COM

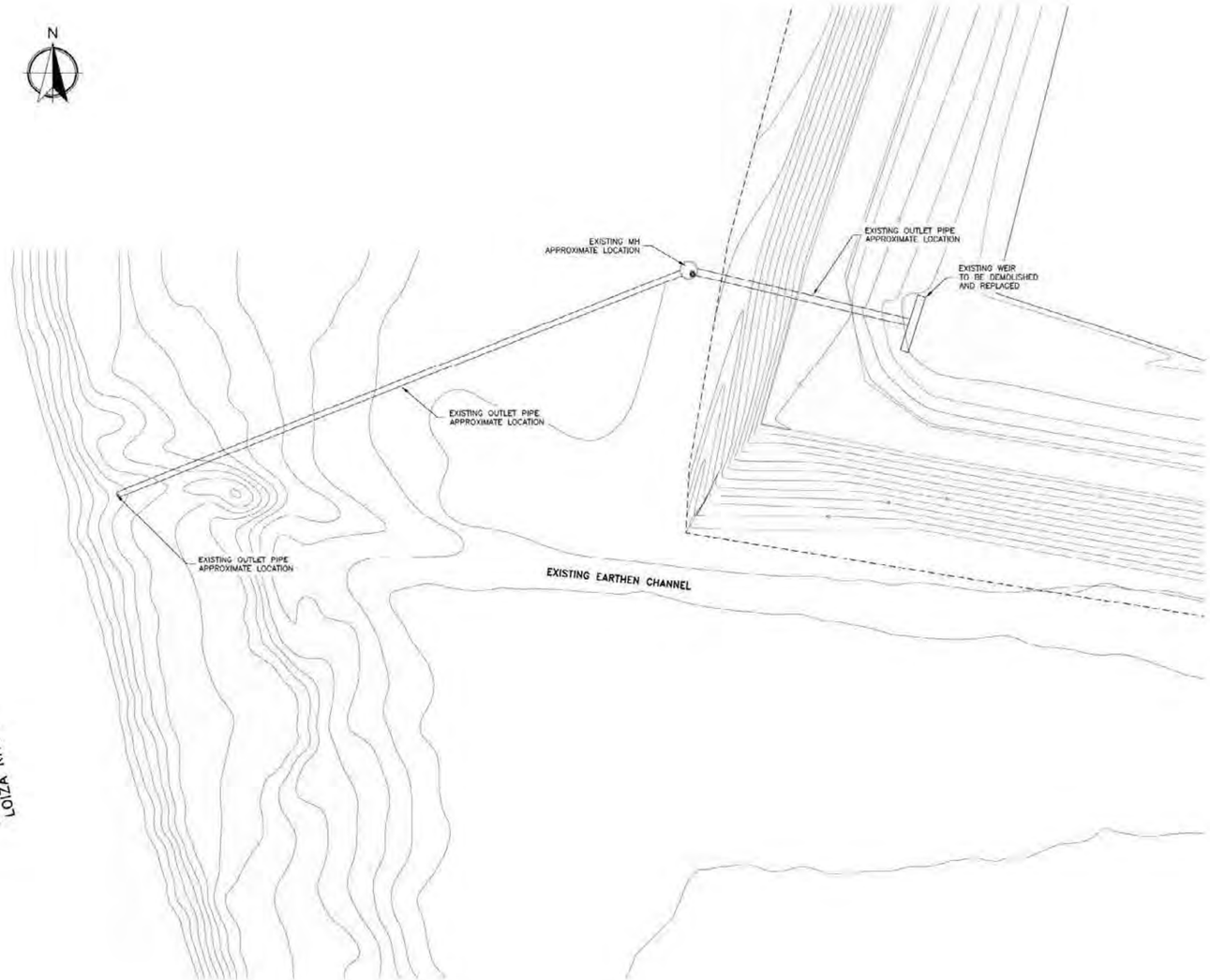
BASIS OF DESIGN FOR LAGO LOIZA
(CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

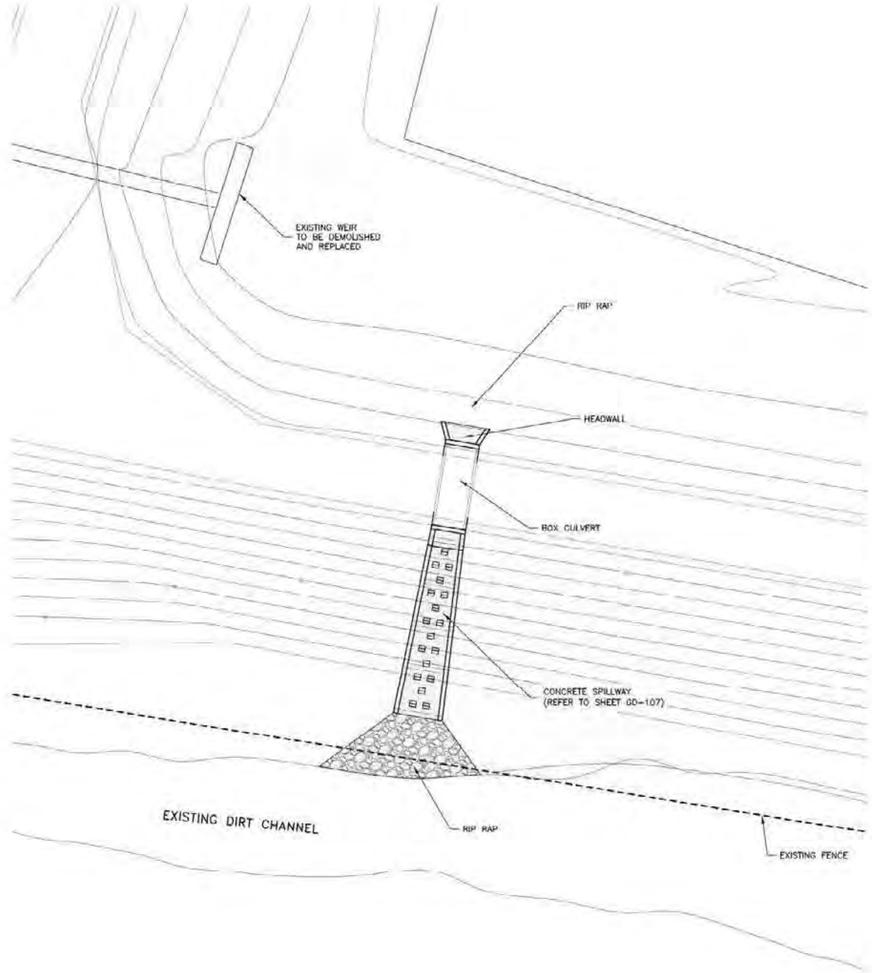
SHEET TITLE:
DISPOSAL AREA A
DIKE A SECTIONS
(2 of 2)

SHEET ID. C-106
SHEET No. 31
PROJ NO. CIP NO 1-01-9000
SCALE AS SHOWN
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2CM
DATE JAN/28/2022



EXISTING OUTFALL STRUCTURE

SCALE: 1=400



PROPOSED LONG TERM
OVERFLOW WEIR AND SPILLWAY

SCALE: 1=200

GRAPHIC SCALE

SCALE: 1=400

GRAPHIC SCALE

SCALE: 1=200

NOTES:

1. SHOWN CONTOURS OUTSIDE DISPOSAL AREA A PERIMETER FENCE ARE FROM THE COMMONWEALTH OF PUERTO RICO QL2 LIDAR FROM 2017.

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
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BASIS OF DESIGN FOR LAGO LOIZA
(CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DISPOSAL AREA A
OUTFALL INFRASTRUCTURE
PLAN

SHEET ID. C-107
SHEET No. 32
PROJ NO. CIP NO 1-01-9000

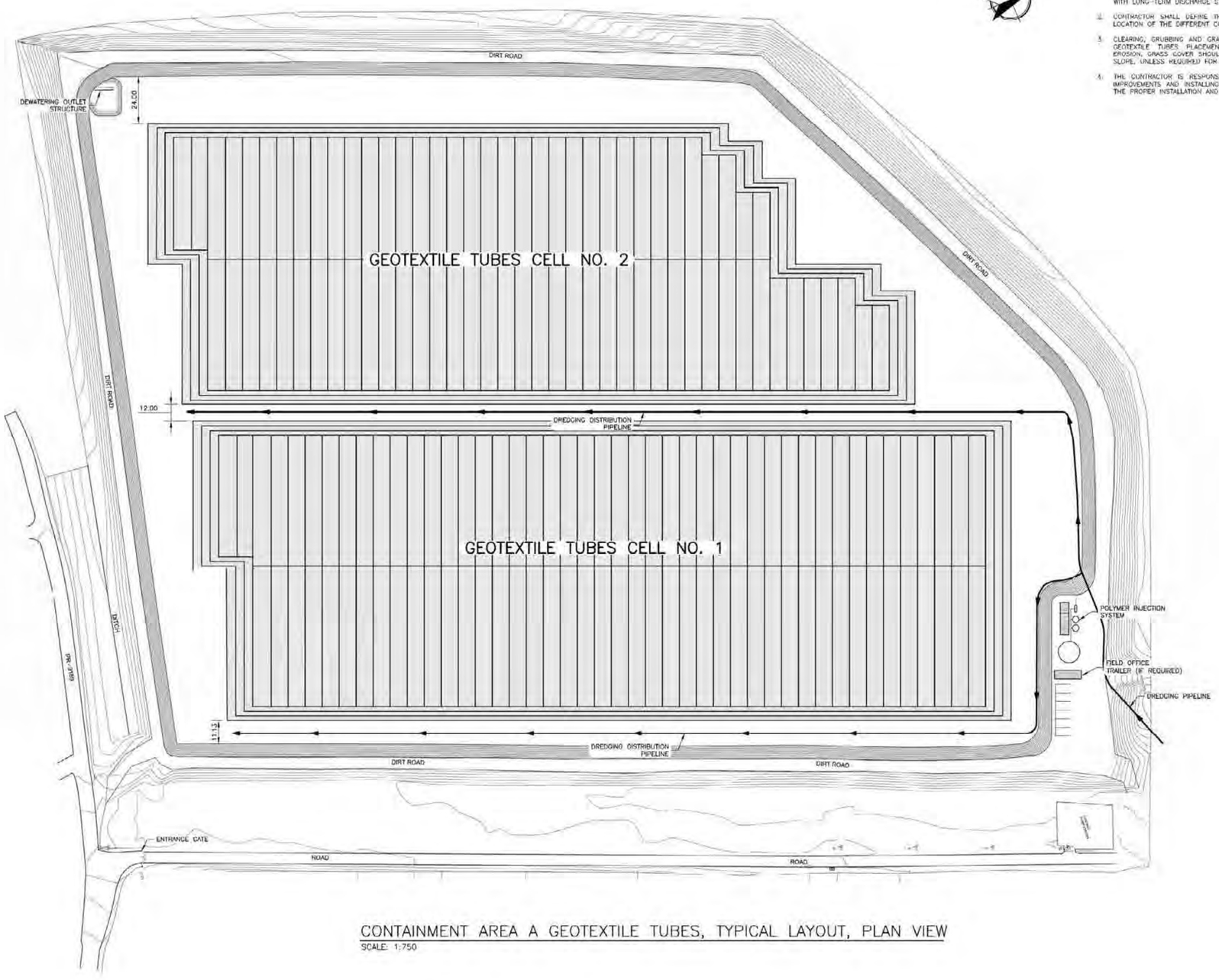
SCALE: AS SHOWN

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY. 0 2CM

DATE: JAN/28/2022

NOTES:

1. DEWATERING OUTLET STRUCTURE MUST BE REHABILITATED OR REPLACED WITH LONG-TERM DISCHARGE STRUCTURE.
2. CONTRACTOR SHALL DEFINE THE MOST APPROPRIATE LAYOUT, AND THE LOCATION OF THE DIFFERENT COMPONENTS REQUIRED BY THE PROJECT.
3. CLEARING, GRUBBING AND GRADING WORKS WILL BE AS REQUIRED FOR GEOTEXTILE TUBES PLACEMENT AND OTHER ACTIVITIES. TO REDUCE EROSION, GRASS COVER SHOULD NOT BE REMOVED FROM DIKE EXTERIOR SLOPE, UNLESS REQUIRED FOR REHABILITATION WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR DESIGNING ANY REQUIRED SOIL IMPROVEMENTS AND INSTALLING ANY DRAINAGE ELEMENTS REQUIRED FOR THE PROPER INSTALLATION AND OPERATION OF THE GEOTEXTILE TUBES.



CONTAINMENT AREA A GEOTEXTILE TUBES, TYPICAL LAYOUT, PLAN VIEW
SCALE: 1:750

GRAPHIC SCALE
10 0 10 20 30
SCALE: 1=750

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
REVISIONS				

GLM ENGINEERING-GROUP
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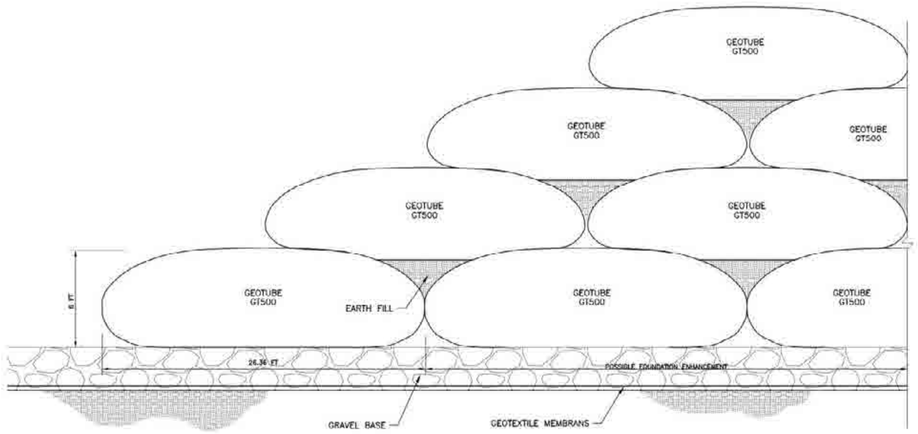
BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DISPOSAL AREA A
GEOTEXTILE TUBES TYPICAL
LAYOUT PLAN VIEW

SHEET ID.	SHEET No.
C-110	33
PROJ NO.	
CIP NO 1-01-9000	
SCALE: N.T.S.	DATE: JAN/28/2022

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY. 0 2CM



GEOTUBES STACKING LAYOUT (SCHEMATIC)
SCALE: N.T.S.

GEOTUBE SUMMARY TABLE (BASED ON TENCATE GEOTUBE® GT500 DEWATERING CONTAINERS)						
LAYER	QUANTITY	LENGTH (FT)	WIDTH (FT)	HEIGHT (FT)	APPROX. VOL (YD^3)	APPROX. VOL (M^3)
1	87	228	26.36	6	91,259	69,762
1	83	214	26.36	6	81,717	62,468
1	2	186	26.36	6	1,711	1,308
1	2	172	26.36	6	1,583	1,210
1	2	130	26.36	6	1,196	914
2	45	228	26.36	6	47,203	36,084
2	82	214	26.36	6	80,733	61,716
2	38	200	26.36	6	34,965	26,729
2	2	172	26.36	6	1,593	1,210
2	2	158	26.36	6	1,454	1,111
2	2	116	26.36	6	1,067	816
3	88	214	26.36	6	86,640	66,231
3	66	200	26.36	6	60,729	46,424
3	7	186	26.36	6	5,990	4,579
3	2	172	26.36	6	1,583	1,210
3	2	144	26.36	6	1,325	1,013
3	2	116	26.36	6	1,067	816
4	43	214	26.36	6	42,336	32,363
4	76	200	26.36	6	69,930	53,458
4	31	189	26.36	6	26,955	20,606
4	7	172	26.36	6	5,539	4,234
4	2	158	26.36	6	1,454	1,111
4	2	130	26.36	6	1,196	914
4	2	102	26.36	6	939	717
	590				410,547	497,007

NOTES:

1. CONTRACTOR SHALL ESTABLISH THE MOST APPROPRIATE GEOTEXTILE TUBE LAYOUT, AND DEFINE THE AMOUNT OF MATERIAL TO DISPOSE IN DISPOSAL AREA A.
2. EARTH FILL BETWEEN THE TUBES VOIDS IS INCLUDED AS PER GEOTEXTILE TUBE MANUFACTURER RECOMMENDATIONS.
3. QUANTITIES AND VOLUMES PRESENTED ARE APPROXIMATE, CONTRACTOR SHALL MAKE THEIR OWN CALCULATIONS TO DEFINE THE SEDIMENT DISPOSAL DISTRIBUTION BETWEEN AREAS.
4. GEOTEXTILE TUBES LAYOUT HAS BEEN DEFINED BASED ON TENCATE GT500 DEWATERING GEOTEXTILE TUBE CONTAINERS WITH A CIRCUMFERENCE OF 60 FT.
5. FOUNDATION ENHANCEMENT SHOULD BE ANTICIPATED BENEATH GEOTEXTILE TUBES. CONTRACTOR SHALL BE RESPONSIBLE FOR FOUNDATION ENHANCEMENT DESIGN AND CONSTRUCTION.
6. THE CONTRACTOR IS RESPONSIBLE FOR DESIGNING ANY REQUIRED SOIL IMPROVEMENTS AND INSTALLING ANY DRAINAGE ELEMENTS REQUIRED FOR THE PROPER INSTALLATION AND OPERATION OF THE GEOTEXTILE TUBES.



DISPOSAL AREA A AERIAL IMAGE
SCALE: N.T.S.



DISPOSAL AREA A INTERIOR PHOTO (JUNE, 2021)
SCALE: N.T.S.

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
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WWW.GLMENGINNERS.COM

ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DISPOSAL AREA A
GEOTEXTILE TUBE
LAYOUT GENERAL DETAILS

SHEET ID. C-111
SHEET No. 34
PROJ NO. CIP NO 1-01-9000
SCALE N.T.S.
BAR IS TWO CM ON ORIGINAL DRAWING IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM
DATE JAN/28/2022



VIEW LOOKING EAST

SCALE: N.T.S.



VIEW LOOKING WEST

SCALE: N.T.S.

NOTES:

1. PHOTO COLLECTED USING DJI MAVIC PRO 2 ON DECEMBER 2, 2021.

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
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ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA
(CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

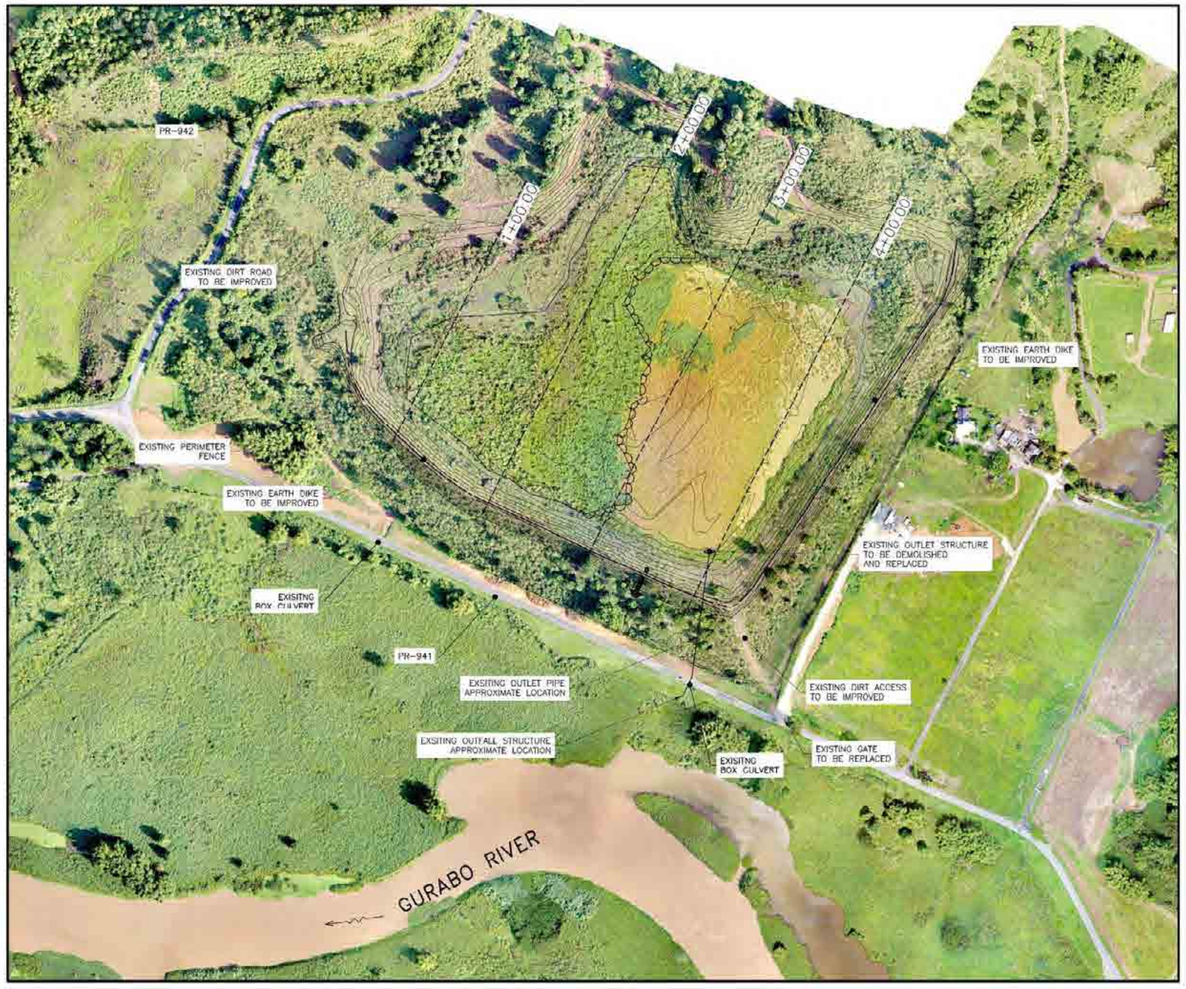
Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DISPOSAL AREA B
PONARAMIC PHOTOS

SHEET ID. C-200
SHEET No. 35
PROJ NO. CIP NO 1-01-9000
SCALE N.T.S.
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM
DATE JAN/28/2022

NOTES:

1. DISTANCE, STATIONS AND ELEVATIONS ARE IN METERS.
2. THE TOPOGRAPHIC SURVEY DATA DEPICTED ON THE MAP WAS OBTAINED DURING THE PERIOD OF MAY 26, 2021 AND JUNE 25, 2021.
3. PLANE COORDINATES ARE BASED ON THE LAMBERT PROJECTION FOR PUERTO RICO AND THE US VIRGIN ISLAND AND REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83 2011) EPOCH 2010.00 ADJUSTMENT IN METERS.
4.
5. ELEVATION ARE ORTHOMETRICS, IN METERS AND REFERENCED TO THE PUERTO RICO VERTICAL DATUM 2002, (PRVD2002) GEOID 2018
6. THIS TOPOGRAPHIC SURVEY WAS PERFORMED USING VIRTUAL REFERENCE NETWORK (vrs) TO OBTAIN REAL TIME KINEMATIC (RTK) SOLUTIONS, AND WERE VERIFIED EVERY DAY FOR HORIZONTAL AND VERTICAL POSITIONING IN NGS CONTROL POINT A1016 (DO1105) AND Z1015 (DO1104).
7. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE COMPLETE RESULTS OF LAND SURVEYORS MADE ON THE AFOREMENTIONED DATES AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS AT THE TIME THE SURVEY WERE CONDUCTED.
8. DESIGN TOP OF DIKE ELEVATION IS 61.0M



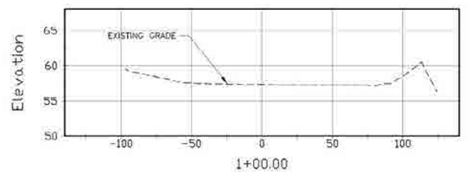
PLAN
SCALE: 1=2500

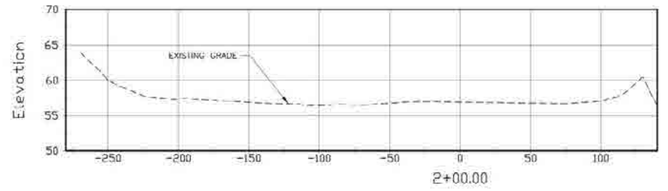
N

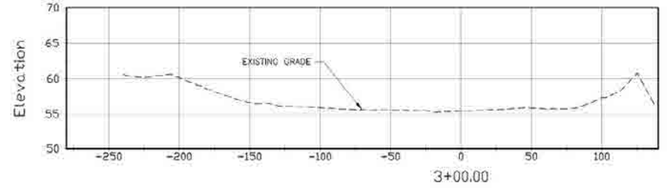
GRAPHIC SCALE
SCALE: 1=200

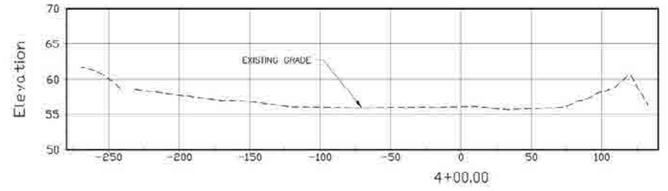
GRAPHIC SCALE
SCALE: 1=2000

GRAPHIC SCALE
SCALE: 1=2,500









SECTIONS
HOR SCALE: 1=2000
VER SCALE: 1=200

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR
00902-4157 USA
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ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DISPOSAL AREA B
EXISTING CONFIGURATION
PLAN AND SECTIONS

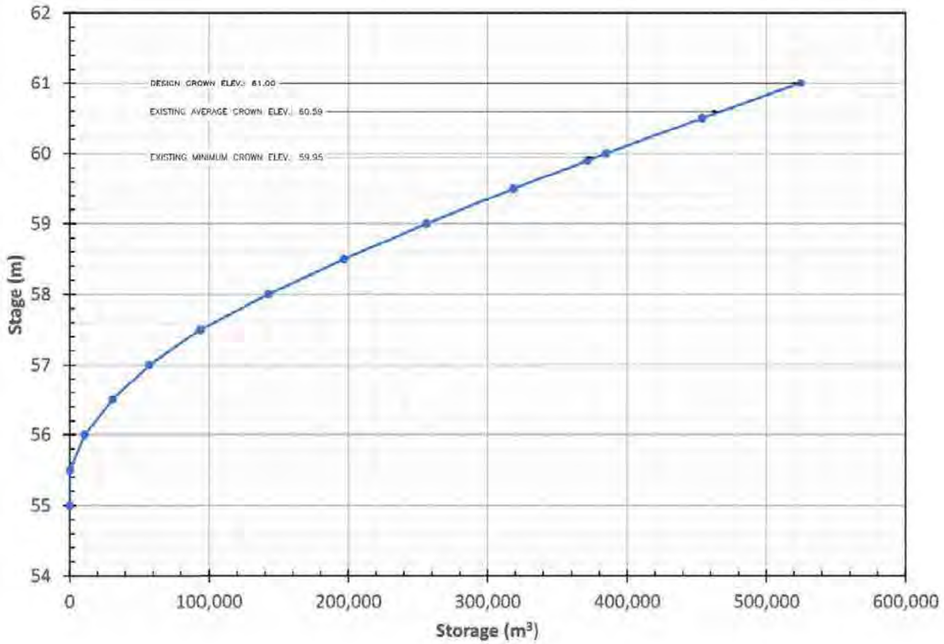
SHEET ID.	SHEET No.
C-201	36

PROJ NO.
CIP NO 1-01-9000

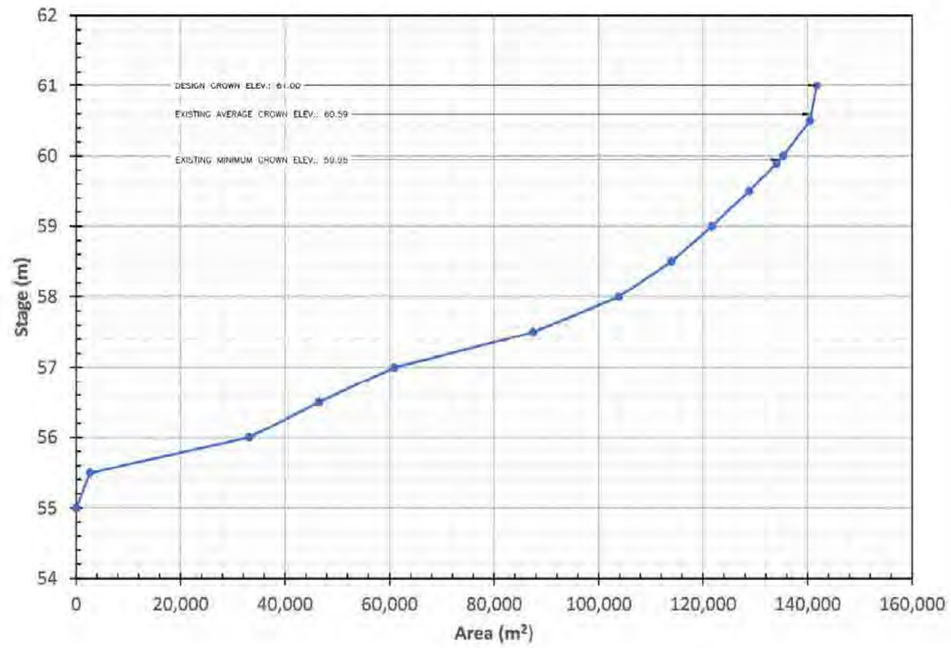
SCALE
AS SHOWN

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2CM

DATE
JAN/28/2022



DISPOSAL AREA B
STAGE–STORAGE
SCALE: N.T.S.



DISPOSAL AREA B
STAGE–AREA
SCALE: N.T.S.

DIKE B, TABLE OF STAGE
VOLUME AND AREA.

STORAGE (m)	VOLUME (m^3)	AREA (m^2)
55.0	0.000	0.000
55.5	178.000	2,637
56.0	10,721	33,128
56.5	30,791	46,541
57.0	57,389	60,885
57.5	93,893	87,547
58	142,482	103,855
58.5	197,097	113,977
59	256,083	121,749
59.5	318,702	128,732
59.9 — EXISTING MINIMUM CROWN ELEV.: 59.95	371,531	134,042
60.0	384,738	135,278
60.5 — EXISTING AVERAGE CROWN ELEV.: 60.59	453,823	140,412
61.0 — DESIGN CROWN ELEV.: 61.00	524,852	141,722

NOTES:

1. DISTANCE, STATIONS AND ELEVATIONS ARE IN METERS.
2. STAGE STORAGE DATA HAS BEEN DEFINED FROM TOPOGRAPHIC SURVEY.
3. TOP OF THE DIKE DESIGN CROWN ELEVATION IS PER DREDGING DESIGN.

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
	REVISIONS			

GLM ENGINEERING-GROUP
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WWW.GLMENGINNERS.COM

BASIS OF DESIGN FOR LAGO LOIZA
(CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DISPOSAL AREA B
STAGE STORAGE
AND AREA

SHEET ID. C-202
SHEET No. 37
PROJ NO. CIP NO 1-01-9000
SCALE N.T.S.
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM
DATE JAN/28/2022



INTERIOR VIEW (EAST SIDE)



INTERIOR VIEW (EAST SIDE)



INTERIOR VIEW (WEST SIDE)



INTERIOR VIEW (CENTER)



PANORAMA INTERIOR VIEW (LOOKING NW SHOWING OUTLET STRUCTURE)

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
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BASIS OF DESIGN FOR LAGO LOIZA
(CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DISPOSAL AREA B
PHOTOS

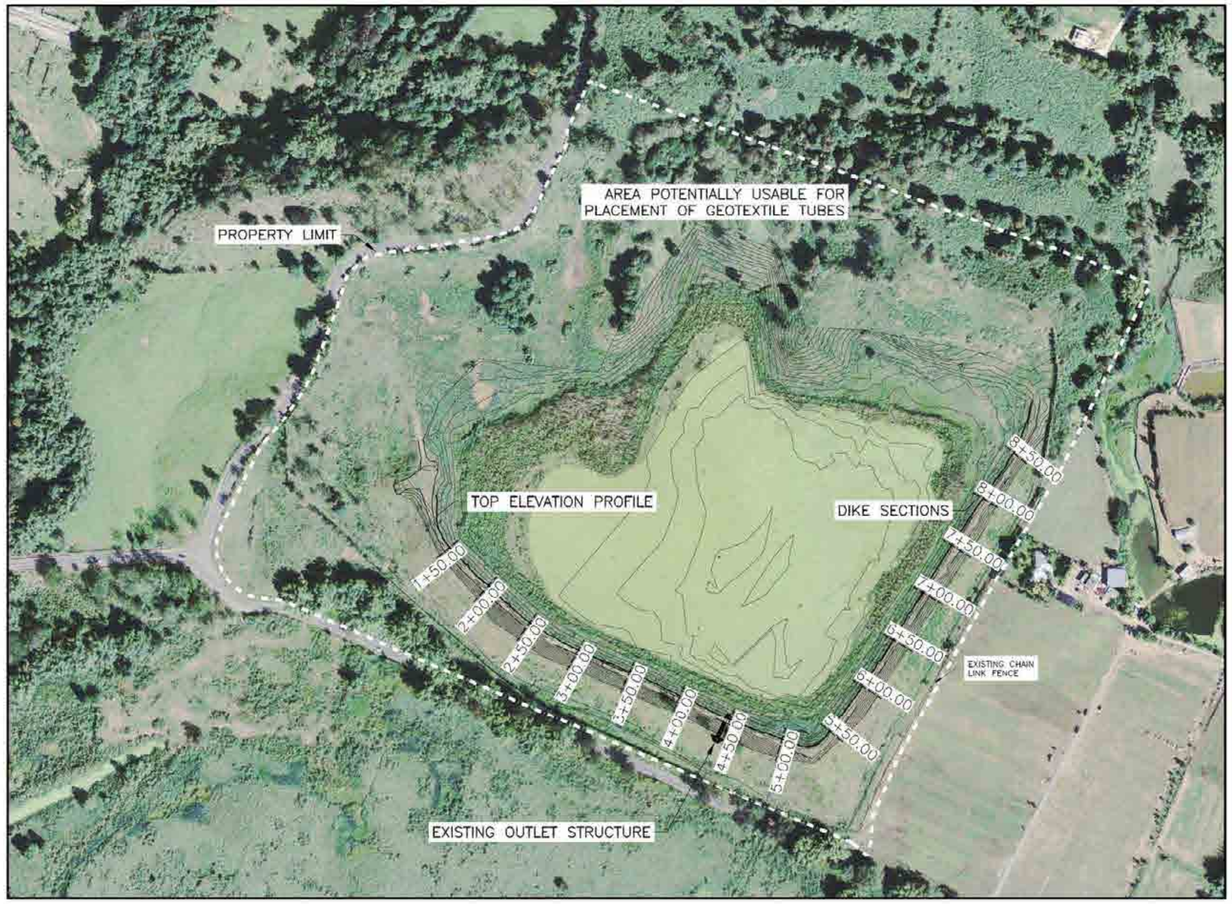
SHEET ID.	SHEET No.
C-203	38

PROJ NO.
CIP NO 1-01-9000

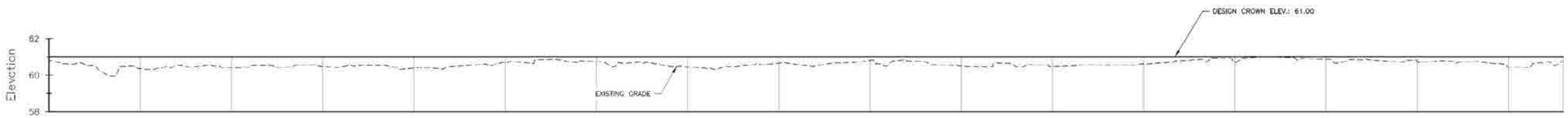
SCALE
N.T.S

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2CM

DATE
JAN/28/2022



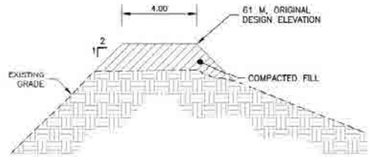
DIKE B PLAN
SCALE: 1:2500



	0+50	1+00	1+50	2+00	2+50	3+00	3+50	4+00	4+50	5+00	5+50	6+00	6+50	7+00	7+50	8+00	8+30
EXISTING GROUND	60.35	60.42	60.48	60.59	60.73	60.74	60.45	60.35	60.30	60.50	60.47	60.39	60.70	60.36	60.72	60.62	60.77
PROPOSED ELEV	61.00	61.00	61.00	61.00	61.00	61.00	61.00	61.00	61.00	61.00	61.00	61.00	61.00	61.00	61.00	61.00	61.00
STATION																	

DIKE B TOP ELEVATION PROFILE
HOR SCALE: 1=1250
VER SCALE: 1=125





DIKE REPAIR TYPICAL SECTION (AS REQUIRED)
NTS

NOTES:

1. DISTANCE, STATIONS, AND ELEVATIONS ARE IN METERS.
2. RAISING THE DIKES UP TO THE DESIGN LEVEL OF 61m WILL INCREASE THE STORAGE. CONTRACTOR SHALL DEFINE IF RAISING THE DIKE ELEVATION TO THE DESIGN LEVEL IS REQUIRED UNDER THE PROPOSED PROJECT CONFIGURATION.
3. FILL MATERIAL SHALL BE A-2-4 COMPACTED TO 95% PROCTOR TEST OR BETTER.

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
REVISIONS				

GLM ENGINEERING-GROUP
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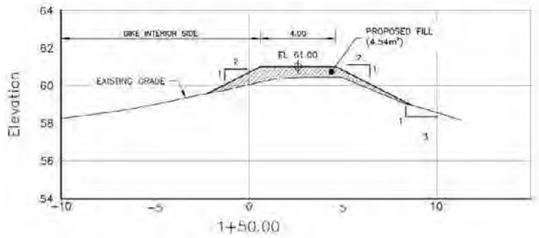
ANCHOR QEA

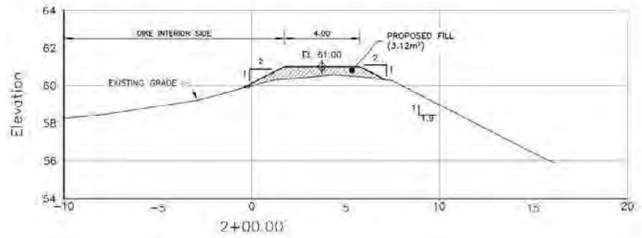
BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

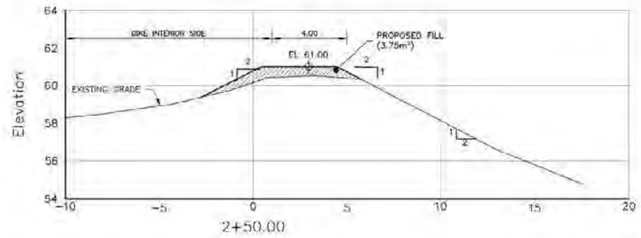
Autoridad de Acueductos y Alcantarillados

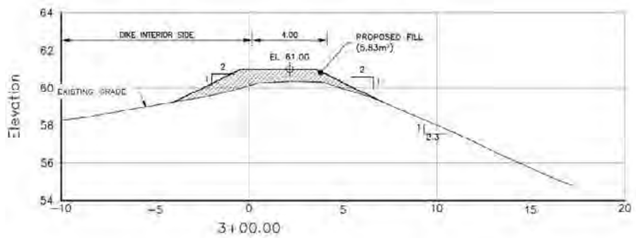
SHEET TITLE:
DISPOSAL AREA B
EXISTING CONDITION PLAN, PROFILE AND TYPICAL SECTION

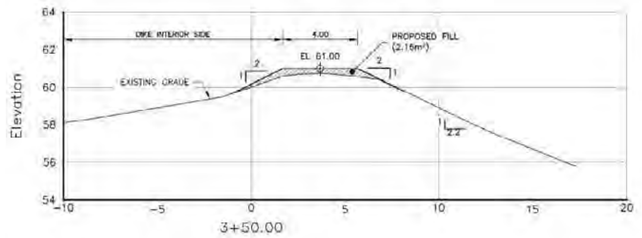
SHEET ID. C-204
SHEET No. 39
PROJ NO. CIP NO 1-01-9000
SCALE AS SHOWN
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM
DATE JAN/28/2022

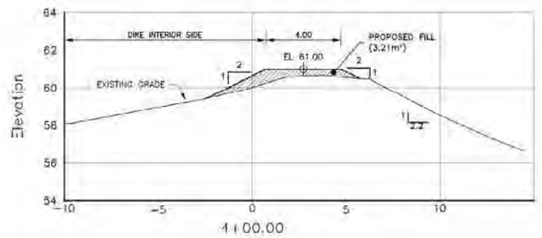


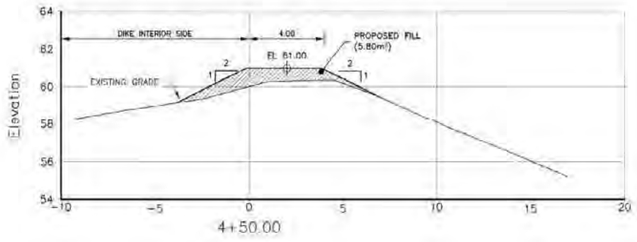


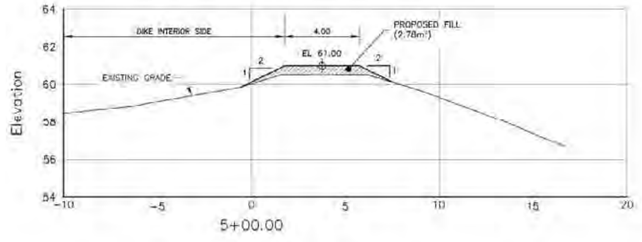


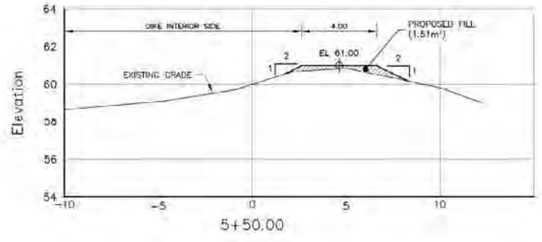












SECTIONS
SCALE 1:150

NOTES:

1. DISTANCE, STATIONS, AND ELEVATIONS ARE IN METERS.
2. RAISING THE DIKES UP TO THE DESIGN LEVEL OF 61m WILL INCREASE THE STORAGE. CONTRACTOR SHALL DEFINE IF RAISING THE DIKE ELEVATION TO THE DESIGN LEVEL IS REQUIRED UNDER THE PROPOSED PROJECT CONFIGURATION.

LEGEND:

EXISTING GRADE

PROPOSED FILL

GRAPHIC SCALE
SCALE 1=150

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
	REVISIONS			

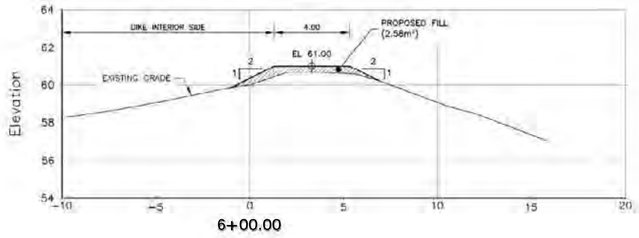
GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR
00902-4157 USA
TEL. 787-723-8005
FAX. 787-721-3156
WWW.GLMENGINNERS.COM

ANCHOR QEA

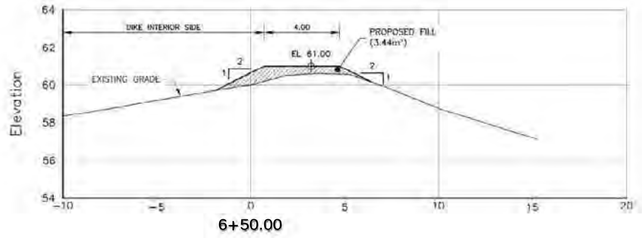
BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:	DISPOSAL AREA B DIKE SECTIONS (1 OF 2)
SHEET ID.	C-205
SHEET No.	40
PROJ NO.	CIP NO 1-01-9000
SCALE	1:100
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY	0 2CM
DATE	JAN/28/2022



6+00.00



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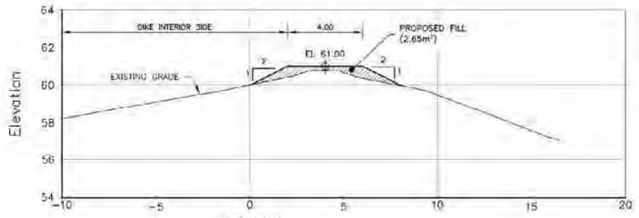
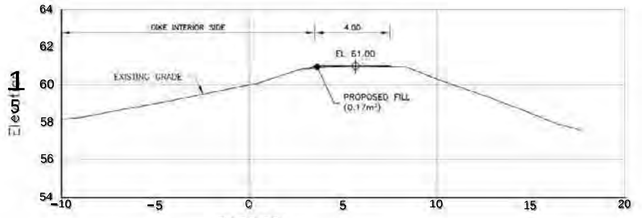
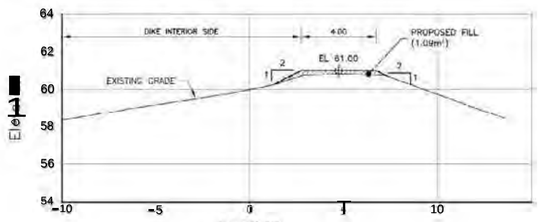


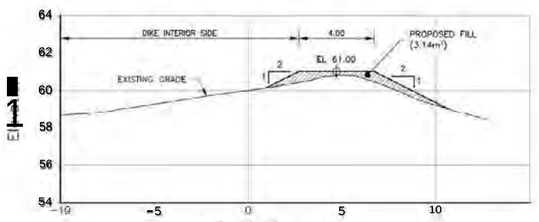
7+00.00



7+50.00



8+00.00



8+50.00

SECTIONS

SCALE 1:150

NOTES:

1. DISTANCE, STATIONS, AND ELEVATIONS ARE IN METERS.
2. RAISING THE DIKES UP TO THE DESIGN LEVEL OF 61m WILL INCREASE THE STORAGE. CONTRACTOR SHALL DEFINE IF RAISING THE DIKE ELEVATION TO THE DESIGN LEVEL IS REQUIRED UNDER THE PROPOSED PROJECT CONFIGURATION.

LEGEND:

EXISTING GRADE

PROPOSED FILL

GRAPHIC SCALE

SCALE: 1:150

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

Tak VJILVV ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR 00902-4157 USA

ANCHOR QEA

TEL. 787-723-6005
FAX 787-721-3196
WWW.GLMENGINNERS.COM

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: DISPOSAL AREA B DIKE SECTIONS (2 OF 2)

SHEET ID.	SHEET No.
C-206	41

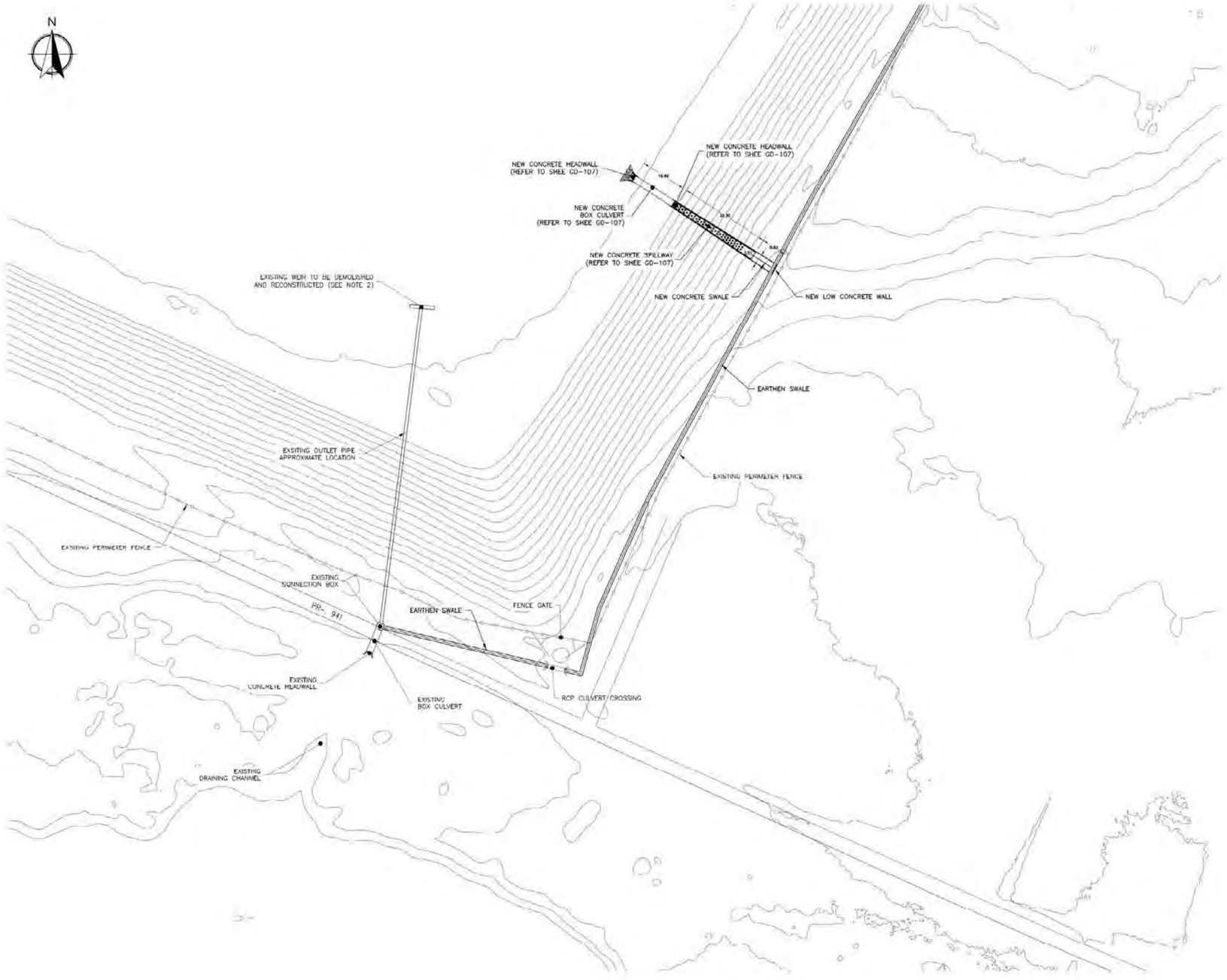
PROJ NO. CIP NO 1-01-9000

SCALE 1:100

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY

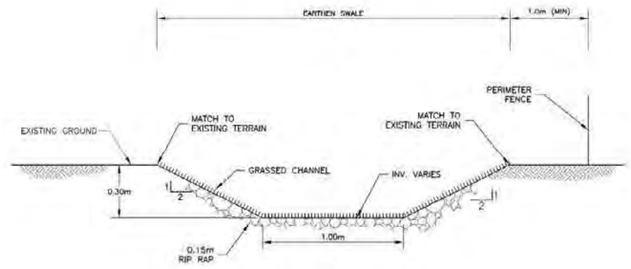
0 2CM

DATE JAN/28/2022



OUTFALL ARRANGEMENT

SCALE: 1=750



TYPICAL EARTH SWALE DETAIL

NTS

NOTES:

1. SHOWN CONTOURS ARE FROM THE COMON WELTH OF PUERTO RICO QL2 LIDAR FROM 2017.
2. RECONSTRUCTED WEIR STRUCTURE SHALL FOLLOW USACE GUIDELINES PRESENTED IN ERDC/TN DOTS-14-01, AUGUST, 2014. THE STRUCTURE SHALL BE PERMANENT WITH THE OPTION FOR FUTURE USE.

GRAPHIC SCALE

0 10 20 25

SCALE: 1=750

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
REVISIONS				

GLM ENGINEERING-GROUP
743 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR 00902-4157 USA
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ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:

DISPOSAL AREA B
OUTFALL INFRASTRUCTURE PLAN

SHEET ID. C-207

SHEET No. 42

PROJ NO. CIP NO 1-01-9000

SCALE AS SHOWN

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET ADJUST SCALES ACCORDINGLY 0 2CM

DATE JAN/28/2022



VIEW LOOKING EAST
SCALE: N.T.S.



VIEW LOOKING WEST
SCALE: N.T.S.



VIEW LOOKING SOUTH
SCALE: N.T.S.



VIEW LOOKING SOUTHWEST
SCALE: N.T.S.

NOTES:

1. PHOTO COLLECTED USING DJI MAVIC PRO 2 ON NOVEMBER, 2021.

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
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ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA
(CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

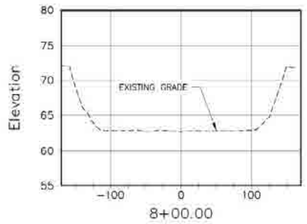
SHEET TITLE:
DISPOSAL AREA C
PONARAMIC PHOTOS

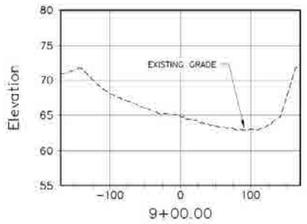
SHEET ID. C-300
SHEET No. 43
PROJ NO. CIP NO 1-01-9000
SCALE N.T.S.
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM
DATE JAN/28/2022

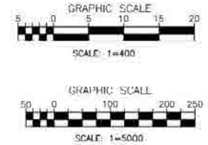


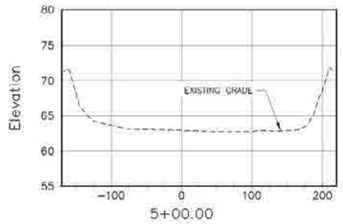
PLAN

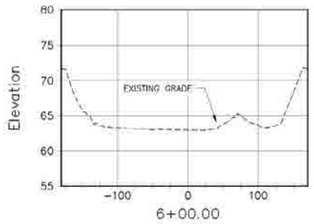
SCALE: 1=4000

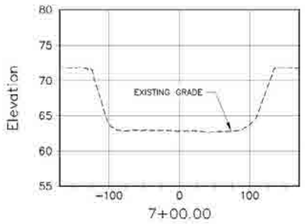


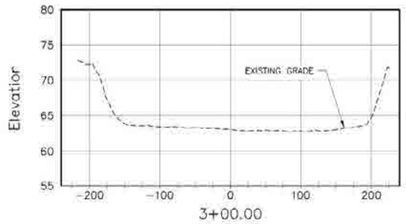


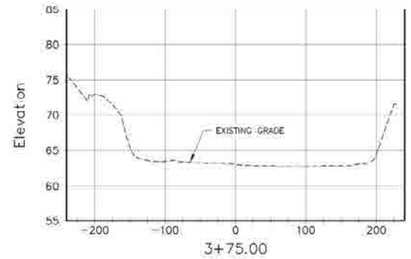


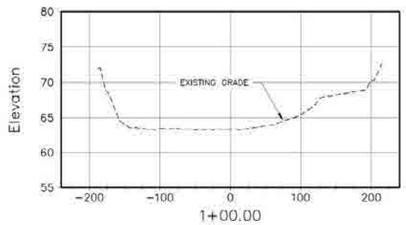


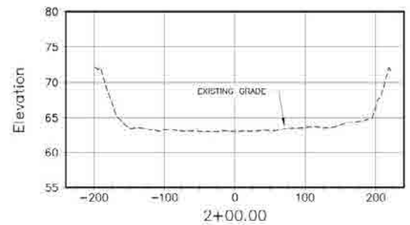












SECTIONS

HOR SCALE: 1=4000
VER SCALE: 1=400

NOTES:

1. DISTANCE, STATIONS AND ELEVATIONS ARE IN METERS.
2. THE TOPOGRAPHIC SURVEY DATA DEPICTED ON THE MAP WAS OBTAINED DURING THE PERIOD OF MAY 26, 2021 AND JUNE 25, 2021.
3. PLANE COORDINATES ARE BASED ON THE LAMBERT PROJECTION FOR PUERTO RICO AND THE US VIRGIN ISLAND AND REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83 2011) EPOCH 2010.00 ADJUSTMENT IN METERS.
4. ELEVATION ARE ORTHOMETRICS, IN METERS AND REFERENCED TO THE PUERTO RICO VERTICAL DATUM 2002, (PRVD2002) GEOID 2018.
5. THIS TOPOGRAPHIC SURVEY WAS PERFORMED USING VIRTUAL REFERENCE NETWORK (vrs) TO OBTAIN REAL TIME KINEMATIC (RTK) SOLUTIONS, AND WERE VERIFIED EVERY DAY FOR HORIZONTAL AND VERTICAL POSITIONING IN NGS CONTROL POINT A1016 (DO1105) AND Z1015 (DO1104).
6. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE COMPLETE RESULTS OF LAND SURVEYORS MADE ON THE AFOREMENTIONED DATES AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS AT THE TIME THE SURVEY WERE CONDUCTED.
7. DESIGN TOP OF DIKE ELEVATION WAS 72M.

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR
00902-4157 USA
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FAX 787-721-3190
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ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DISPOSAL AREA C
EXISTING CONFIGURATION
PLAN AND SECTIONS

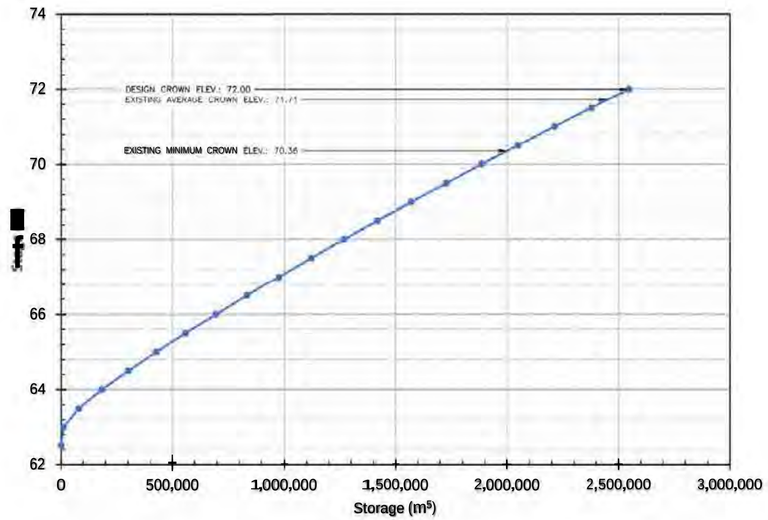
SHEET ID.	SHEET No.
C-301	44

PROJ NO.
CIP NO 1-01-9000

SCALE
AS SHOWN

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY. 0 2CM

DATE
JAN/28/2022

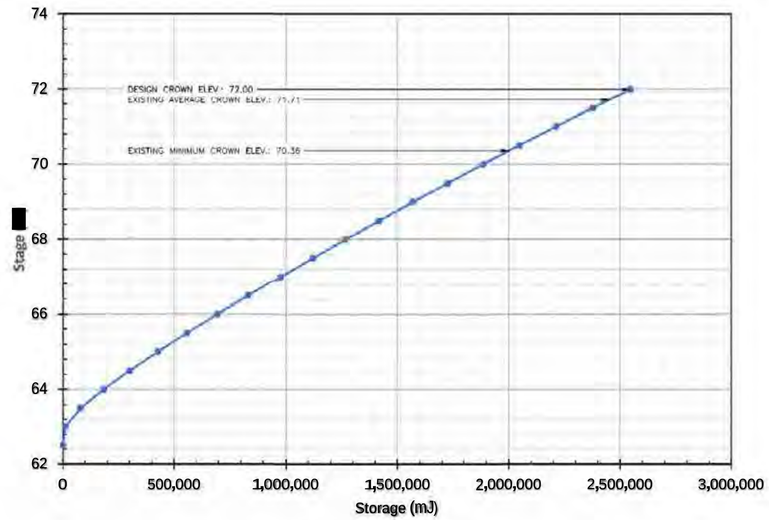


DISPOSAL AREA C
STACE STORACE
SCALE: N.T.S.

DIKE C, TABLE OF STAGE VOLUME AND AREA.

STORAGE (m)	VOLUME (m³)	AREA (m²)
62.5	0.000	0.000
63.0	10,934	68,161
63.5	78,799	187,111
64.0	183,668	224,685
64.5	301,039	244,200
65.0	426,953	258,306
65.5	558,638	268,056
66.0	694,615	275,494
68.5	833,883	281,412
67.0	975,949	286,804
67.5	1,120,610	291,788
68.0	1,267,672	296,407
68.5	1,417,199	302,186
69.0	1,570,048	309.323
69.5	1,726,361	316,005
70.0	1,003,994	322,602
70.5	2,048,482	326,971
71.0	2,212,009	330,467
71.5	2,379,086	334.609
72.0	2,546,775	334,392

EXISTING MINIMUM CROWN ELEV.: 70.36
EXISTING AVERAGE CROWN ELEV.: 71.71
DESIGN CROWN ELEV.: 72.00



DISPOSAL AREA C
STACE AREA
SCALE: N.T.S.

NOTES:

1. DIGTANCC, STATIONS AND CLCVATIONS ARC IN MCTCRS.
2. STAGE STORAGE DATA HAS BEEN DEFINED FROM TOPOGRAPHIC SURVEY.

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

ULMI ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR
00902-4157 USA

ANCHOR QEA
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WWW.GLMENGINNERS.COM

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: DISPOSAL AREA C STAGE STORAGE AND AREA

SHEET ID.	SHEET No.
C-302	45

PROJ NO. CIP NO 1-01-9000

SCALE: N.T.S.

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY. 0 2CM

DATE: JAN/28/2022



DIKE VIEW



DIKE VIEW



INTERIOR VIEW



INTERIOR VIEW



PANORAMA INTERIOR VIEW

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR
00902-4157 USA

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BASIS OF DESIGN FOR LAGO LOIZA
(CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DISPOSAL AREA C
PHOTOS

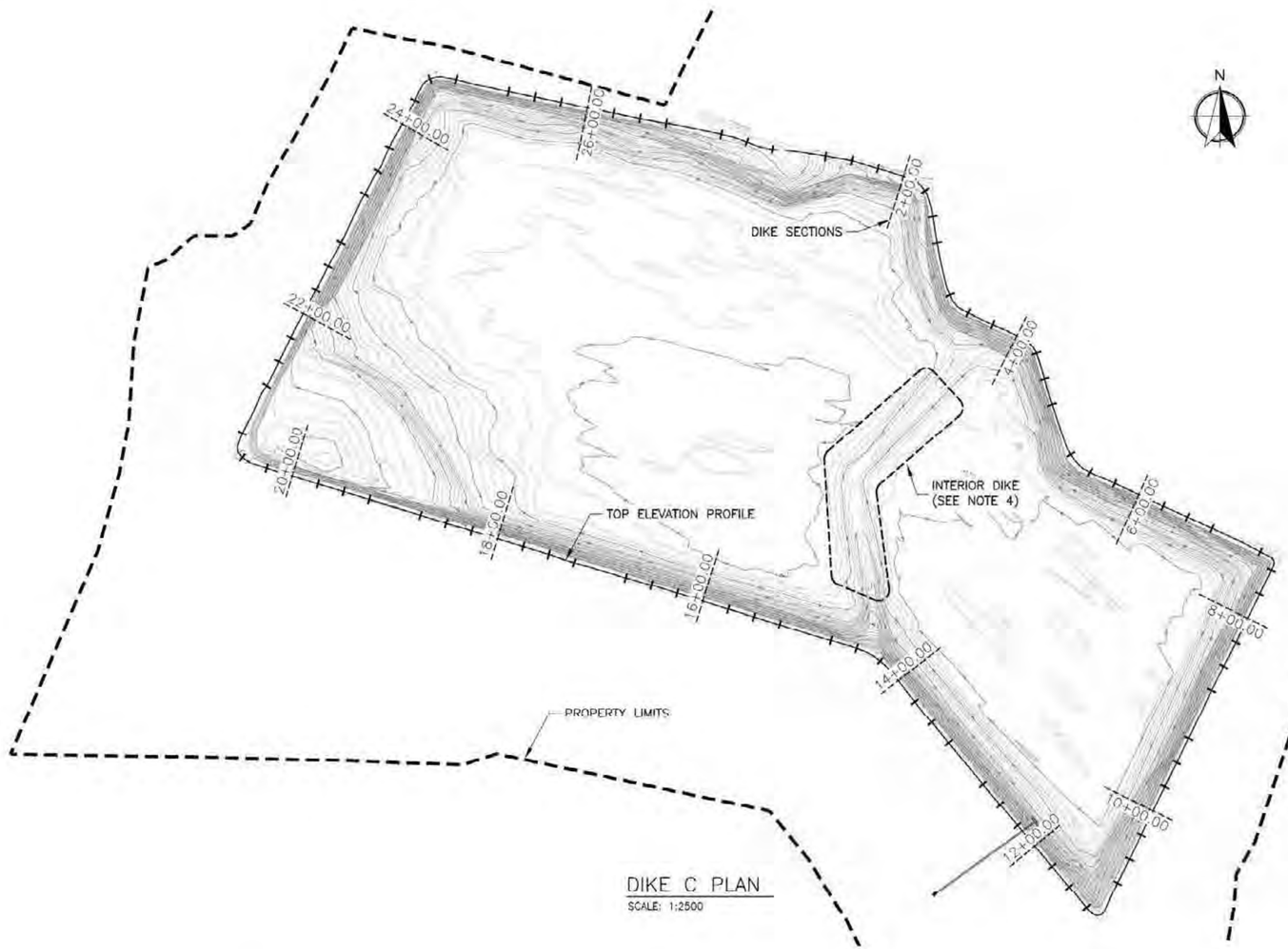
SHEET ID.	SHEET No.
C-303	46

PROJ NO.
CIP NO 1-01-9000

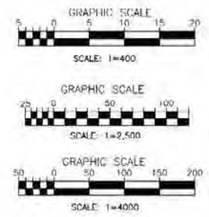
SCALE
N.T.S

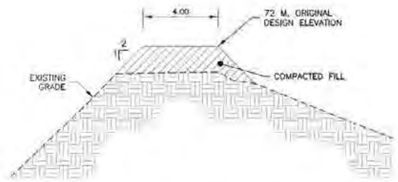
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET ADJUST SCALES ACCORDINGLY
0 2CM

DATE
JAN/28/2022



DIKE C PLAN
SCALE: 1:2500

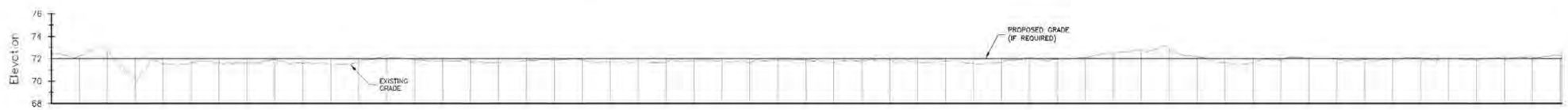




DIKE IMPROVEMENTS TYPICAL SECTION (AS REQUIRED)
NTS

NOTES:

1. DISTANCE, STATIONS, AND ELEVATIONS ARE IN METERS.
2. RAISING THE DIKES UP TO THE DESIGN LEVEL OF 72m WILL INCREASE THE STORAGE. CONTRACTOR SHALL DEFINE IF RAISING THE DIKE ELEVATION TO THE DESIGN LEVEL IS REQUIRED UNDER THE PROPOSED PROJECT CONFIGURATION.
3. FILL MATERIAL SHALL BE A-2-4 COMPACTED TO 95% PROCTOR TEST OR BETTER.
4. INTERIOR DIKE MATERIAL MAY BE USED AS BORROW AREA.



STATION	PROPOSED ELEV	EXISTING GROUND
0+50	72.00	76.23
1+00	72.00	77.02
1+50	72.00	76.01
2+00	72.00	74.43
2+50	72.00	71.80
3+00	72.00	71.63
3+50	72.00	71.68
4+00	72.00	71.93
4+50	72.00	71.94
5+00	72.00	71.83
5+50	72.00	71.80
6+00	72.00	71.96
6+50	72.00	71.91
7+00	72.00	71.86
7+50	72.00	71.73
8+00	72.00	71.70
8+50	72.00	71.63
9+00	72.00	71.68
9+50	72.00	71.83
10+00	72.00	71.81
10+50	72.00	71.76
11+00	72.00	71.72
11+50	72.00	71.83
12+00	72.00	71.94
12+50	72.00	71.91
13+00	72.00	71.91
13+50	72.00	71.85
14+00	72.00	71.82
14+50	72.00	71.83
15+00	72.00	71.91
15+50	72.00	71.84
16+00	72.00	71.80
16+50	72.00	71.72
17+00	72.00	71.71
17+50	72.00	72.04
18+00	72.00	71.93
18+50	72.00	72.13
19+00	72.00	72.43
19+50	72.00	72.77
20+00	72.00	72.82
20+50	72.00	72.21
21+00	72.00	71.62
21+50	72.00	71.65
22+00	72.00	71.86
22+50	72.00	72.07
23+00	72.00	72.08
23+50	72.00	71.92
24+00	72.00	72.01
24+50	72.00	72.03
25+00	72.00	72.04
25+50	72.00	71.88
26+00	72.00	72.02
26+50	72.00	72.05
27+00	72.00	72.32

DIKE C TOP ELEVATION PROFILE
SCALE H: 1=4000
SCALE V. 1=400

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
	REVISIONS			

GLM ENGINEERING-GROUP
749 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR
00902-4157 USA
TEL. 787-723-8005
FAX 787-721-3190
WWW.GLMENGINNERS.COM

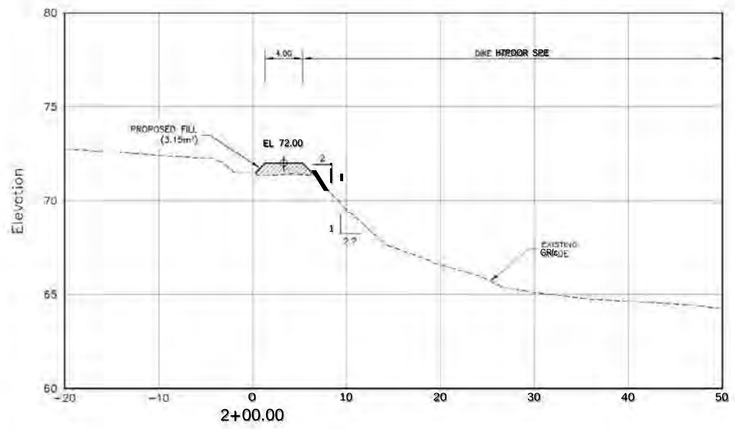
ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

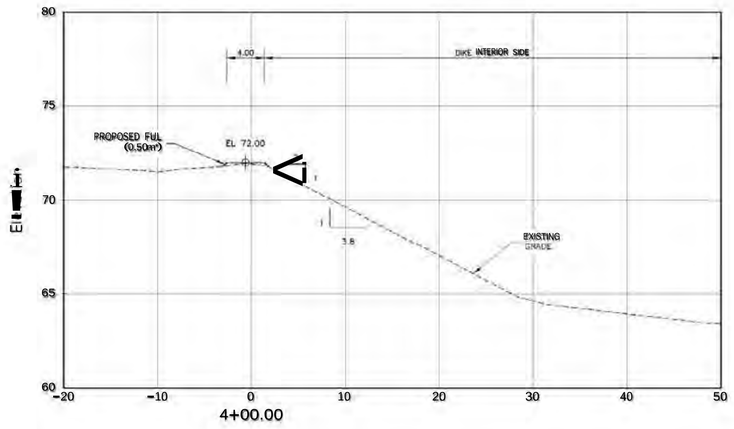
Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
DISPOSAL AREA C
PLAN AND PROFILE

SHEET ID. C-304
SHEET No. 47
PROJ NO. CIP NO 1-01-9000
SCALE 1:2000
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY. 0 2CM
DATE JAN/28/2022



2+00.00



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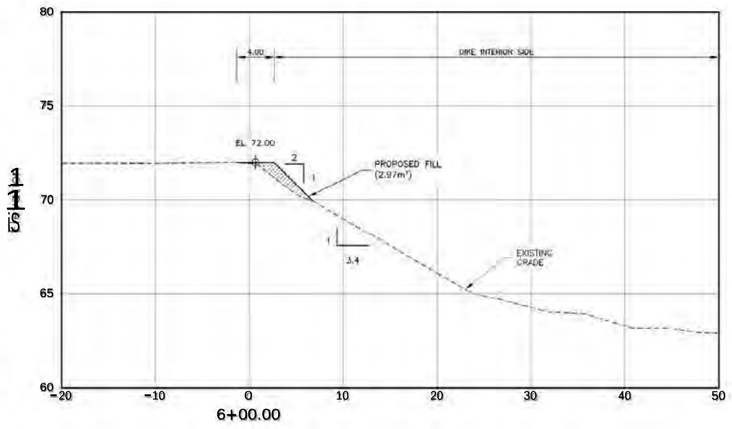

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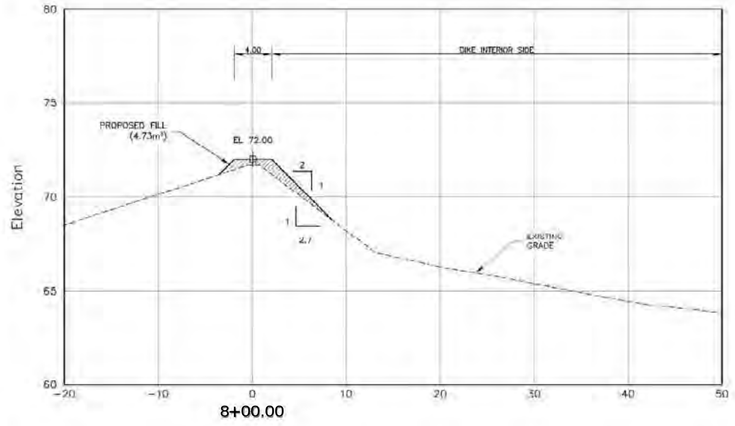

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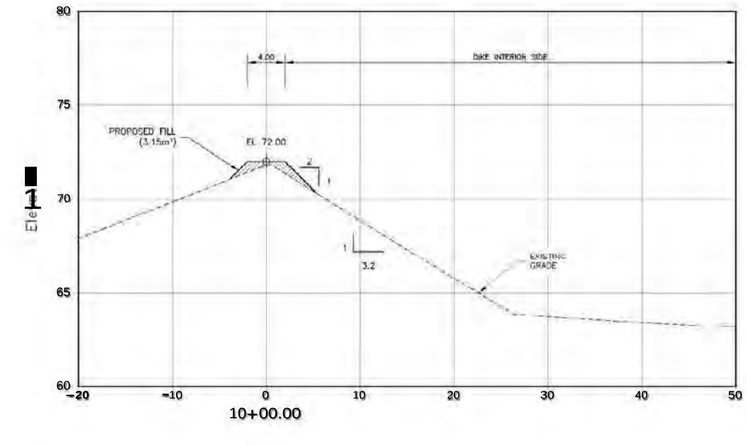
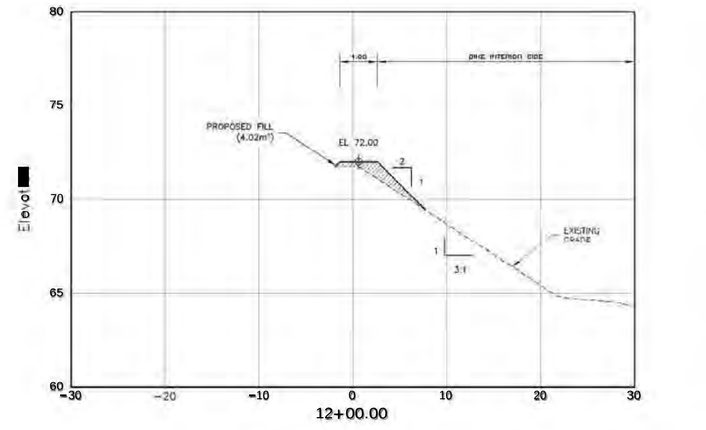


10+00.00



12+00.00

SECTIONS

HOR SCALE: 1:300
VER SCALE: 1:150

LEGEND:

EXISTING GRADE

PROPOSED FILL

GRAPHIC SCALE

SCALE: 1=300

GRAPHIC SCALE

SCALE: 1=150

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
REVISIONS				

Tak VJHLVV ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR 00902-4157 USA

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FAX: 787-721-3196
WWW.GLMENGINNERS.COM

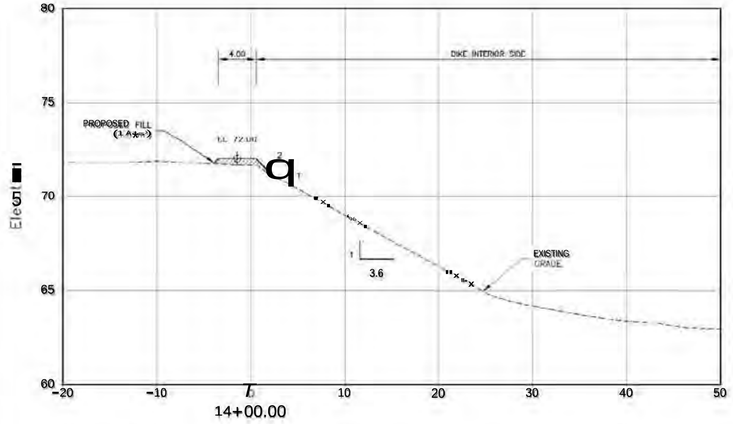
BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

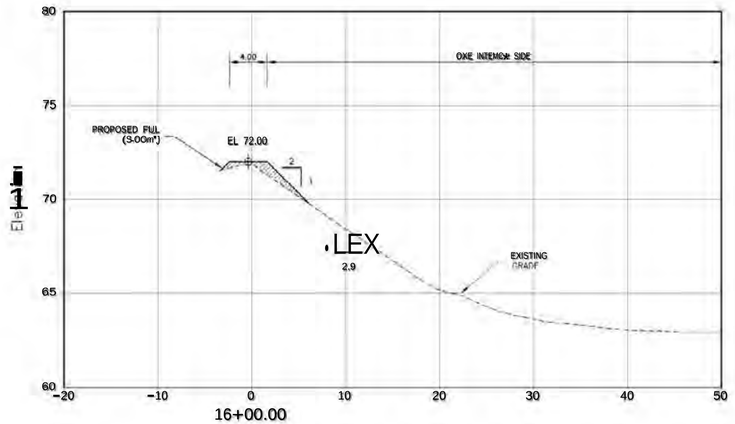
TRUJILLO ALTO, PUERTO RICO

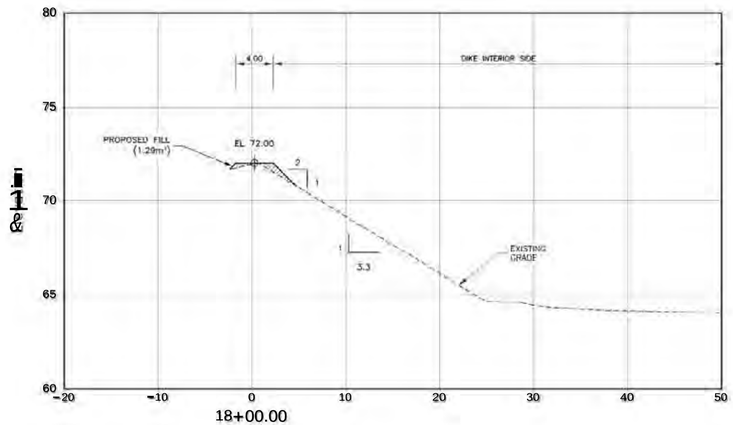
CIP NO. 1-01-9000

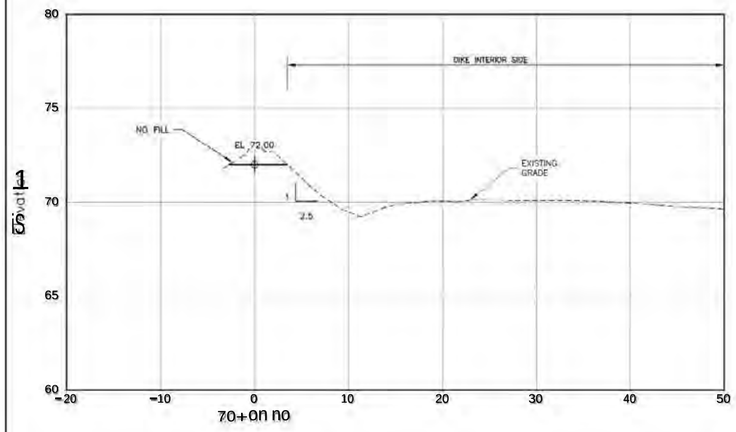
Autoridad de Acueductos y Alcantarillados

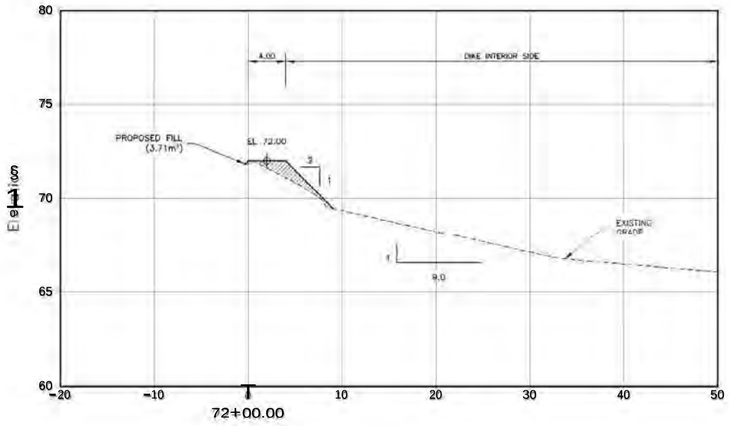
SHEET TITLE: DISPONSAL AREA C DIKE SECTIONS (1 OF 2)		SHEET ID. C-305	SHEET No. 48
		PROJ NO. CIP NO 1-01-9000	
SCALE AS SHOWN	BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM	DATE JAN/28/2022	

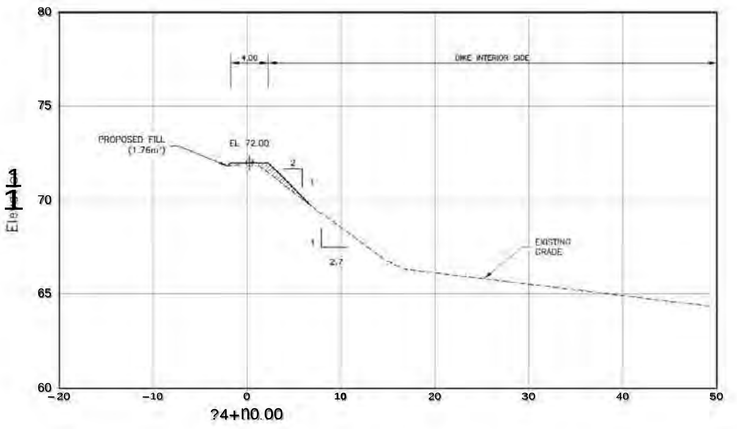


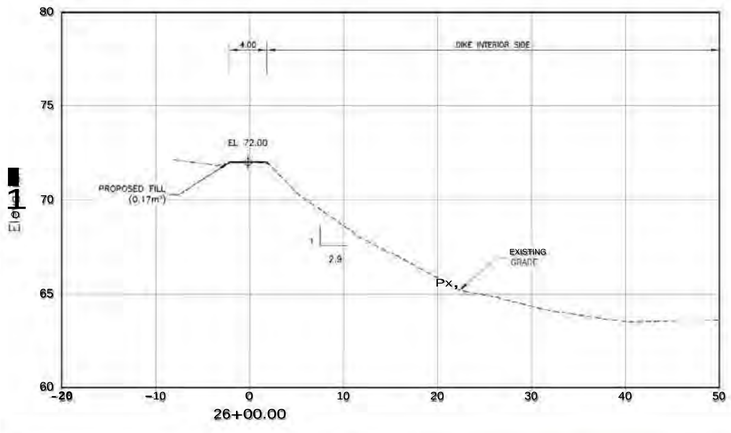












SECTIONS

HOR SCALE: 1:300
VER SCALE: 1:150

GRAPHIC SCALE
SCALE: 1=300

GRAPHIC SCALE
SCALE: 1=150

LEGEND:
EXISTING GRADE
PROPOSED FILL

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
	REVISIONS			

ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR 00902-4157 USA
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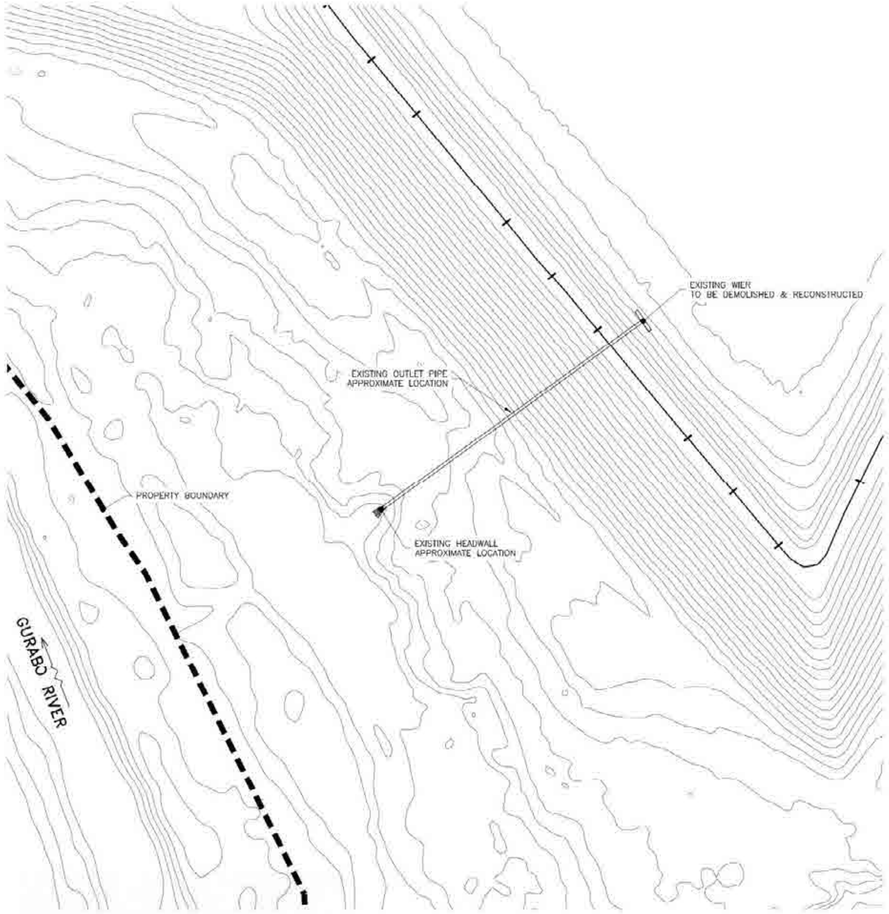
FAX 787-721-3136
www.GLMENGINNERS.COM
ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: DISPONSAL AREA C
DIKE SECTIONS
(2 OF 2)

SHEET ID. C-306
SHEET No. 49
PROJ NO. CIP NO 1-01-9000
SCALE AS SHOWN
BAR IS TWO CM CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY
0 2CM
DATE JAN/28/2022



EXISTING OUTFALL STRUCTURES

SCALE: 1:1000

GRAPHIC SCALE

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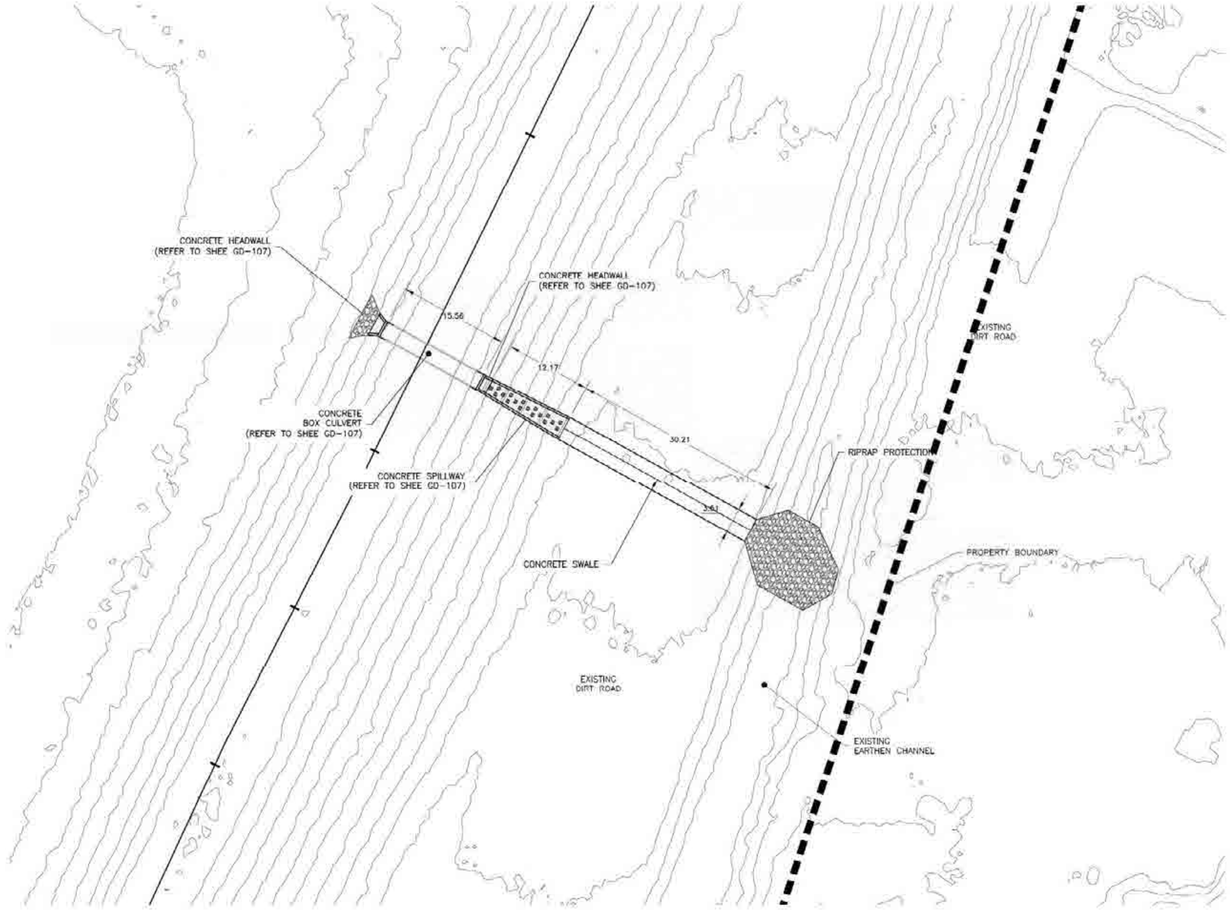
SCALE: 1=1000



PROPOSED LONG-TERM OUTFALL STRUCTURES

SCALE: 1:400

GRAPHIC SCALE

2.5 0 5 10

SCALE: 1=400

NOTES:

1. SHOWN CONTOURS ARE FROM COMMONWEALTH OF PUERTO RICO QL2 LIDAR FROM 2017

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING-GROUP
743 PROLONGACION PAZ, SANTURCE, PR 00907
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ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:

DISPOSAL AREA C
OUTFALL INFRASTRUCTURE
PLAN

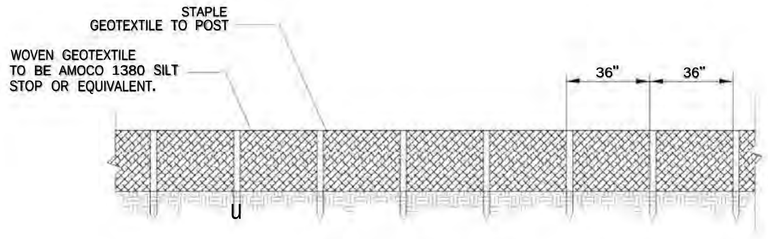
SHEET ID.	SHEET No.
C-307	50

PROJ NO.
CIP NO 1-01-9000

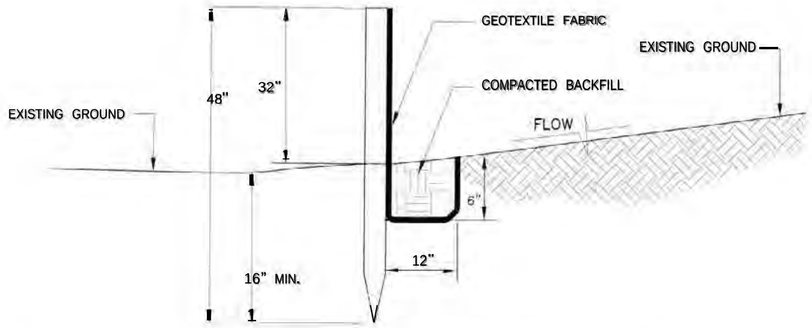
SCALE
AS SOWN

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY. 0 2CM

DATE
JAN/28/2022



SILT FENCE INSTALLATION DETAIL
NOT TO SCALE



SILT FENCE INSTALLATION SECTION
NOT TO SCALE

SILT FENCE SPECIFICATIONS

1. SILT FENCE SHALL BE CONSTRUCTED BEFORE UPSLOPE LAND DISTURBANCE BEGINS.
2. ALL SILT FENCE SHALL BE PLACED AS CLOSE TO THE CONTOUR AS POSSIBLE SO THAT WATER WILL NOT CONCENTRATE AT LOW POINTS IN THE FENCE AND SO THAT SMALL SWALES OR DEPRESSIONS WHICH MAY CARRY SMALL CONCENTRATED FLOWS TO THE SILT FENCE ARE DISSIPATED ALONG ITS LENGTH.
3. TO PREVENT WATER POUNDED BY THE SILT FENCE FROM FLOWING AROUND THE ENDS, EACH END SHALL BE CONSTRUCTED UPSLOPE SO THAT THE ENDS ARE AT A HIGHER ELEVATION.
4. WHERE POSSIBLE, SILT FENCE SHALL BE PLACED ON THE FLATTEST ARE AVAILABLE.
5. WHERE POSSIBLE, VEGETATION SHALL BE PRESERVED FOR 5 FT. (OR AS MUCH AS POSSIBLE) UPSLOPE FROM THE SILT FENCE. IF VEUETATIUN IS KEMUVEU, IT SMALL BE ESTABLISMEU WITMIN / UATS FKUM IME INSTALLATIUN UF IME SILT FENCE.
6. THE HEIGHT OF THE SILT FENCE SHALL BE A MINIMUM OF 16 IN. ABOVE THE ORIGINAL GROUND SURFACE.
7. THE SILT FENCE SHALL BE PLACED IN A TRENCH CUT A MINIMUM OF 6 IN. DEEP. THE TRENCH SHALL BE CUT WITH A TRENCHER, CABLE LAYING MACHINE, OR OTHER SIITTABLE DEVICE WHICH WIII ENSURE ADEQUATE UNIFORM TRENCH DEPTH.
8. THE SILT FENCE SHALL BE PLACED WITH THE STAKES ON THE DOWNSLOPE SIDE OF THE GOETEXTILE AND SO THAT THE 8 IN. OF CLOTH ARE BELOW THE GROUND SURFACE. EXCESS MATERIAL SHALL LAY ON THE BOTTOM OF THE 6 IN. DEEP TRENCH. THE TRENCH SHALL BE BACKFILLED AND COMPACTED.
9. SEAMS BETWEEN SECTIONS OF SILT FENCE SHALL BE OVERLAPPED WITH THE END STAKES OF EACH SECTIONS WRAPPED TOGETHER BEFORE DRIVING INTO THE GROUND.
10. MAINTENANCE - SILT FENCE SHALL ALLOW RUNOFF TO PASS ONLY AS DIFFUSE FLOW THROUGH THE GEOTEXTILE. IF RUNOFF OVERTOPS THE SILT FENCE, FLOWS UNDER OR AROUND THE ENDS, OR IN ANY OTHER WAY BECOMES A CONCENTRATED FLOW, ONE OF THE FOLLOWING SHALL BE PERFORMED, AS APPROXIMATE: 1) THE LAYOUT OF THE SILT FENCE SHALL BE CHANGED, 2) ACCUMULATED SEDIMENT SHALL BE REMOVED , OR 3) OTHER PRACTICE SHALL BE INSTALLED.

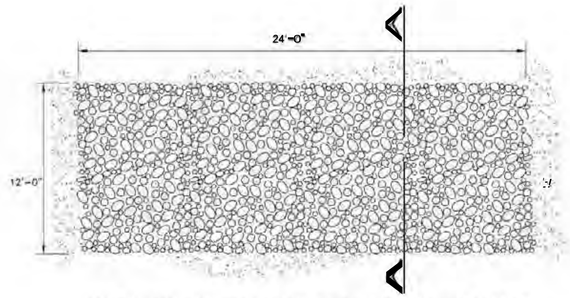
CRITERIA FOR SILT FENCE

1. FENCE POSTS - THE LENGTH SHALL BE A MINIMUM OF 32 IN. LONG. WOOD POSTS WILL BE 2 BY 2 IN. HARDWOOD OF SOUND QUALITY. THE MAXIMUM SPACING BETWEEN POSTS SHALL BE 10 FT.
2. SILT FENCE FABRIC (SEE CHAT BELOW).

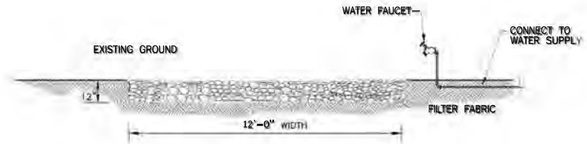
FABRIC PROPERTIES	VALUES	TEST METHOD
GRAD TCNSILC STRCNGTII	90 LO. MINIMUM	ASTM D 1682
MULLEN BURST STRENGTH	190 PSI MINIMUM	ASTM D 3786
SLURRY FLOW RATE	0.3 GAL/MIN/FT MAXIMUM	
EQUIVALENT OPENING SIZE	40-80	US STD. SIEVE CW-02215
ULTRAVIOLET RADIATION STABILITY	90% MINIMUM	ASTM-G-26

GENERAL NOTES:

1. CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE MAKING ANY EXCAVATION ACROSS OR NEAR THEM.
2. NO FILL SHALL BE LEFT UNESTABLISHED MORE THAN THIRTY (30) DAYS, NOT STORED WITHOUT COMPACTING.
3. SEDIMENT CONTROL STRUCTURE SHALL BE INSPECTED AND REPAIRED AS NECESSARY TO ASSURE A SATISFACTORY PERFORMANCE DURING CONSTRUCTION.
4. ALL PERMANENT SLOPES SHALL BE SODDED AS SOON AS POSSIBLE.
5. CONTRACTOR SHALL SPRAY WITH WATER ALL BARE GROUND THROUGHOUT PROJECT.
6. ALL SEDIMENT PREVENTIVE WORKS SHALL BE PERFORMED PRIOR TO EARTH MOVEMENT ACTIVITIES.
7. FOR ADDITIONAL INFORMATION ON SEDIMENT CONTROL DURING CONSTRUCTION, REFER TO THE "CES PLAN" PROPOSAL.
8. NO FILL SHALL BE STORED IN PROJECT FOR MORE THAN SEVEN (7) DAYS.
9. ALL TRUCKS AND EQUIPMENT WHEELS SHALL BE CLEANED AT STABILIZED AREA BEFORE LEAVING THE PROJECT.
10. THE PROJECT SHALL ONLY HAVE THE SPECIFIED EXITS DURING CONSTRUCTION.
11. CONTRACTOR SHALL IMPLEMENT DUST CONTROL MEASURES ON ALL DIRT ROADS DURING THE DURATION OF THE PROJECT.



STABILIZED CONSTRUCTION ENTRANCE #1 PLAN VIEW
NOT TO SCALE

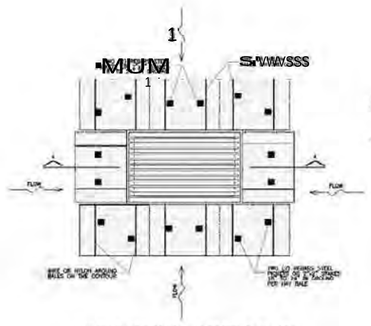


STABILIZED CONSTRUCTION ENTRANCE #1 SECTION B-B
NOT TO SCALE

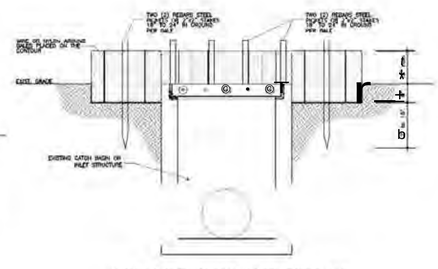
NOISE EMISSION NOTES:

1. THE DAYTIME PERIOD CORRESPONDS TO THE HOURS BETWEEN 7:01 AM AND 10:00 PM.
2. THE NIGHTTIME PERIOD CORRESPONDS TO THE HOURS BETWEEN 10:01 PM AND 7:00 AM.

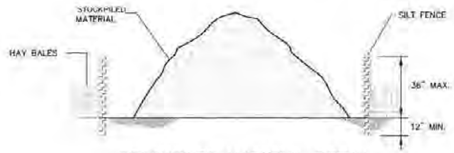
NOISE EMISSION LIMITS								
SHED ZONE	ZONE I (RESIDENTIAL)		ZONE II (COMMERCIAL)		ZONE III (INDUSTRIAL)		ZONE VI (TRANQUILITY)	
	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT
ZONE I	60	50	65	55	70	60	50	45
ZONE II	65	50	70	60	75	65	50	45
ZONE III	65	50	70	65	75	75	50	45
ZONE VI	65	50	70	65	75	75	50	45



HAY BALE PROTECTION AT INLETS PLAN VIEW
NOT TO SCALE



HAY BALE PROTECTION AT INLETS SECTION A-A
NOT TO SCALE



STOCKPILED MATERIAL DETAIL
NOT TO SCALE

STABILIZED CONST. ENTRANCE #1 NOTES

1. STONE SIZE - USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - AS REQUIRED, BUT NOT LESS THAN 50 FEET.
3. THICKNESS - NOT LESS THAN TWELVE (12) INCHES.
4. WIDTH - TWENTY (20) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR ECRESS OCCURS.
5. FILTER CLOTH - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WASHING - WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
	REVISIONS			

AJHLW ENGINEERING-GROUP
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BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: PLAN CES GENERAL DETAILS AND NOTES

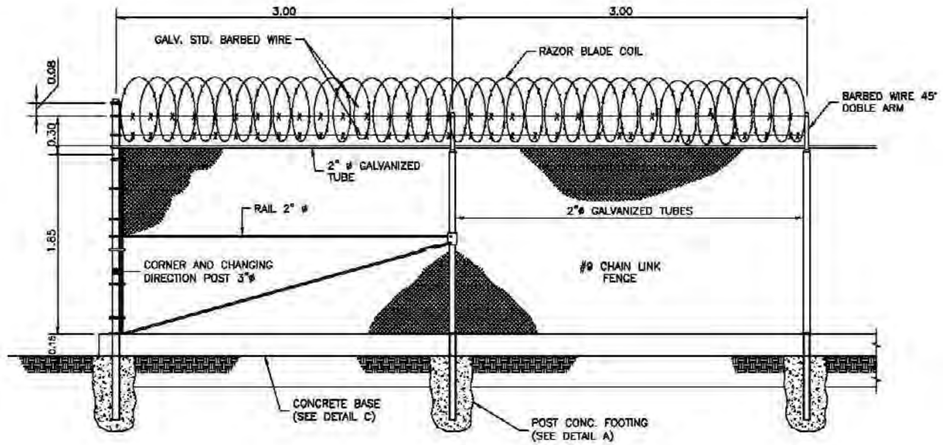
SHEET ID. GD-101 | SHEET No. 51

PROJ NO. CIP NO 1-01-9000

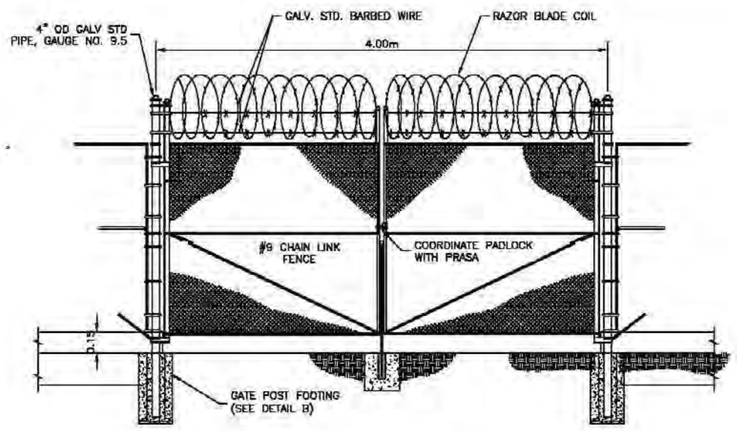
SCALE NTS

IF THIS MEASUREMENT DOES NOT MATCH ON ORIGINAL DRAWING THEN SCALE ACCORDINGLY. ADJUST SCALES 0 2CM

DATE JAN/28/2022



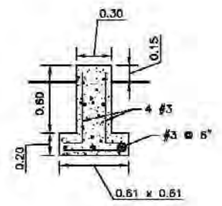
FENCE DETAIL
NTS



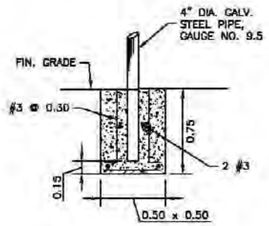
GATE DETAIL
NTS

NOTES:

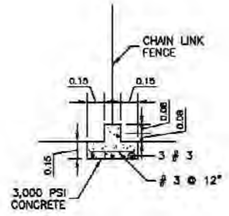
1. SIGN TO BE LOCATED AT THE ENTRANCE GATE.
2. SIGNS SHOULD BE PER PRASA STANDARD REQUIREMENT.
3. INCLUDE WARNING SIGN A LONG THE CHAIN LINK FENCE.
4. THE SIGN SHALL CONTAIN "PELIGRO ALAMBRES CORTANTES", TO BE PLACED EVERY 6M. ALONG THE CHAIN LINK FENCE.
5. FENCE AND GATE DETAILS ARE PRESENTED FOR REFERENCE ONLY. CONTRACTOR SHALL PROVIDE THEIR OWN DETAILS. TEMPORARY FENCE MAY BE USED FOR THE STAGING AREA.
6. DETAILS ARE PROVIDED FOR REFERENCE ONLY. CONTRACTOR SHALL FOLLOW THESE DETAILS IN THE EVENT A REPAIR OR INSTALLATION IS REQUIRED AS PART OF THE PROJECT. CONTRACTOR MAY PROVIDE THEIR OWN DETAILS AND PRESENT THEN TO PRASA REPRESENTATIVE OR APPROVAL.



GATE DETAIL A
NTS



GATE DETAIL B
NTS



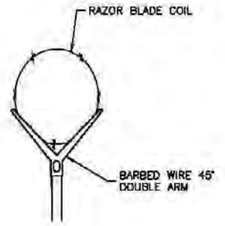
CONCRETE BASE DETAIL C
NTS

PELIGRO
ENTRADA
Y SALIDA
DE
CAMIONES

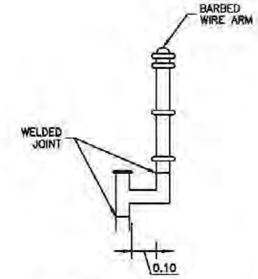
CONSTRUCTION SIGN
NTS (REFER TO NOTES)

PROPIEDAD
DE A. A. A.
PROHIBIDO
EL PASO

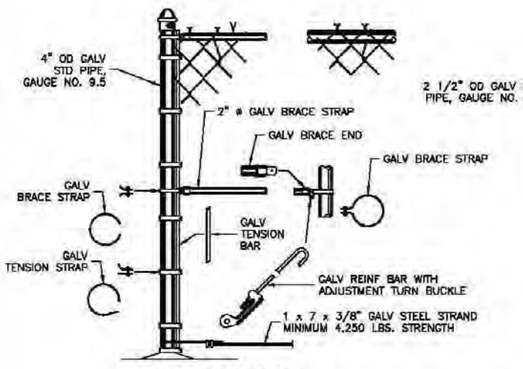
SECURITY SIGN
NTS (REFER TO NOTES)



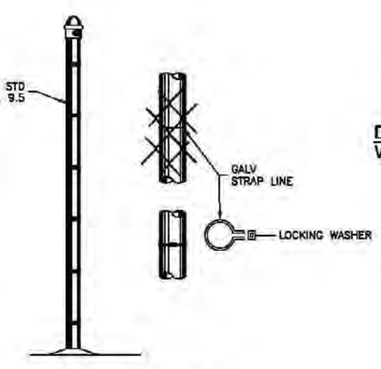
BARBED WIRE ARM
NTS



SLIDING GATE
BARBED WIRE ARM
NTS



END POST DETAIL

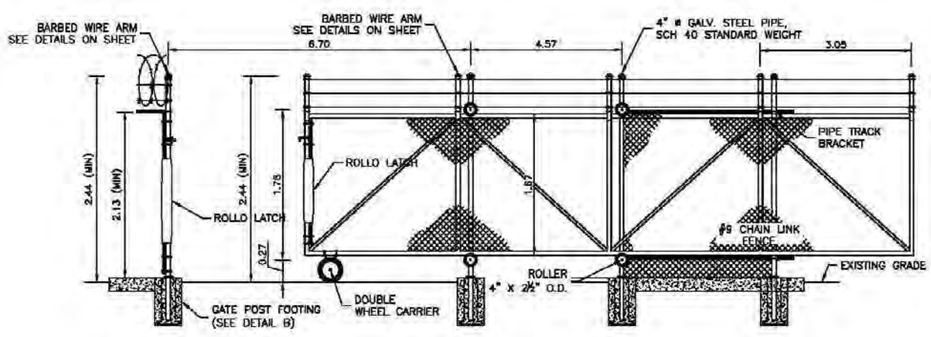


MIDDLE POST DETAIL



DETAIL OF 3/8" GALVANIZED WIRE ROPE CLIP

CHAIN LINK FENCE DETAILS
NTS



SLIDING GATE DETAIL
NTS

BASIS OF DESIGN
(NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
	REVISIONS			

GLM ENGINEERING GROUP
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ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: PERIMETER FENCE GENERAL DETAILS

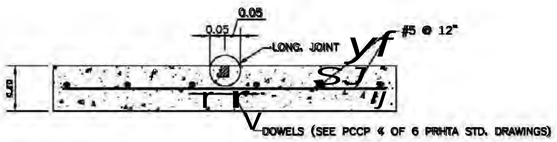
SHEET ID.	SHEET No.
GD-102	52

PROJ NO. CIP NO 1-01-9000

SCALE: NTS

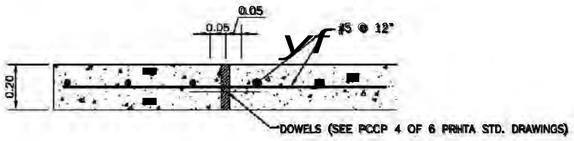
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM

DATE: JAN/28/2022



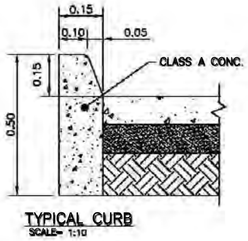
SECTION THROUGH LONGITUDINAL & TRANSVERSE JOINTS

SCALE: 1=50



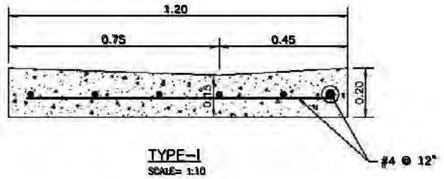
SECTION THROUGH EXPANSION JOINTS

SCALE: 1=50



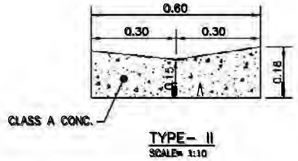
TYPICAL CURB

SCALE= 1:10



TYPE-I

SCALE= 1:10

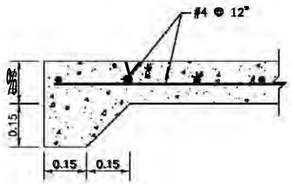


TYPE- II

SCALE= 1:10

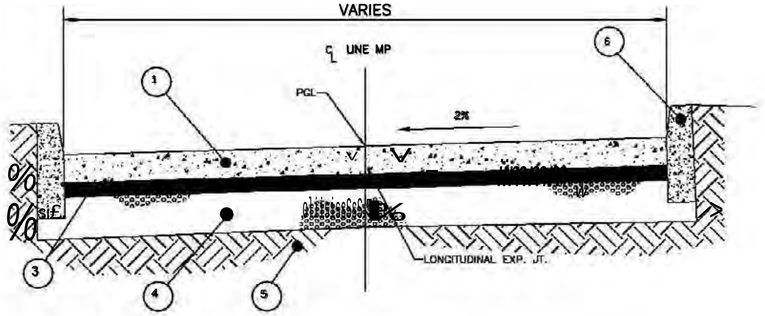
TYPICAL SWALE AND GUTTER DETAIL

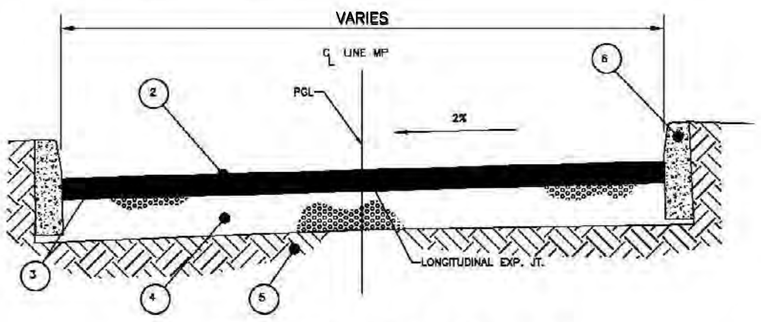
SCALE: 1=10



TYPICAL SIDEWALK AND CONCRETE SLAB DETAIL

SCALE: 1=10





TYPICAL ROAD PAVEMENT DETAIL

SCALE: 1=20

LEGEND:

Ⓒ 0.20 PORTLAND CEMENT CONCRETE PAVEMENT

② 0.05 HOT PLANT MIX BITUMINOUS PAVEMENT MIX S-1 (75)

③ 0.10 HOT PLANT MIX BITUMINOUS PAVEMENT MIX B-1 (75) BLACK BASE

④ 0.20 COMPACTED SUBBASE COURSE (A-2-4).

Ⓢ COMPACTED SUBGRADE TO NOT LESS THAN 90%.

Ⓒ CONC. CURB.

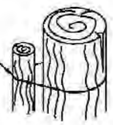
NOTE:

1. REFER TO PCCP 4 OF 6 PRHTA STD. DRAWINGS FOR JOINTS DETAILS.
2. CONTRACTOR SHALL RESTORE ANY DAMAGED ROAD, SIDEWALK, CURB/GUTTERS, BARB WIRES AND ANY OTHER INFRASTRUCTURE TO ITS ORIGINAL CONDITION.
3. DETAILS ARE PROVIDED FOR REFERENCE ONLY. CONTRACTOR SHALL FOLLOW THESE DETAILS IN THE EVENT A REPAIR OR INSTALLATION IS REQUIRED AS PART OF THE PROJECT. CONTRACTOR MAY PROVIDE THEIR OWN DETAILS AND PRESENT THEN TO PRASA REPRESENTATIVE OR APPROVAL.

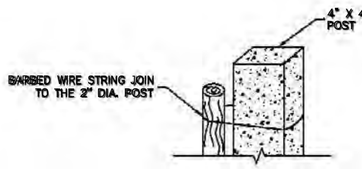
GRAPHIC SCALE 0.2 0 0.2 0.4 — SCALE: 1=10

GRAPHIC SCALE 0.2 0 0.5 1 — SCALE: 1=20

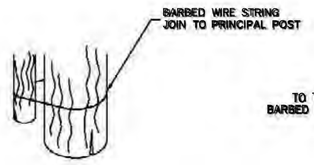
GRAPHIC SCALE 0.5 0 1 2 2.5 — SCALE: 1=50



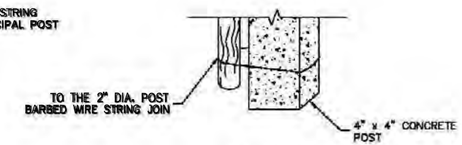
DETAIL A



DETAIL A



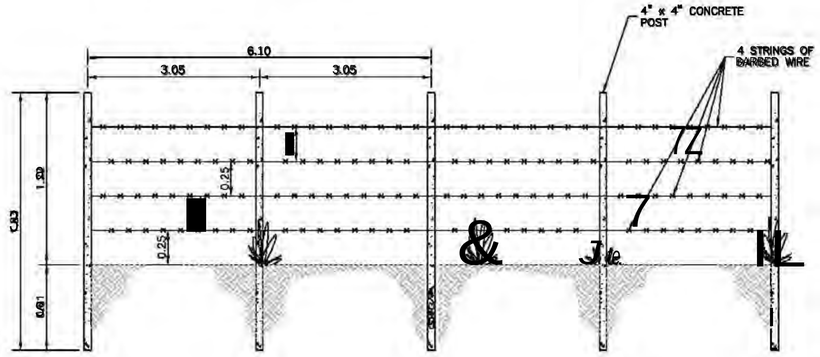
DETAIL B



DETAIL B

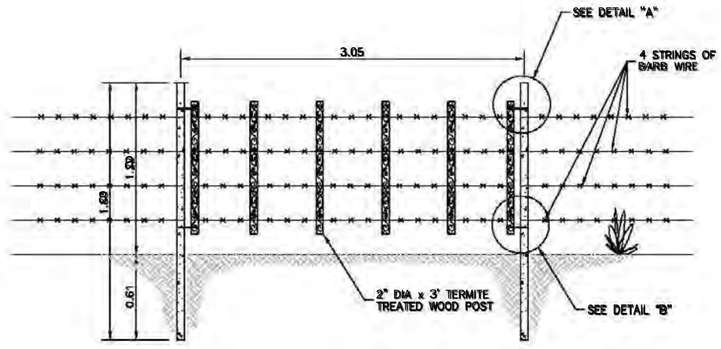
BARBED WIRE DETAILS

NOT TO SCALE



BARBED WIRE FENCE DETAIL

NOT TO SCALE



BARBED WIRE GATE DETAIL

NOT TO SCALE

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
	REVISIONS			

Gilmvi ENGINEERING GROUP
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WWW.GILMENGINNERS.COM

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: ACCESS ROAD DETAILS

SHEET ID. GD-103 | SHEET No. 53

PROJ NO. CIP NO 1-01-9000

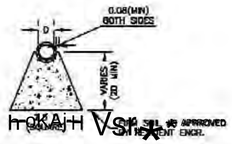
SCALE AS SHOWN

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM

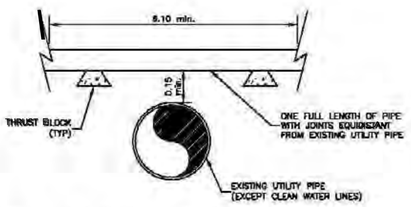
DATE JAN/28/2022

GENERAL NOTES:

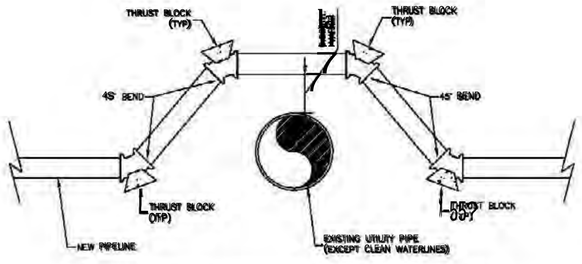
1. THESE PLANS HAVE BEEN PREPARED AS PER P.R.A.S.A. SPECIFICATIONS, IN THE EVENT OF AN OVERSIGHT OR OMISSION, CONTRACTOR SHALL FOLLOW THE DIRECTIVE ISSUED BY P.R.A.S.A. INSPECTOR AND/OR RESIDENT ENGINEER
2. WHEN SEWER PIPING AND WATER MAINS CROSS EACH OTHER OR WHEN LAID AT HORIZONTAL DISTANCE OF LESS THAN 1.52m (5Ft.) FROM EACH OTHER, SEWER PIPE SHOULD BE INSTALLED AT A LOWER LEVEL THAN THE WATER MAIN PIPING AND NO LESS THAN 0.305m (1Ft.) BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE SEWER.
3. UTILITY CROSSINGS TO BE APPROVED BY RESIDENT ENGINEER AND THE CORRESPONDING AGENCY OR OWNER OF THE UTILITY TO BE CROSSED.
4. COMPRESSIVE STRENGTH OF CONCRETE TO BE 3,500 PSI @ 28 DAYS.
5. CONTRACTOR SHALL PROTECT FRESH CONCRETE FROM POSSIBLES DAMAGES UNTIL SET ITS STRENGTH. IN CASE OF DAMAGES, THE CONTRACTOR IF FULLY RESPONSIBLE TO IMPLEMENT THE REQUIRED CORRECTIVE MEASURES. CORRECTIVE MEASURES TO BE APPROVED BY THE RESIDENT ENGINEER.
6. AT ALL TIME SEWER LINES SHALL BE BELOW CLEAN WATER LINES.
7. DETAILS ARE PROVIDED FOR REFERENCE ONLY. CONTRACTOR SHALL FOLLOW THESE DETAILS IN THE EVENT A REPAIR OR INSTALLATION IS REQUIRED AS PART OF THE PROJECT. CONTRACTOR MAY PROVIDE THEIR OWN DETAILS AND PRESENT THEN TO PRASA REPRESENTATIVE OR APPROVAL.



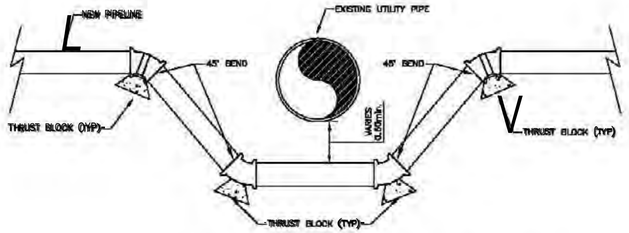
THRUST BLOCK/PIER TYPICAL DETAIL
NOT TO SCALE



PIPELINE INSTALLATION AT UTILITIES CROSSINGS
NOT TO SCALE



PIPELINE INSTALLATION AT UTILITIES CROSSINGS
NOT TO SCALE

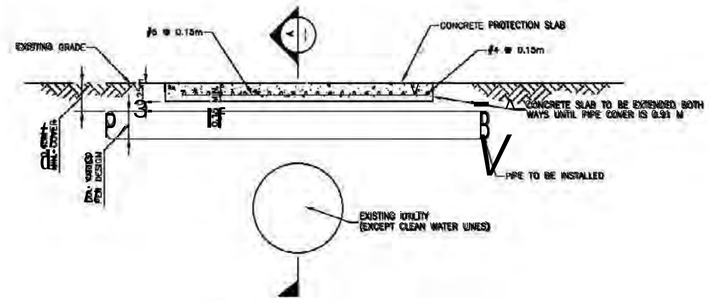


PIPELINE INSTALLATION AT UTILITIES CROSSINGS
NOT TO SCALE

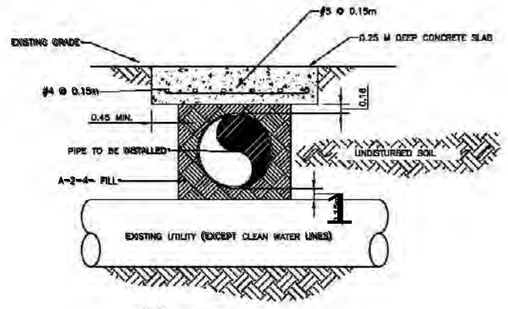
SPECIAL NOTE:

CONTRACTOR SHALL INCLUDE AS PART OF HIS BID PRICE A UNIT COST FOR A TYPICAL UTILITY CROSSING. THIS UNIT COST WILL BE APPLIED TO ANY ADDITIONAL UTILITY CROSSING THAT MAY APPEAR ON THE FIELD AND IS NOT ANTICIPATED FROM THE INFORMATION PROVIDED ON THESE DRAWINGS. THE CONTRACTOR SHALL BE FAMILIARIZED WITH THE INFORMATION PROVIDED IN THESE DRAWINGS AND WITH THE FIELD CONDITIONS PRIOR TO BID.

PIPELINE BELOW EXISTING UTILITIES



DETAIL
NOT TO SCALE



SECTION
PIPELINE ABOVE EXISTING

PIPE INSTALLATION AT CROSSINGS
NOT TO SCALE

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED
REVISIONS				

GLM ENGINEERING-GROUP
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BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE:
GENERAL DETAILS
PIPELINE CROSSING DETAILS

SHEET ID.	SHEET No.
GD-104	54

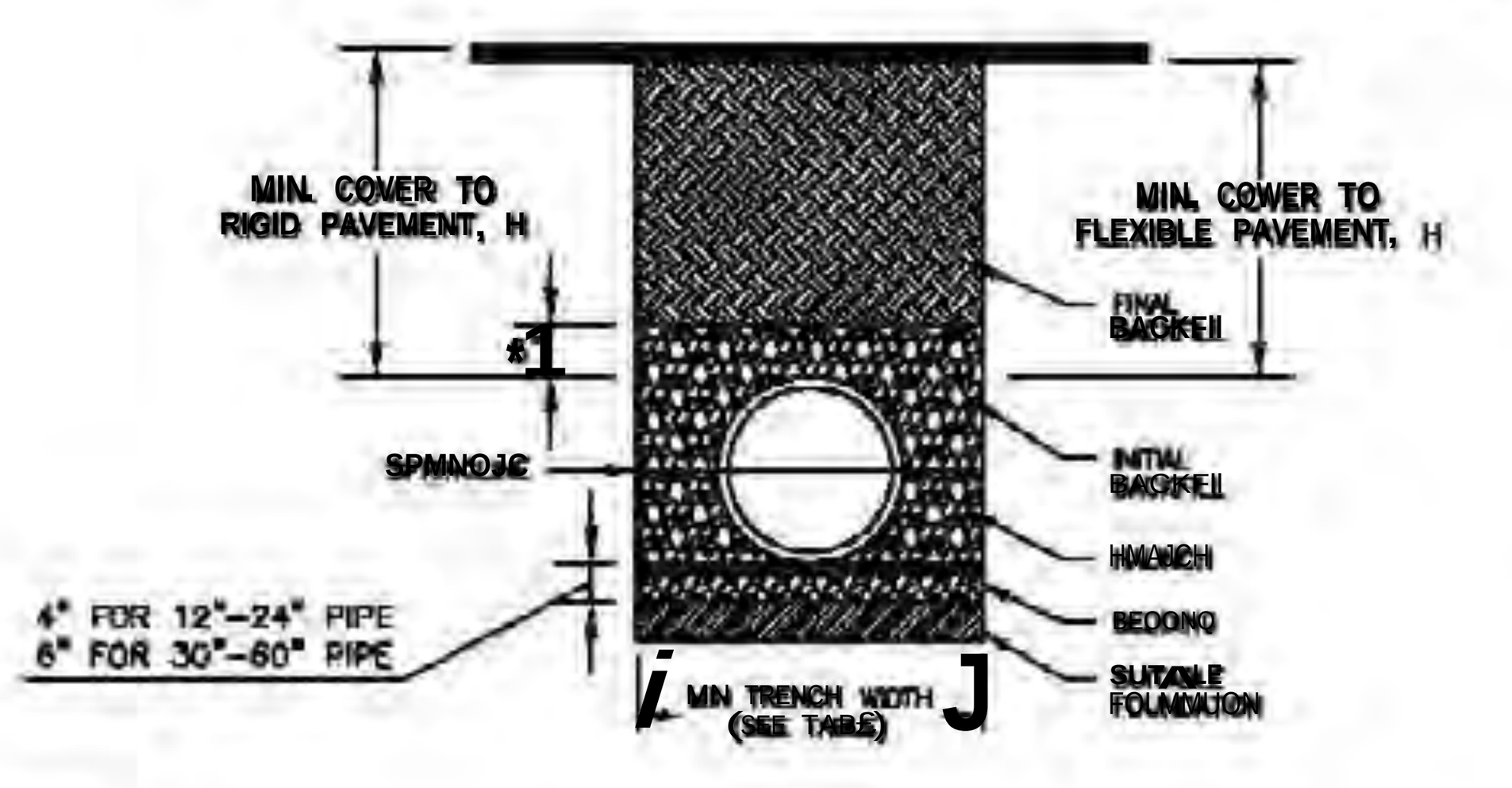
PROJ NO.
CIP NO 1-01-9000

SCALE
NTS

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET ADJUST SCALES ACCORDINGLY
0 2cm

DATE
JAN/28/2022

SANITITE® HP TRENCH INSTALLATION DETAIL



NOTES:

1. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDER-GROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST ADDITION.
2. MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.
3. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
4. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I OR II. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. COMPACTION SHALL BE SPECIFIED BY THE ENGINEER IN ACCORDANCE WITH TABLE 3 FOR THE APPLICABLE FILL HEIGHTS LISTED. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 12"–24" DIAMETER PIPE (300mm–600mm); 6" (150mm) FOR 30"–60" (750mm–1500mm) DIAMETER PIPE. THE MIDDLE ⅓ BENEATH THE PIPE INVERT SHALL BE LOOSELY PLACED.
5. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I OR II IN THE PIPE ZONE EXTENDING NOT LESS THAN 6" ABOVE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION. COMPACTION SHALL BE SPECIFIED BY THE ENGINEER IN ACCORDANCE WITH TABLE 3 FOR THE APPLICABLE FILL HEIGHTS LISTED.
6. MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" (300mm) FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOTATION. FOR TRAFFIC APPLICATIONS, CLASS I OR II MATERIAL COMPACTED TO 90% SPD IS REQUIRED. MINIMUM COVER, H, IS 12" (300mm) UP TO 48" (1200mm) DIAMETER PIPE AND 24" (600mm) OF COVER FOR 60" (1500mm) DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT.

TABLE 1, RECOMMENDED MINIMUM TRENCH WIDTHS

PIPE DIAM.	MIN. TRENCH WIDTH
12" (300mm)	30" (762mm)
15" (375mm)	34" (864mm)
18" (450mm)	39" (991mm)
24" (600mm)	48" (1219mm)
21" (525mm)	43" (1092mm)
30" (750mm)	56" (1422mm)
36" (900mm)	64" (1626mm)
42" (1050mm)	72" (1829mm)
48" (1200mm)	80" (2032mm)
60" (1500mm)	96" (2438mm)

TABLE 2, MINIMUM RECOMMENDED COVER BASED ON VEHICLE LOADING CONDITIONS

PIPE DIAM.	SURFACE LIVE LOADING CONDITION: H-25	HEAVY CONSTRUCTION (75T AXLE LOAD) *
12" – 48" (300mm – 1200mm)	12" (305mm)	48" (1219mm)
60" (1500mm)	24" (610mm)	60" (1524mm)

* VEHICLES IN EXCESS OF 75T MAY REQUIRE ADDITIONAL COVER

TABLE 3, MAXIMUM COVER FOR ADS SANITITE HP PIPE, ft (m)

PIPE DIAM.	CLASS I COMPACTED	CLASS II 95%	CLASS II 90%
12" (300mm)	39 (11.9m)	27 (8.2m)	[illegible]
15" (375mm)	42 (12.8m)	29 (8.8m)	21 (6.4m)
18" (450mm)	36 (11.0m)	25 (7.6m)	18 (5.5m)
21" (525mm)	39 (11.9m)	27 (8.2m)	19 (5.8m)
24" (600mm)	31 (9.4m)	22 (6.7m)	16 (4.9m)
[illegible]	30 (9.1m)	22 (6.7m)	[illegible]
36" (900mm)	31 [illegible]	22 [illegible]	[illegible]
42" (1050mm)	[illegible]	23 (7.0m)	(5.2m)
48" (1200mm)	34 (10.4m)	24 (7.3m)	17 (5.2m)
60" (1500mm)	32 (9.8m)	[illegible]	16 (4.9m)

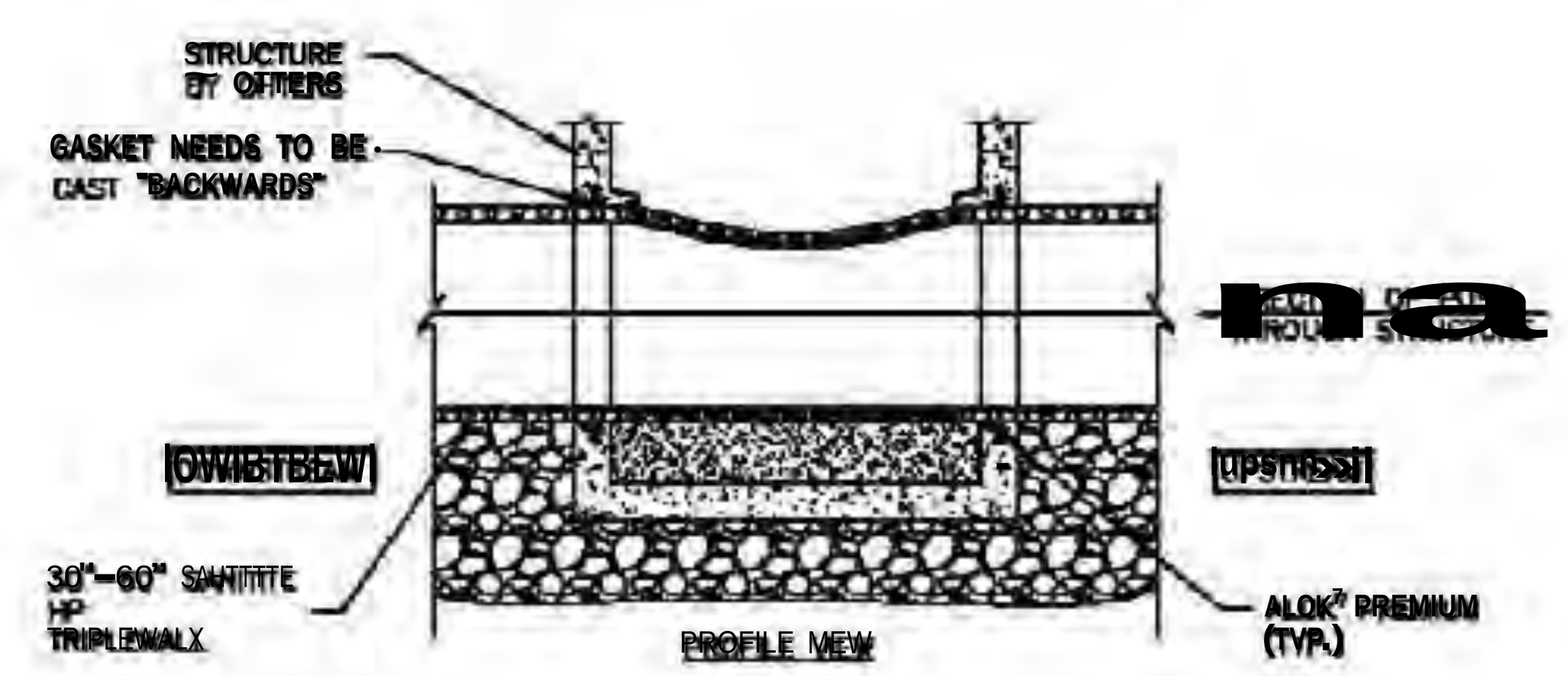
FILL HEIGHT TABLE GENERATED USING AASHTO SECTION 12, LOAD RESISTANCE FACTOR DESIGN (LRFD) PROCEDURE WITH THE FOLLOWING ASSUMPTIONS:
NO HYDROSTATIC PRESSURE, UNIT WEIGHT OF SOIL (γs) = 120 PCF

ALTERNATE PRECAST MANHOLE CONNECTION WITH SANITITE HP PIPE

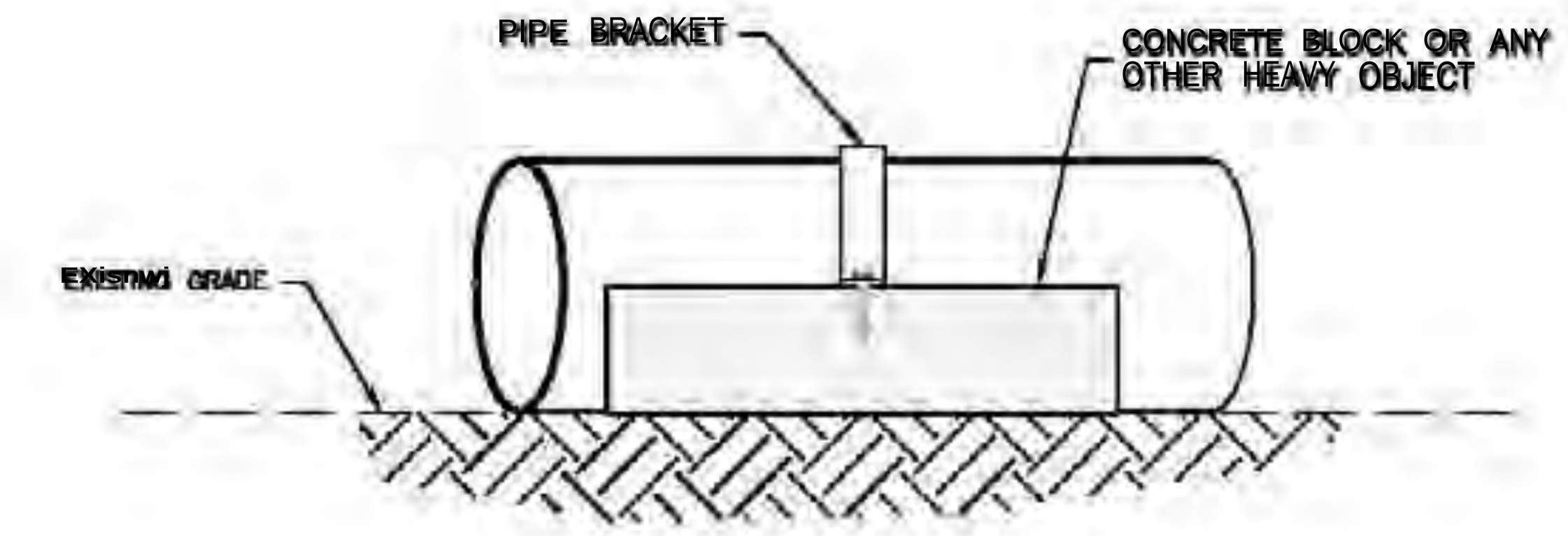


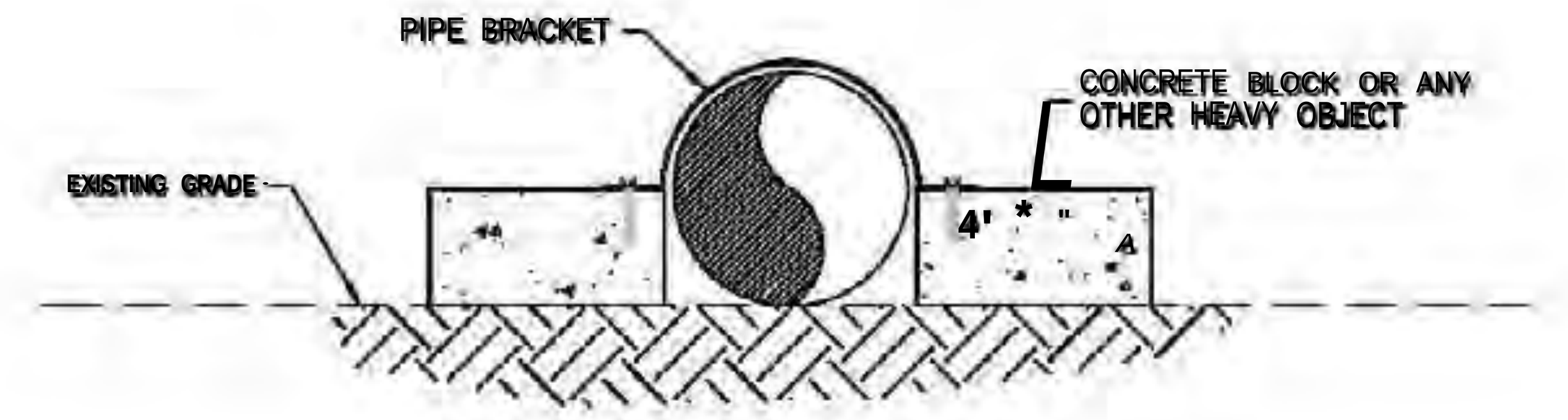
NOTES:

1. AFTER PIPE IS INSERTED THROUGH MANHOLE, POUR CONCRETE AROUND PIPE IN MANHOLE.
2. CUT SECTION FROM TOP OF PIPE AND REMOVE IN FIELD FOR PIPE ACCESS.
3. FILL ALL OPEN CORRUGATION VOIDS WITH NON-SHRINK GROUT, ENSURING GROUT FILLS THE VOID SPACE ALL THE WAY AROUND CIRCUMFERENCE.
4. STRUCTURE DIAMETER & WALL THICKNESS BY ENGINEER.
5. REFER TO ALOK® RECOMMENDATION FOR PROPER GASKET & MANDREL SIZING.
6. PIPE TO BE INSERTED INTO STRUCTURE ABOVE GRADE AND LOWERED IN THE TRENCH AS ONE UNIT.



NON INVASIVE TEMPORARY PIPE ANCHORAGE





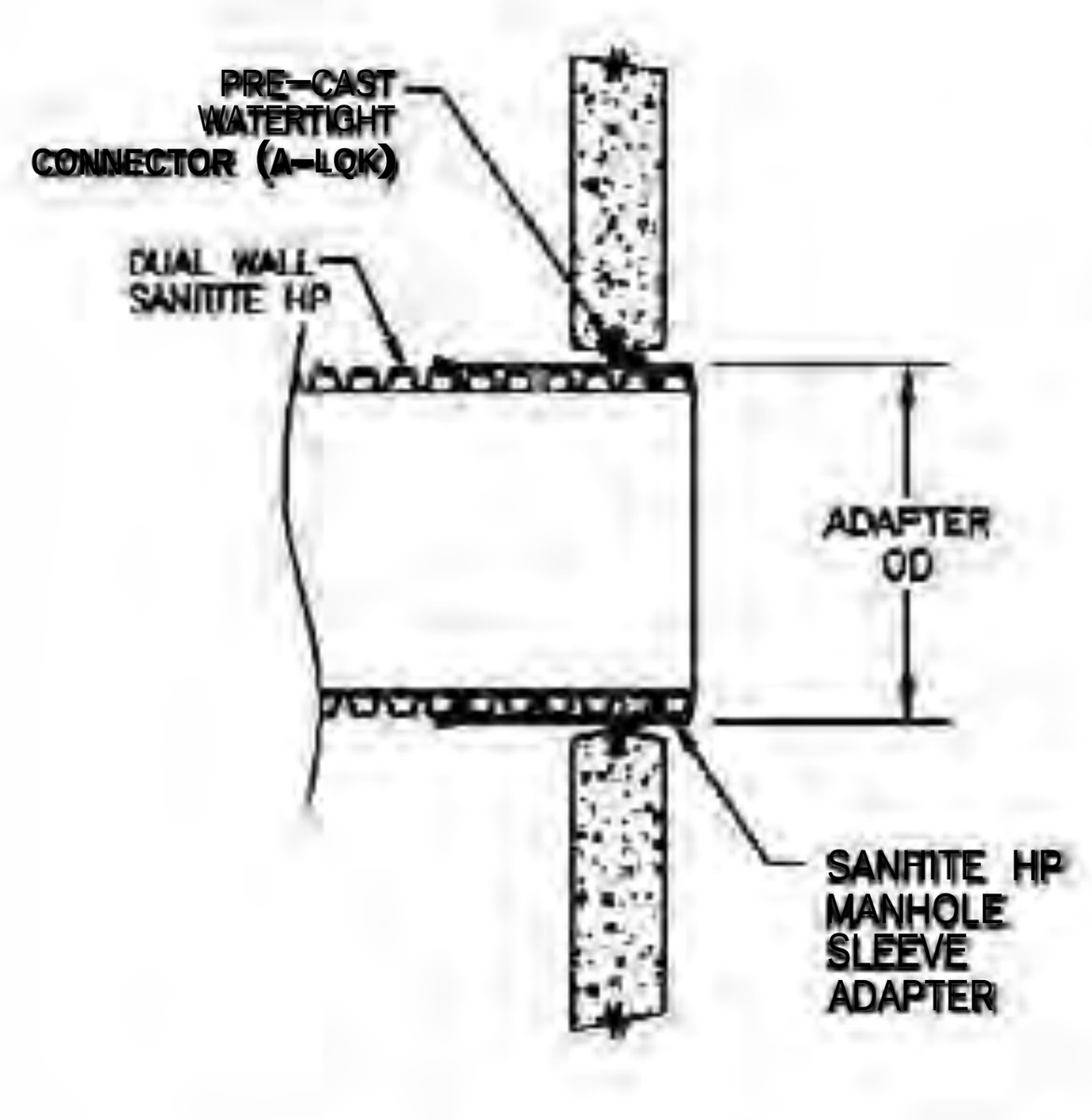
CLASSES OF EMBEDMENT AND BACKFILL MATERIALS

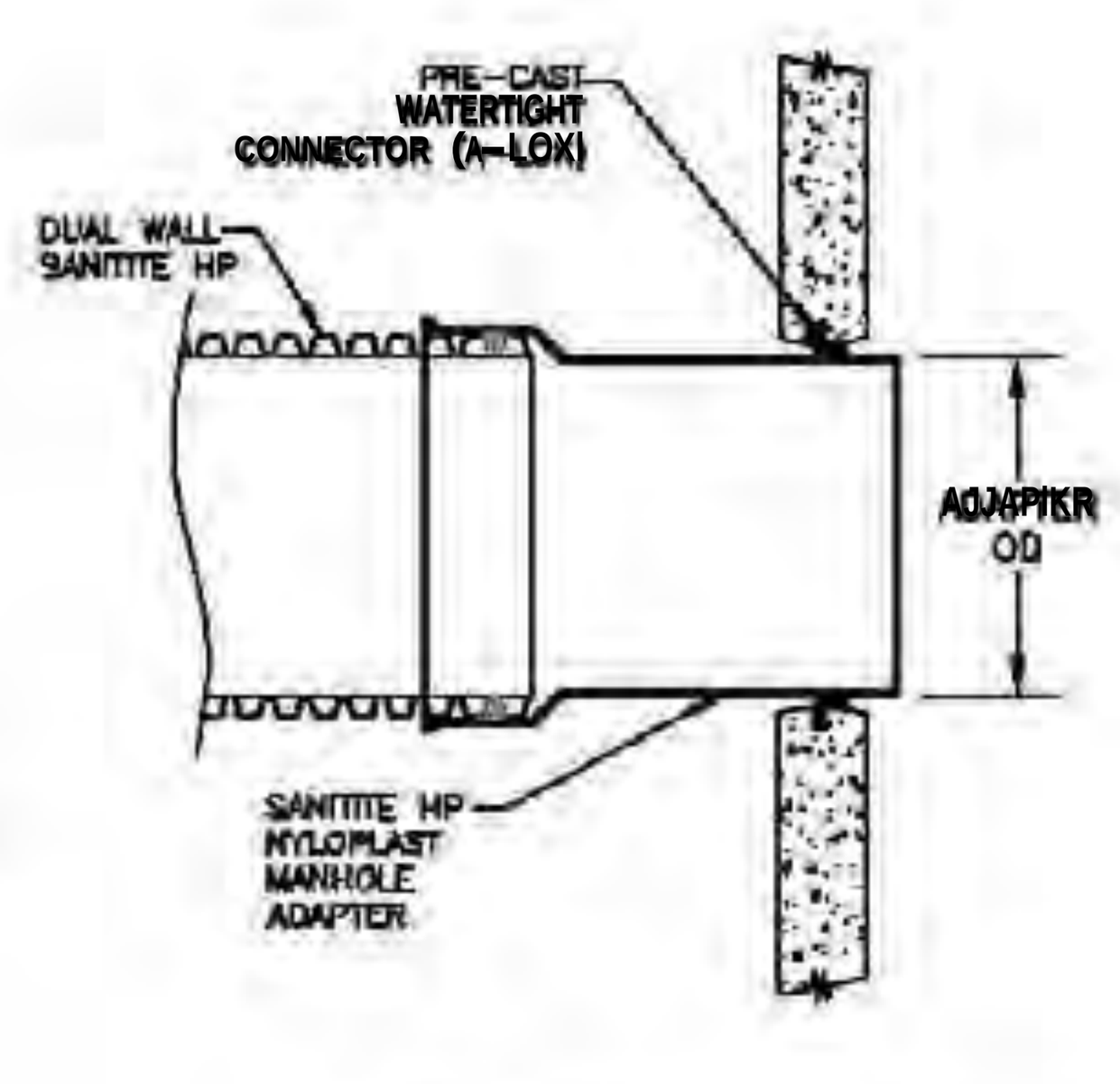
ASTM D2321 (2) (CSA B182.11) CLASS DESCRIPTION		ASTM D2487 NOTATION	ASTM D2487 DESCRIPTION	AASHTO M43 NOTATION	AASHTO M145 NOTATION	BNQ 2560	ASTM D2321 (1) (CSA B182.11): PERCENTAGE PASSING SIEVE SIZES 1 1/2 IN. (40mm)	3/8" (9.5mm)	No. 4 (4.75mm)	NO. 200 (0.075mm)	ATTERBERG LIMITS LL	PI	COEFFICIENTS Cu	Cc
I (3)	CRUSHED ROCK, ANGULAR *	N/A	ANGULAR CRUSHED STONE OR ROCK, CRUSHED GRAVEL, CRUSHED SLAG; LARGE VOIDS WITH LITTLE OR NO FINES	5, 56, 57 (4), 6, 67 (4)	N/A		100	≤25%	≤15%	≤12%	NON PLASTIC		N/A	
II	CLEAN, COARSE-GRAINED SOILS	GW	WELL-GRADED GRAVEL, GRAVEL-SAND MIXTURES; LITTLE OR NO FINES	6	A1, A3	CG-14, MG-20	100		<50% OF "COARSE FRACTION"	<5%	NON PLASTIC		>4	1 to 3
		GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES; LITTLE OR NO FINES	[illegible]									4	<1 or >3
		SW	WELL-GRADED SANDS, GRAVELLY SANDS; LITTLE OR NO FINES						>50% OF "COARSE FRACTION"				>6	1 to 3
		SP (5)	POORLY-GRADED SANDS, GRAVELLY SAND; LITTLE OR NO FINES										<6	<1 or >3
	COARSE-GRAINED SOILS, BORDERLINE CLEAN TO W/FINES	GW-GC, SP-SM	SANDS AND GRAVELS WHICH ARE BORDERLINE BETWEEN CLEAN AND WITH FINES	N/A			100		VARIES	5% TO 12%	NON PLASTIC		SAME AS FOR GW, GP, SW AND SP	
III	COARSE-GRAINED SOILS WITH FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	GRAVEL & SAND WITH <10% FINES	A-2-4, A-2-5, A-2-6, OR A-4 OR A-6 SOILS WITH MORE THAN 30% RETAINED ON [illegible]		100		<50% OF "COARSE FRACTION"	12% TO 50%	N/A	<4 OR <"A" LINE	N/A	
		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES									<7 & >"A" LINE		
		SM	SILTY SANDS, SAND-CLAY MIXTURES						>50% OF "COARSE FRACTION"			[illegible] OR <"A" LINE		
		SC	CLAYEY SANDS, SAND-CLAY MIXTURES									>7 & >"A" LINE		
	INORGANIC FINE-GRAINED SOILS	ML	VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, SILTS WITH [illegible]						100	> 30% (RETAINED)	<50	<4 OR <"A" LINE		
		CL	[illegible] TO MEDIUM PLASTICITY; GRAVELLY, SANDY, OR SILTY CLAYS; LEAN CLAYS							> 30% (RETAINED)		>7 & >"A" LINE		

NOTES:

1. REFER TO ASTM D2321 / CSA B182.11 / BNQ 2560 FOR MORE COMPLETE SOIL DESCRIPTIONS.
2. CLASS I MATERIALS ALLOW FOR A BROADER RANGE OF FINES THAN PREVIOUS VERSIONS OF D2321 / B182.11. WHEN SPECIFYING CLASS I MATERIAL FOR INFILTRATION SYSTEMS, THE ENGINEER SHALL INCLUDE A REQUIREMENT FOR AN ACCEPTABLE LEVEL OF FINES.
3. ALL PARTICLE FACES SHALL BE FRACTURED.
4. ASSUMES LESS THAN 25% PASSES THE 3/8" SIEVE.
5. UNIFORM FINE SANDS (SP) WITH MORE THAN 50% PASSING A 100 SIEVE BEHAVE LIKE SILTS AND SHOULD BE TREATED AS CLASS III SOILS IF ALLOWED.
6. DETAILS ARE PROVIDED FOR REFERENCE ONLY. CONTRACTOR SHALL FOLLOW THESE DETAILS IN THE EVENT A REPAIR OR INSTALLATION IS REQUIRED AS PART OF THE PROJECT. CONTRACTOR MAY PROVIDE THEIR OWN DETAILS AND PRESENT THEN TO PRASA REPRESENTATIVE OR APPROVAL.

12"-24" DUAL WALL SANITITE® HP WATERTIGHT CONNECTION USING A PRE-CAST COMPRESSION GASKET





PIPE SIZE	SANITITE HP MANHOLE SLEEVE ADAPTER: ADAPTER OD	ADS PRODUCT CODES	A-LOK® *
12" (300mm)	15.3" (389mm)	1222AAPP	490
15" (375mm)	18.3" (465mm)	1522AAPP	580
18" (450mm)	22.0" (559mm)	1822AAPP	710
[illegible]	29.0" (737mm)	2422AAPP	915

* THIRD PARTY – CODES AS SUPPLIED BY MANUFACTURER A-LOK IS A REGISTERED TRADEMARK OF A-LOK PRODUCTS, INC. (WWW.A-LOK.COM)

PIPE SIZE	SANITITE HP NYLOPLAST MANHOLE MANHOLE ADAPTER: ADAPTER OD	NYLOPLAST PRODUCT CODES	A-LOK® *
12" (300mm)	12.5" (318mm)	1267AGHPU2	410
15" (375mm)	[illegible] (389mm)	1557AGHPU2	480
18" (450mm)	18.7" (475mm)	1857AGHPU2	610
21" (525mm)	22.06" (560mm)	2187AGHPU2	710
24" (600mm)	24.8" (630mm)	2457AGHPU2	800

* THIRD PARTY – CODES AS SUPPLIED BY MANUFACTURER A-LOK IS A REGISTERED TRADEMARK OF A-LOK PRODUCTS, INC. (WWW.A-LOK.COM)

NOTES:

1. PERFORMANCE HIGHLY DEPENDENT ON INSTALLATION. CONTRACTOR MUST ENSURE MANHOLE GASKET IS UNIFORMLY SEATED AROUND STRUCTURE ADAPTER. EXTRA PRECAUTIONS MUST BE TAKEN TO PREVENT DIFFERENTIAL SETTLEMENT BETWEEN THE PIPE AND MANHOLE.
2. SEE STANDARD DETAIL STD-201.

POST INSTALLATION TESTING

DEFLECTION TESTING: WHEN TESTING FOR ALLOWABLE DEFLECTION LIMITS, THE MINIMUM SPECIFIED INSIDE DIAMETER SHOULD BE USED WHEN ESTABLISHING MANDREL SIZING. TABLE 1 LISTS THE INSIDE DIAMETERS THAT RESULT FROM 5% DEFLECTION BASED UPON THE MINIMUM INSIDE DIAMETER. MANDRELS MAY BE OBTAINED FROM A VARIETY OF COMMERCIAL SUPPLIERS.

LEAKAGE TESTING: SANITITE HP MAY BE TESTED IN ACCORDANCE W/ASTM F1417 "STANDARD TEST METHOD FOR INSTALLATION ACCEPTANCE OF PLASTIC GRAVITY SEWER LINES USING LOW-PRESSURE AIR." TABLE 2 BELOW SUMMARIZES THE MINIMUM TIME THAT MUST BE REACHED FOR LESS THAN 0.5- OR 1.0-PSI OF PRESSURE DROP, DEPENDING ON THE DIAMETER AND LENGTH OF PIPE BEING TESTED, IN ACCORDANCE WITH ASTM F1417. WHEN THE PIPE IS LARGE ENOUGH TO BE PHYSICALLY ACCESSED, IT MAY BE DESIRABLE TO TEST INDIVIDUAL JOINTS FOR SAFETY REASONS. IN THESE CASES, CONSIDER JOINT TESTING IN ACCORDANCE WITH ASTM F3058.

TABLE 1
SANITITE HP RECOMMENDED MANDREL SETTINGS

PIPE TYPE	PIPE DIAMETER	INSIDE DIAMETER WITH 5% DEFLECTION[1]
DUAL WALL	12	11.31
DUAL WALL	15	14.11
DUAL WALL	18	17.03
DUAL WALL	21	19.71
DUAL WALL	24	22.71
DUAL WALL	30	28.30
TRIPLE WALL	30	28.14
TRIPLE WALL	36	33.65
TRIPLE WALL	42	39.24
TRIPLE WALL	48	44.94
TRIPLE WALL	60	56.34

NOTES:

1. BASED UPON MINIMUM INSIDE DIAMETER PER ASTM F2736 & F2764.

TABLE 2
TIME FOR PRESSURE DROP FOR SANITITE HP (PER ASTM F1417)[1]

PIPE DIAMETER	PRESSURE DROP (PSI)	MINIMUM TEST TIME (MIN:SEC)	LENGTH FOR MINIMUM TIME (FT)	TIME FOR LONGER LENGTHS (SEC)	100 FT	150 FT	200 FT	250 FT	300 FT	350 FT	400 FT	450 FT
12	0.5	5:40	199	1.709 L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
12	1.0	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:06	19:56	22:47	25:38
15	0.5	7:05	159	2.671 L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
15	1.0	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	0.5	8:30	133	3.846 L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
18	1.0	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	0.5	9:55	114	5.235 L	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
21	1.0	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	0.5	11:20	99	6.837 L	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17
24	1.0	22:40	99	13.764 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
30	0.5	14:10	80	10.683 L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07
30	1.0	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15

NOTES:

1. DATA TAKEN FROM ASTM F1417 AND UNI-B-6, UNI-B-6-90

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

VJEVI ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR 00902-4157 USA

ANCHOR QEA
TEL. 787-723-8005
FAX 787-721-3196
WWW.GLMENGINNERS.COM

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT
TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

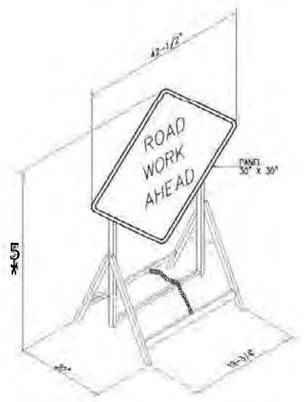
SHEET TITLE: HDPE PIPE GENERAL DETAILS

SHEET ID. GD-105 | SHEET No. 55
PROJ NO. CIP NO 1-01-9000
SCALE NTS
BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM
DATE JAN/28/2022

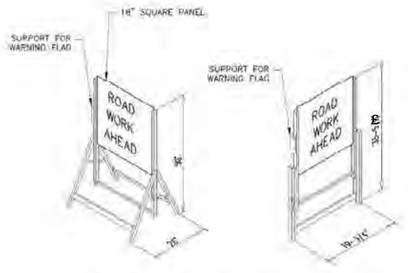


FOR USE IN GUARDING WORK AREAS AT NIGHT THE SILVER COLORED REFLECTOR FITS OVER THE UPPER PART OF TRAFFIC CONES AND REFLECTS LIGHT

TRAFFIC REFLECTOR



FOR USE AS A WARNING TO TRAFFIC

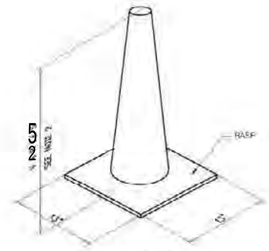


FOR USE AS WARNING TO TRAFFIC SOCKET AT SIDE OF FRAME PROVIDES A SUPPORT FOR WARNING FLAG REFLECTIVE YELLOW BACKGROUND PROVIDE ONLY FOR WARNING SIGN D.

FRAME AND PANEL

WARNING SIGN		WARNING SIGN
B	STEEL	25
C	ALUMINUM	15
D	ALUMINUM	15

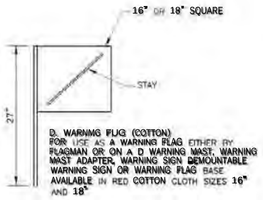
WARNING SIGNS B, C AND D



TRAFFIC CONE

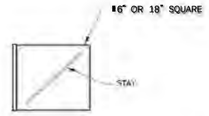
NOTES:

1. RED FLUORESCENT PLASTIC CONE FOR USE IN GIVING DRIVERS OF VEHICLES ADVANCE NOTICE AS THEY ARE APPROACHING WORK AREAS AND TO GUIDE TRAFFIC GRADUALLY INTO LANES AROUND THESE LOCATIONS WITH MINIMUM CONGESTION.
2. ALSO AVAILABLE IN 18 IN. CONE WITH 13 IN. SQUARE BASE.



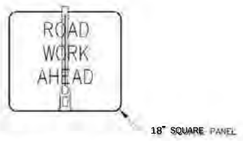
D. WARNING FLAG (COTTON) FOR USE AS A WARNING FLAG EITHER BY FLAGMAN OR ON A D WARNING MAST. WARNING MAST ADAPTER, WARNING SIGN DEMOUNTABLE WARNING SIGN OR WARNING FLAG BASE AVAILABLE IN RED COTTON CLOTH SIZES 16" AND 18".

H. WARNING FLAG (NYLON) SAME AS D WARNING FLAG EXCEPT IN RED VINYL COATED NYLON.

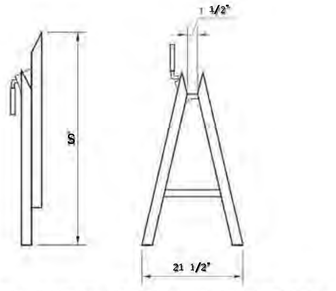


C. WARNING FLAG (COTTON) FOR USE WITH AN WARNING FLAG BRACKET OR WARNING FLAG CHAINS AS A WARNING AVAILABLE IN RED COTTON CLOTH IN SIZES 16" AND 18".

G. WARNING FLAG (NYLON) SAME AS C WARNING FLUG EXCEPT IN RED VINYL COATED NYLON.



"B" WARNING STAND ALL STEEL CONSTRUCTION WITH UPRITE AND OF SUPPORT TUBULAR TO ACCOMMODATE THE WARNING FLAG STAFF.



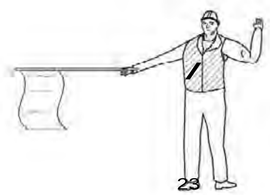
FOR USE IN PAIRS WITH A WOOD BOARD (NO REFURNISHED) TO 2/2" THICK IN PROTECTING WORK AREAS CONSIST OF 2 COLLAPSIBLE A FRAME IS PROVDE WITH A FLAG SOCKET AND LANTERN HOOK

TABLE A
WARNING SIGN SELECTION

POSTED SPEED (MPH)	LANE CLOSED	INITIAL SIGN	SIGN SIZE	ADDITIONAL SIGN (2&4)	SIGN SIZE
40 UNDER	NO	MEN WORKING	30"	——	——
45 OR OVER	NO	MEN WORKING	48"	MEN WORKING	30"
	YES	LANE CLOSED	48"	MEN WORKING	30"
EXPRESSWAY OR FREEWAY	NO	MEN WORKING	48"	MEN WORKING	48"
	YES	LANE CLOSED	48"	LANE CLOSED OR MEN WORKING	48" OR 48"
ONE LANE TRAFFIC	YES	LANE CLOSED	48"	LANE CLOSED OR MEN WORKING	48" OR 48"

WITH FLAG

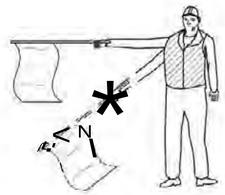
(SEE GENERAL NOTE 9)



TO STOP TRAFFIC



TRAFFIC PROCEED



TRAFFIC PROCEED

WITH PADDLE

(SEE GENERAL NOTE 9)







USE OF HAND SIGNALING DEVICES BY FLAGMAN

GENERAL NOTES:

1. A SUITABLE PLAN FOR GUARDING THE WORK AREA SHOULD BE DEVELOPED BEFORE THE AREA IS VISITED. THIS MAY BE ACCOMPLISHED DURING THE JOB SITE VISIT PROVIDED FOR IN THE CONSTRUCTION CONTROL PLAN. AT BUSY INTERSECTIONS ON HIGHWAYS AND CITY STREETS OR AT OTHER HEAVY TRAFFIC LOCATIONS THE SUPERVISOR SHOULD PRESURVEY THE WORK LOCATION AND THEN DISCUSS THE PROTECTION PLAN WITH THE CRAFTSMEN BEFORE WORKS ARE STARTED.
2. THE DEVICES REQUIRED TO PROTECT A WORK AREA MUST BE CONSIDERED IN ADVANCE TO MEET THE INDIVIDUAL REQUIREMENTS OF THE JOB SITE. CRAFTSMEN FAMILIAR WITH THE AREA WHERE THE JOB IS TO BE PERFORMED SHALL EQUIP THEMSELVES WITH AN ADEQUATE SUPPLY OF WARNING DEVICES PRIOR TO STARTING A JOB. SUPERVISORS CONDUCTING FIELD SURVEYS OF WORK TO BE PERFORMED AT LATER DATE, SHOULD MAKE A NOTATION ON THE FIELD JOB PLAN REPORT (FORCE MANAGEMENT PLAN) OF THE WORK AREA.
3. STATE, LOCAL LAWS AND ORDINANCES PERTAINING TO TRAFFIC CONTROL, WARNING SIGNALS, COLOR OF LENSES IN LIGHTING DEVICES, GUARDS AND SIMILAR DEVICES MUST BE COMPLIED WITH. IT IS A GOOD PRACTICE TO NOTIFY LOCAL LAW ENFORCEMENT OFFICIALS WHEN A MINOR TRAFFIC DISLOCATION IS INVOLVED. WHERE A MAJOR TRAFFIC ARTERY WITHIN A TOWN, THE POLICE FORCE HAVING JURISDICTION SHOULD BE CONSULTED BEFORE WORK IS BEGUN.
4. WHENEVER ROAD CONDITIONS PERMIT, SUFFICIENT WARNING CONES SHOULD BE PLACED TO OBTAIN A TAPER LENGTH, IN FEET OF TO TIME POSTED TRAFFIC SPEED, (AT A POSTED SPEED OF 50 MPH, THE TAPER FORMED BY THE SPACED WARNING CONES SHOULD EXTENT 500 FEET FROM THE WORK AREA).
5. WHEN WORK IS PERFORMED DURING HOURS OF DARKNESS, BARRICADES WITH STEADY BURNING LIGHTS CAN BE USED IN ADDITION OR IN PLACE OF WARNING, CONES FOR CHANNELING THE ON COMING TRAFFIC AROUND THE WORK AREA.
6. WHEN VEHICLE IS USED IN GUARDING A WORK AREA, IT SHOULD BE CONSIDERED SUPPLEMENTAL TO ALL WARNING DEVICES NECESSARY TO ADEQUATELY SAFEGUARD THE AREA AND NOT AS A SUBSTITUTE FOR ANY DEVICE IN THIS WAY, THE WORK AREA IS PROTECTED SHOULD IT BE NECESSARY TO REMOVE THE VEHICLE.
7. THE AMOUNT FOR WORK TO BE PERFORMED SHALL HAVE NO BEARING AS TO WETHER OR NOT WORK AREA PROTECTION IS REQUIRED, WARNING AND GUARDING DEVICES ARE TO TO BE PLACED WHENEVER WORK OF ANY DURATION IS PERFORMED IN A ROADWAY.
8. FOR THE WARNINGS SIGNS AND CONES LOCATION REFER TO TABLE A AND B ON THIS SHEET.
9. CONTRACTOR SHALL NORMALLY USE THE PADDLE AS A HAND SIGNALING DEVICE; THE FLAG IS TO BE USED ONLY IN AN EMERGENCY.
10. CONTRACTOR SHALL PROGRAM WORK ON EXISTING ROADS SUCH AS TO LIMIT THE OBSTRUCTION OF TRAFFIC AND ENSURING THE REESTABLISHMENT OF TRAFFIC AT THE END OF THE WORK DAY.
11. ALL OPEN EXCAVATION NEAR ROADWAY SHALL BE BARRICADED PROPERLY AND CONTRACTOR SHALL INSTALL TRAFFIC WARNING SIGNS ACCORDING TO STANDARDS.

NOTES TO CONSTRUCTION INSPECTOR & CONTRACTOR:

12. IT IS A CONSTRUCTION DEPARTMENT, RESPONSIBILITY TO INSURE THE ENFORCEMENT & COMPLIANCE OF ALL SAFETY RULES INCLUDED IN THE BELL SYSTEM PRACTICE NUMBER 620 – 135 – 010, "GUARDING WORK AREAS" AS WELL AS ALL STATE AND/OR LOCAL RULES APPLICABLE.
13. COPY OF THIS PRACTICE IS AVAILABLE UPON REQUEST FROM THE O.P. CONSTRUCTION DEPARTMENT.
14. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL STATE OR LOCAL SAFETY REQUIREMENTS. IN NO EVENT THE OMISSION OF ANY SUCH REQUIREMENT IN THESE NOTES WILL WAIVE THE CONTRACTOR TO COMPLY WITH THEM.
15. IN NO EVENT SHALL THE CONSTRUCTION INTERFERE WITH THE FREE TRANSIT OF VEHICLES AND/OR PEDESTRIAN.
16. IN NO EVENT THE MATERIAL PRODUCT OF ANY EXCAVATION SHALL INTERFERE WITH THE FREE TRANSIT OF VEHICLES AND/OR PEDESTRIAN.
17. THE CONTRACTOR SHALL AT ALL TIMES TAKE REASONABLE PRECAUTIONS FOR THE SAFETY OF EMPLOYEES ON THE WORK AND OF THE PUBLIC SHALL COMPLY WITH ALL EMPLOYEES ON THE WORK AND OF THE PUBLIC AND SHALL COMPLY WITH ALL APPLICABLE PROVISIONS OF FEDERAL, COMMONWEALTH AND MUNICIPAL SAFETY LAWS AND BUILDING AND CONSTRUCTION CODE WHEN APPLICABLE. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PUERRO RICO OCCUPATIONAL SAFETY AND HEALTH ACT (LAW NUMBER 16 APPROVED ON AUGUST 5, 1975). THE CONTRACTOR SHALL PROVIDE AND UTILIZE EQUIPMENT FOR PERSONAL PROTECTION, MATERIALS, TOOLS, EQUIPMENT AND APPROVED WORK PROCEDURES WHICH GUARANTEE THE PERFORMANCE OF THE DISPOSITION OF THE GENERAL INDUSTRY OSHA SAFETY AND HEALTH STANDARDS (29 CFR 1910) AND THE SAFETY AND HEALTH STANDARDS APPLICABLE TO THE CONSTRUCTION INDUSTRY (10 OSHA 1926).

TABLE B
SPACING FOR INITIAL WARNING SIGNS AND CONES

POSTED TRAFFIC SPEED (MPH)	INITIAL SIGN	CONE SPACING (FEET)
15 OR UNDER	*90'	10'
20	*120'	20'
25	*150'	25'
30	*180'	30'
35	*210'	35'
40	240'	40'
45 OR ABOVE	NOTE 1	NOTE 2
EXPRESSWAY OR FREEWAY	300'	NOTE 2
ONE LANE TRAFFIC	SEE POSTED SPEED	NOTE 2

NOTES:

1. INITIAL WARNING SIGN TO BE PLACED AT A POINT 10 TIMES POSTED SPEED.
2. SAME AS POSTED SPEED * INITIAL WARNING SIGN TO BE PLACED AT A POINT 6 TIMES POSTED SPEED.

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLMV ENGINEERING-GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 9024157, SAN JUAN, PR 00902-4157 USA
TEL. 787-723-8005
FAX 787-721-3196
www.GLMENGINNERS.COM

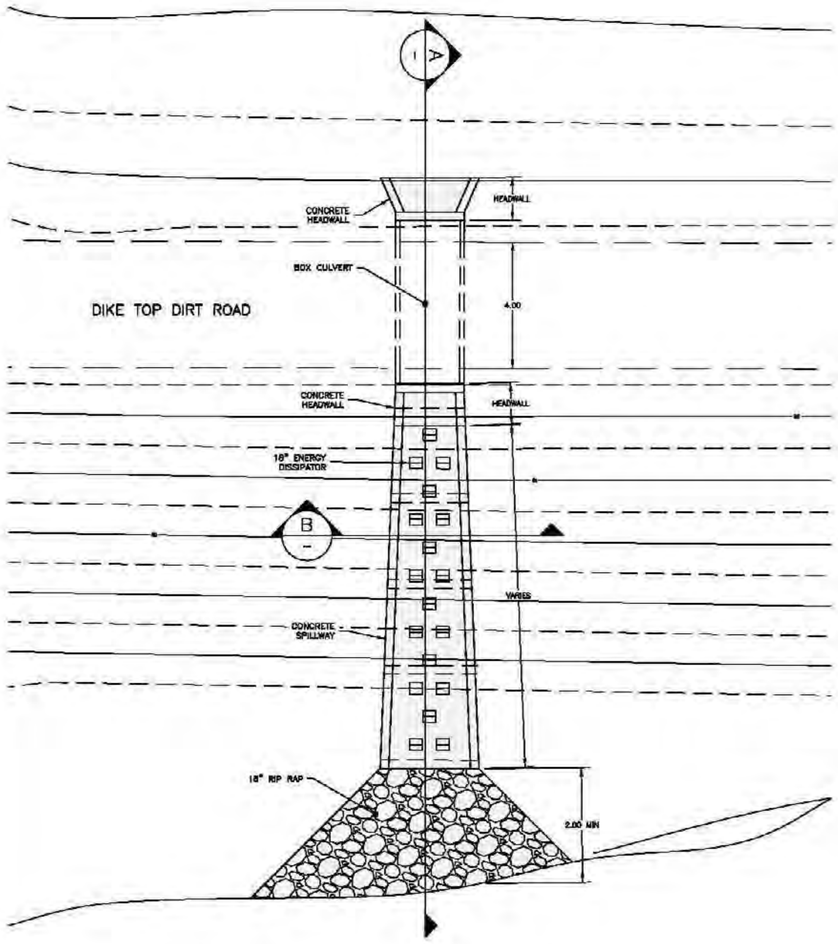
ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO
CIP NO. 1-01-9000

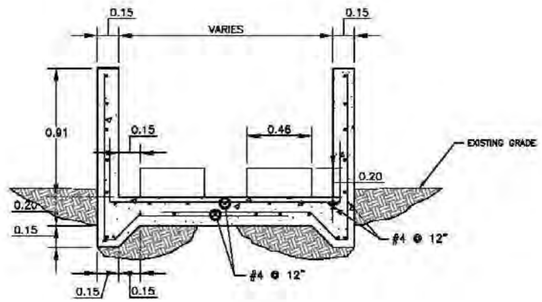
Autoridad de Acueductos y Alcantarillados

SHEET TITLE:	SHEET ID.	SHEET No.
MOT GENERAL DETAILS	GD-106	56
	PROJ NO.	CIP NO 1-01-9000
SCALE: NTS	BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM	DATE: JAN/28/2022



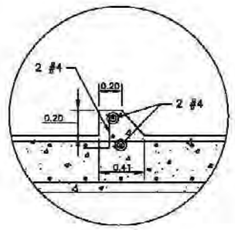
OVERFLOW WEIR AND SPAILLWAY

SCALE: 1=100



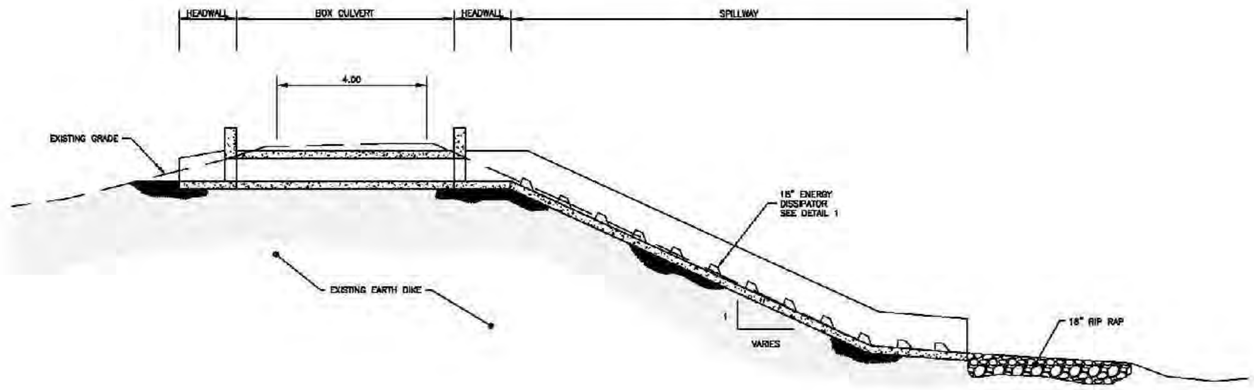
SECTION B

SCALE 1=20



DETAIL 1

NTS



SECTION A

SCALE 1=75

NOTES:

1. CONTRACTOR SHALL ADAPT THE OVERFLOW WEIR CONFIGURATION TO EACH CONTAINMENT AREA.
2. DIMENSIONS AND REINFORCEMENT IS SHOWN FOR REFERENCE ONLY.

GRAPHIC SCALE 0 1 2 3 4 5

BASIS OF DESIGN (NOT FOR CONSTRUCTION)

NO.	COMMENT	DATE	BY	APPROVED

REVISIONS

GLM ENGINEERING GROUP
742 PROLONGACION PAZ, SANTURCE, PR 00907
P.O. BOX 8024157, SAN JUAN, PR 00802-4157 USA
TEL. 787-723-8005
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ANCHOR QEA

BASIS OF DESIGN FOR LAGO LOIZA (CARRAIZO) DREDGING PROJECT

TRUJILLO ALTO, PUERTO RICO

CIP NO. 1-01-9000

Autoridad de Acueductos y Alcantarillados

SHEET TITLE: OVERFLOW WEIR AND SPILLWAY GENERAL DETAILS

SHEET ID. GD-107

SHEET No. 57

PROJ NO. CIP NO 1-01-9000

SCALE NTS

BAR IS TWO CM ON ORIGINAL DRAWING. IF NOT TWO CM ON THIS SHEET, ADJUST SCALES ACCORDINGLY 0 2CM

DATE JAN/28/2022

APPENDIX D PROJECT COMPONENTS GRAPHIC REPRESENTATION

Appendix D

Project Components



Hydraulic Dredging Barge



Floating Booster Pump Station



Photographic documentation of Carraízo Reservoir previous dredging event



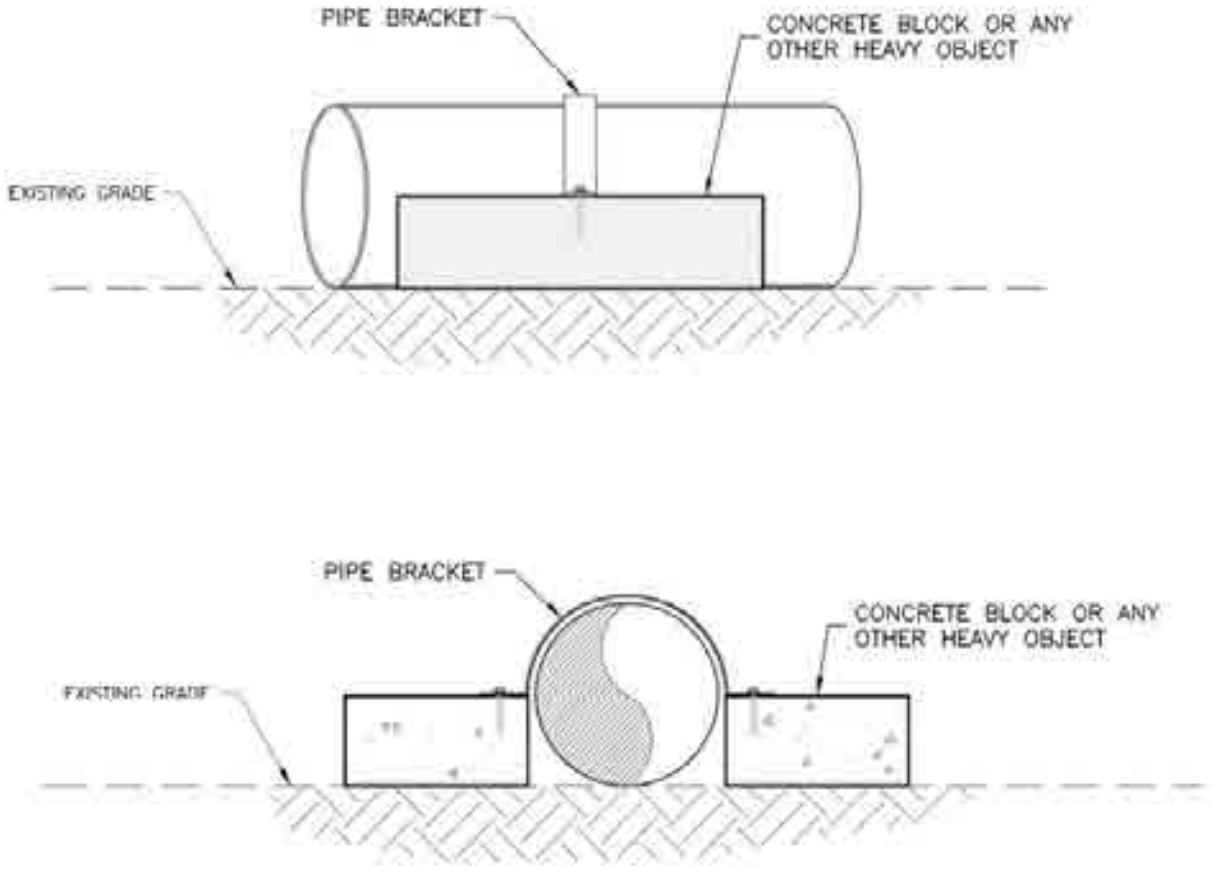
HDPE Floating Dredging Pipeline



Dredging Booster Pump (Skid Mounted for Inshore Installation)



Geotextile Tubes Dewatering System



Non-Invasive Temporary Pipe Fastener

Proposed Inshore Sediment Pipeline Alignment (Maps) – Including Potential Booster Pump Locations

Reservoir to Disposal Dike A Inshore Section





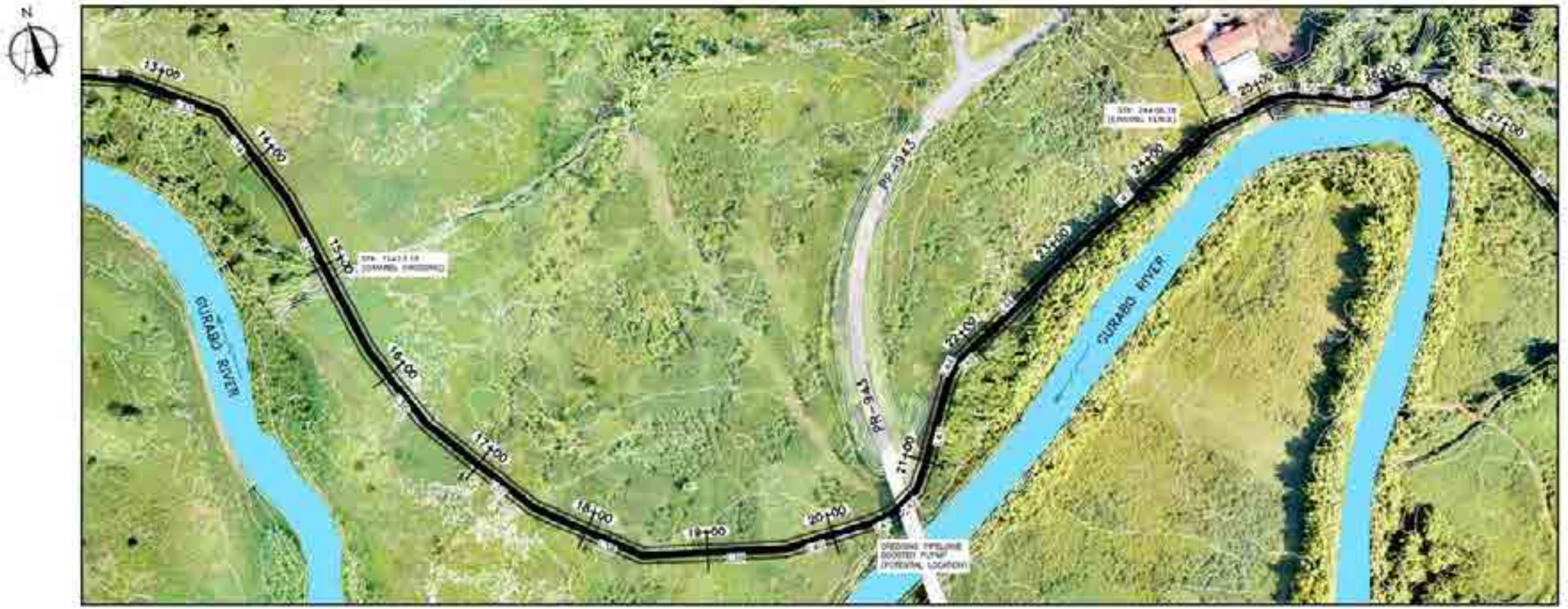
LINE B PLAN VIEW

Reservoir to Disposal Dike B Inshore Section

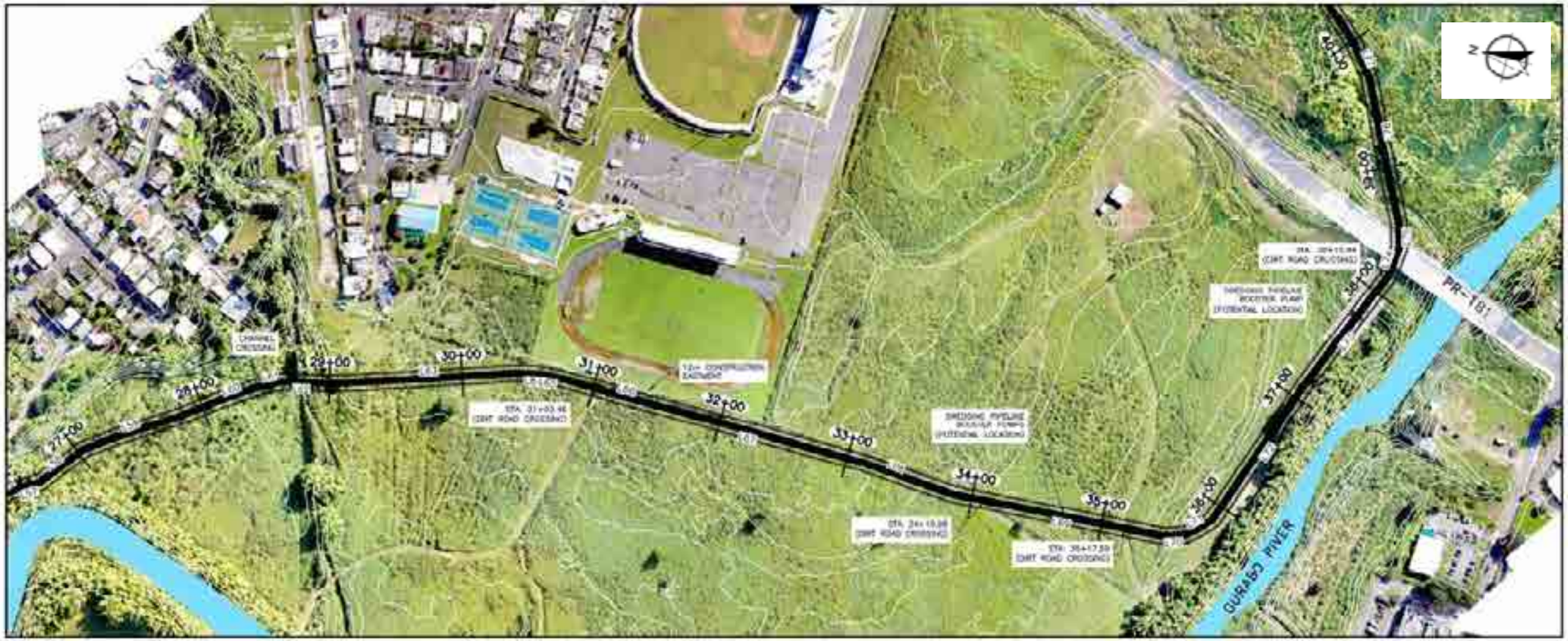
Disposal Dike B to Disposal Dike C Inshore Section (1 of 4)



Disposal Dike B to Disposal Dike C Inshore Section (2 of 4)



Disposal Dike B to Disposal Dike C Inshore Section (3 of 4)



Disposal Dike B to Disposal Dike C Inshore Section (4 of 4)



Flora and Fauna Critical, Threatened and Endangered Species

(For Identification Purposes)



Chilabothrus inornatus (Puerto Rican boa) - Endangered



Patagioenas inornata wetmorei (Puerto Rican Plain Pigeon) - Endangered



Trachemys stejnegeri stejnegeri (Puerto Rican slider) – Critical element by DNER



Amazona vittata (Puerto Rican parrot)



Buteo Platypterus brunnescens (Puerto Rican Broad-winged Hawk)

APPENDIX E GEOTECHNICAL REPORTS

GEOTECHNICAL REPORT ON
DREDGE DISPOSAL AREA A
CARRAIZO RESERVOIR
DREDGING PROJECT
GURABO, PUERTO RICO



Suelos, PSC
Calle Chile 258, San Juan, P.R. 00917-2103
Tel. (787) 753-0147. Emails: suelosinc@gmail.com / jackson.suelos@gmail.com

Suelos, PSC

Soil & Construction Materials Laboratory and Environmental Drilling Services

GEOTECHNICAL REPORT ON
DREDGE DISPOSAL AREA A
CARRAIZO RESERVOIR DREDGING PROJECT
GURABO, PUERTO RICO

CSA GROUP
Requested for

Boring Logs Performed & Supervised By
***SUELOS, PSC.**

Submitted on November 18, 2021
Job No. 5068-Dike A.rep

258 Chile St., San Juan, PR 00917-2103. Phone (787) 753-0147
Emails: suelosinc@gmail.com / jackson.suelos@gmail.com

GEOTECHNICAL REPORT ON
DREDGE DISPOSAL AREA A
CARRAIZO RESERVOIR DREDGING PROJECT
GURABO, PUERTO RICO
November 18, 2021

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CLASSIFICATION TESTS

BORING LOGS

DRILLING APPENDIXES

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GEOTECHNICAL REPORT ON
DREDGE DISPOSAL AREA A
CARRAIZO RESERVOIR DREDGING PROJECT
GURABO, PUERTO RICO

1.0 INTRODUCTION

This report presents the results of the geotechnical investigation performed at the dredge disposal area "A" (hereafter named Dike A) which has been used as disposal site for dredged material from the Carraizo reservoir. Dike A is located at the town of Gurabo, at the area presented in **Figure 1**.

The subsoil exploration and geotechnical consulting services were commissioned by **CSA Group**, following the terms and conditions stated in our approved proposal dated June 28, 2021. A formal **Purchase Order No. 2021-0811** was issued to **Suelos, PSC**. to perform work.

The original objective of the exploration was to determine the capacity of Dike A to receive sediment in connection with the new dredging plan for the Carraizo reservoir, with the possibility of increasing the height of the present levees. In recent conversations with **Eng. Gregory Morris** from **GLM** (consulting engineer for **CSA Group**), we were informed that the deposition approach at Dike A will consider geotubes to contain newly imported sediments. These geotubes would be staked in the interior of the containment area, away from the interior face of the levees.

In view of this approach, our field investigation and geotechnical analyses were geared to provide information regarding soil type and strength parameters (cohesion and internal friction angle) of the existing sediments over which the geotubes would be staked.

2.0 GENERAL PROJECT DESCRIPTION AND BACKGROUND INFORMATION

About two decades ago, dredging contractor Weeks Marine was contracted by the Puerto Rico Aqueduct and Sewer Authority to dredge six million cubic meters of sediment from the Carraízo reservoir. The disposal of the dredged sediment required Weeks Marine to design and build 3 confined disposal areas which had combined capacity of seven million cubic meters. The construction of the disposal areas included excavating and compacting two million cubic meters of soil into levees as high as 17 meters. **Figure 2** show an aerial picture of Dike A, taken more than 20 years ago.



Figure 1. Location of Dike A.



Figure 2. Historic picture of Dike A.

3.0 WORK PERFORMED

As originally intended, the plan to increase the capacity of the dike consisted of rising the height of the levees approximately 2 meters. Based on this approach, our June 28, 2021 technical proposal considered four (4) SPT borings located at the top of the levees and two (2) borings located at the interior of the dike, as requested by CSA, Group.

More recently (October- 2021) we were informed by GLM that, due to permitting issues, the plan now considers placing the new dredge material inside geotubes which, in turn, would be stacked up in layers inside the dike. A preliminary array of geotubes inside Dike A is shown in **Figure 3**. A typical cross section showing the geotubes staked up inside the dike is presented in **Figure 4**.

From **Figure 4** it is worth noting that the array of geotubes lays flat on the containment area, away from the exposed interior face of the levees. This layout suggests that the current state of stresses in the levees will remain unchanged, and thus the present safety factor of the levees would not be affected.



Figure 3. Preliminary array of geotubes inside Dike A (provided by GLM).

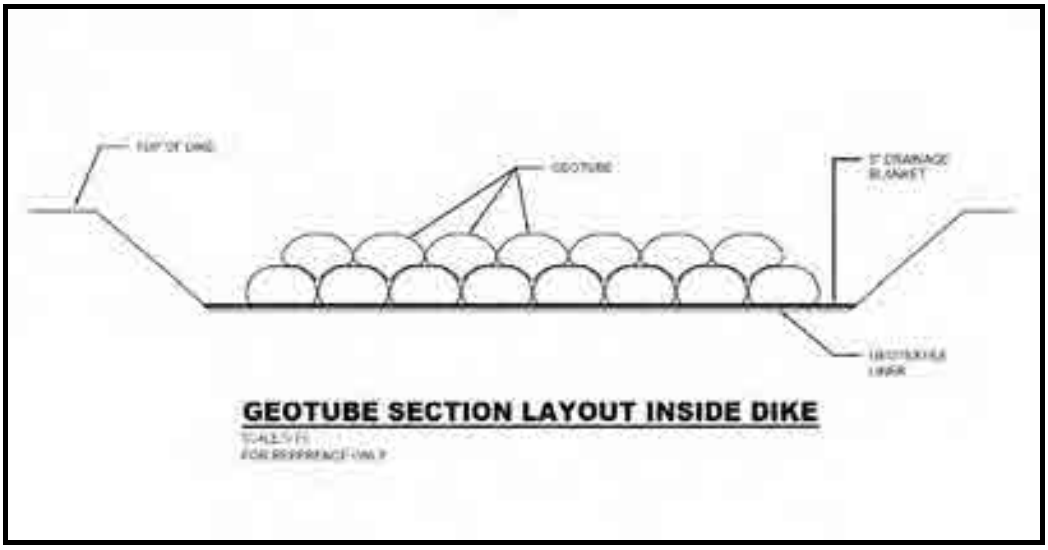


Figure 4. **Stacking up geotubes inside the dike.**

The SPT borings were performed using the Power Auger Method. Borings were located at the field using hand-held GSP and their elevations were inferred from the topographic plan provided to us by CSA. Table 1 lists this information.

Soil samples were secured at vertical intervals not exceeding five (5) feet by means of a 1.375" I.D. Split Spoon Sampler according to ASTM Designation D-1586 and/or D-1452. As part of the work, Unconfined Compressive Strength Tests were performed on clayey samples while Natural Moisture Contents were performed on all collected samples. Results of the laboratory program are included in appendix **"Laboratory Results"** at the back of this report.



Figure 5. Boring location plan.

TABLE 1; Boring Coordinates and Inferred Elevations

Boring I.D.	Latitude	Longitude	Elevation(m)*
A-1	18.258669°	-66.006990°	52.5
A-2	18.257241°	-66.009141°	52.8
A-3	18.260036°	-66.009815°	52.85
A-4	18.261198°	-66.007716°	52.8
A-5	18.260258°	-66.008235°	52.3
A-6	18.258830°	-66.009288°	50.35

*** Elevations inferred from the topographic information provided to us.**

4.0 GENERAL SITE GEOLOGY

Based on the U.S.G.S. Geological Maps of the Aguas Buenas and Gurabo Quadrangles, Dike A should be located entirely located over **Qa** and **Qt** deposits. These consist of alluvial sand, gravel, silt and clay in flood plains. **Figure 6** presents portions of the aforementioned Geologic Quadrangles that show the boundaries of the above listed geologic units.

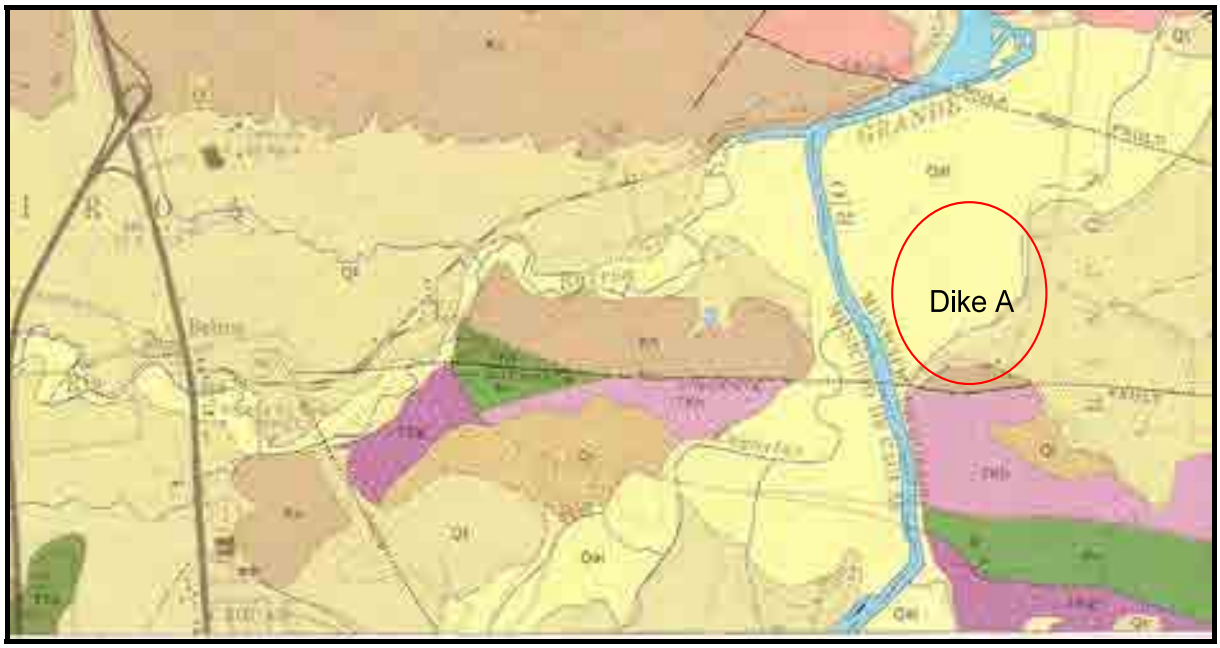


Figure 6. Geologic setting for Dike A.

5.0 GEOTECHNICAL SUBSOIL CONDITIONS

5.1 Soil Composition of Levees

Borings A-1- to A-4 were drilled from the top of the levees in order to characterize their soil composition. The levees that make up the containment site A are made of stiff consistency, relatively well compacted, brown clay, sometimes intermixed with sandy silt. On average, the fill material of the levees extends to a depth of 15 ft and shows AASHTO Soil Classification A-7-6.

Standard Penetration Tests (SPT) resulted with N-values between 13 and 27 blows per foot. The natural moisture content of this material varies mostly from 11 to 22 percent, while the unconfined compressive strength is in the order of 3 to 4.5 tons per square foot.

The native soils appear at about 15 feet deep from the top of the levees. Olive gray, olive brown and yellowish-brown are the most common hues in the stiff alluvial clay (AASHTO A-7-6) and silty sand making up the in-situ material. The N-values recorded by the SPT vary from 4 to 38 blows per foot, but most N-values fall within 5 to 27 bpf range. Natural moisture contents range from 15 to 35 percent and unconfined compressive strengths from 1.5 to 4.5 tsf.

5.2 Dredge Material

Boring A-5 and A-6 where located inside the containment area with the intent of sampling old dredged material. These borings show the presence of 25 to 34 ft of dredged fill made mostly of soft to medium consistency, normally consolidated to slightly over-consolidated, dark gray to dark brown clay, silt and loose fine sand. The soft/loose sediments are capped by firm, desiccated material that shows medium to stiff consistency and a higher over-consolidation ratio ($2<OCR<3$). The thickness of this cap varies from 3 ft in boring A-6 to 10 ft in boring A-5.

Standard Penetration Tests in the soft dredged material resulted with N-values between 2 and 7 blows per foot. Most unconfined compressive strength obtained qu values of 0.5 to 0.75 tsf, consistent with the soft consistency noted from the samples. Natural moisture contents in the dredged material range from 9% in fine grained sand to 67% in soft elastic silt.

Atterberg Limits in the dredged material reveal average LL and PL of 60% and 28%, respectively. Grain Size Analyses disclosed fine contents in the range of 97% and 99%. The USCS for this material corresponds to MH.

5.3 Groundwater

Observations on the groundwater table level were performed after drilling completion. The following table shows the groundwater table level as recorded inside the borings.

TABLE 2; Summary of Water Levels

Boring I.D.	Depth to Groundwater (ft)
A-1	50
A-2	45
A-3	35
A-4	45
A-5	40
A-6	25

6.0 STRENGTH, COMPRESSION AND CONSOLIDATION PARAMETERS FOR DREDGED MATERIAL

Taking into account that the newly dredged material will be encapsulated inside geotubes, staked in the interior of the containment area, the geotechnical work for Dike A is chiefly geared to provide strength, compression and consolidation parameters of the existing sediments. Table 3 presents a summary of these parameters. Strength, compression and consolidation parameters for the fill material comprising the levees are also provided. These parameters are based on well known geotechnical correlations and our experience dealing with similar soils.

TABLE 3; Strength, Compression and Consolidation Parameters

Soil Layer	Moist Unit Weight	Undrained Shear Strength (Su)	Effective Stress Friction Angle (φ)	Compression Ratio (Cc')	Coefficient of Consolidation (Cv)
Levee Fill (A-7-6)	128 pcf	2,400 psf	24°	0.05 to 0.08	0.17 ft^2/day
Desiccated Dredge Cap	115 pcf	1,000 psf	26°	0.108 to 0.15	0.10 to 0.15 ft^2/day
Normally Consolidated Sediments (A-7-5)	105 pcf	500 psf	26°	0.19 to 0.22	0.10 to 0.15 ft^2/day
Native Soils (A-7-6)	118 pcf	2,000 to 3,000 psf	24°	0.08 to 0.15	0.06 to 0.04 ft^2/day

The main input for geotechnical analysis are geometry, magnitude of pore-water pressures, unit weight of materials involved, and shear strength of the materials that intersect potential failure surface. For the latter, a drained or undrained shear strength may be applicable depending on the hydraulic conductivity of the materials and rate of loading involved. For instance, if the loading rate is slow enough that pore-water pressures do not develop, drained or effective shear strength parameters shall be employed.

During and shortly after construction or fill placement, it can be conceived that loading rates occur relatively fast. Under this scenario, undrained shear strength parameters are used. This appears to be the loading rate scenario for the geotubes, as they will be filled rapidly in the field.

7.0 BEARING CAPACITY CONSIDERATIONS

The information obtained from boring A-5 and A-6 was used to described soil conditions in the interior of the containment area. Making reference to **Figure 3** and **4**, and in lieu of more specific information regarding the array and placement rate of geotubes for this project, we have considered that an area of 200 ft long by 200 ft wide would be loaded with geotubes at a time. This area was used to calculate the bearing capacity of existing sediments using Hansen, Vesic and Meyerhof Bearing Capacity Factors (General Shear).

Using a typical safety factor of 3, the results indicate an average allowable soil bearing pressure of 1.13 ksf for general shear failure. Using a unit weight of 105 pcf for the new dredge, a 11 ft high column of new dredge could be placed over the existing sediments without experience a bearing capacity failure.

8.0 CONSOLIDATION ANALYSIS

The soil profile found in boring A-4 was used to conduct consolidation settlement analyses. This boring disclosed 4 ft of over-consolidated, desiccated dredge followed by 20 ft of soft, normally consolidated sediments.

Our settlement prediction for geotubes underlain by soft sediments ignores immediate settlement. The magnitude of primary consolidation is far more important in soft clay and silt. Primary consolidation occurs when the pore water in saturated clay is drained (squeezed out) by the stress increase superimposed on the soil. As the pore water drains a reduction in void ratio and hence, settlement occurs.

We have used empirical correlations to estimate compression and consolidation parameters for the weak sediments (see Table 2). Considering that the new column of dredge should be limited to 11 ft due to bearing capacity issues, the expected blanket-type load would be in the order of 1,155 psf. Under this load scenario, primary consolidation settlements would be in the order of 10 to 12 inches during a period of 15 years.

9.0 RECOMMENDED MONITORING PROGRAM

In view of the weak soil conditions that prevail inside Dike A, we strongly recommend geotechnical monitoring during new dredge placement. If the geotubes are filled or staked up too rapidly, local shear failures could be induced in the existing sediments. Therefore, it is very important to monitor the rate of dredge placement.

Field instrumentations should include, as a minimum, measurements of settlement and pore pressure at the middle of the weak layer, and the installation of one inclinometer per station for monitoring lateral soil displacement. **Shear waves and soil lateral displacement may occur, if the dredge deposition is not monitored carefully**. The fill rate would be established and possibly modified according to the results of the monitoring program.

A minimum of 12 monitoring stations are required for this site. The proposed location of these 12 stations are presented in **Figure 7**.



Figure 7. Location of monitoring stations.

The instrumentation shall be installed prior to new dredge deposition. Each monitoring location shall be comprised of one (1) surface settlement plate, one (1) piezometer at the middle of the compressible layer and one (1) inclinometer. SPT borings shall first be performed at the location of each monitoring station to establish the correct depth and soil strata for installation of the instrumentation.

10.0 LIMITATIONS OF REPORT

At the time of writing we lack detailed information and plans for this project. The main intent of the present study is to provide CSA, GLM and their dredging consultants with the typical soil characteristics, strength and compressibility parameters of levees and old dredged material. This information can be used by experts in this field (dredging projects, levee construction, filling of containment areas, uses and applications of geotubes), to conduct detailed analyses and present and present recommendations and work plans for this project.

The final and comprehensive design for the new dredge deposition will undoubtedly require the participation of this office as Geotechnical Consultants. Suelos, PSC. shall be able to install and evaluate the monitoring program recommended herein. Therefore, the Geotechnical Engineer must be involved during dredge deposition works to monitor the field instrumentation and present additional recommendations as needed.

11.0 GENERAL COMMENTS

The observance or supervision of new dredge deposition over weak deposits is, in general, is a very delicate matter. In some cases this service is not rendered by the Soils Engineer who made the subsoil investigation. In a large number of projects fill and earthwork operations are successfully completed due to the prevalence of ideal and uniform conditions and to the fact that they are being performed by a competent and responsible contractor. But there are cases, where the lack of proper techniques and the lack of adequate supervision has given rise to the occurrence of geotechnical problems and failures.

Conscious of the above exposed problem, we wish to state that the validity of our recommendations is subordinated to the observance and monitoring of new dredge deposition by us. If the contract is awarded to another experienced Soils Engineer, he shall receive a copy of this report, evaluate the same and adopt it as his own, or request additional soil data to verify our recommendations or modify them in accordance to his personal knowledge and judgement, thus assuming full responsibility for his recommendations and the report itself.

The above conclusions and recommendations are being based on a number of representative tests which we consider appropriate to enable us to prepare recommendations for the project. But the testing of every square meter of land to be occupied by the proposed four sites would be economically unfeasible and variations might be encountered in the soil profile, especially, at intermediate areas between boreholes. These variations shall be evaluated by the project geotechnical engineer to provide the corresponding solution. The standard procedures followed during the drilling of the test borings are discussed in detail in the Appendix to this soil report.

This report has been prepared taking into consideration the design factors presently known to us. The project designers shall be alert of any item that might have been overlooked, that could require clarification or that may need additional recommendations to those discussed herein.

Respectfully submitted,



IVAN JACKSON MADURO, P.E., M.S.C.E., CWI
Partner

mgn

Reference No. 5068-A

APPENDIXES

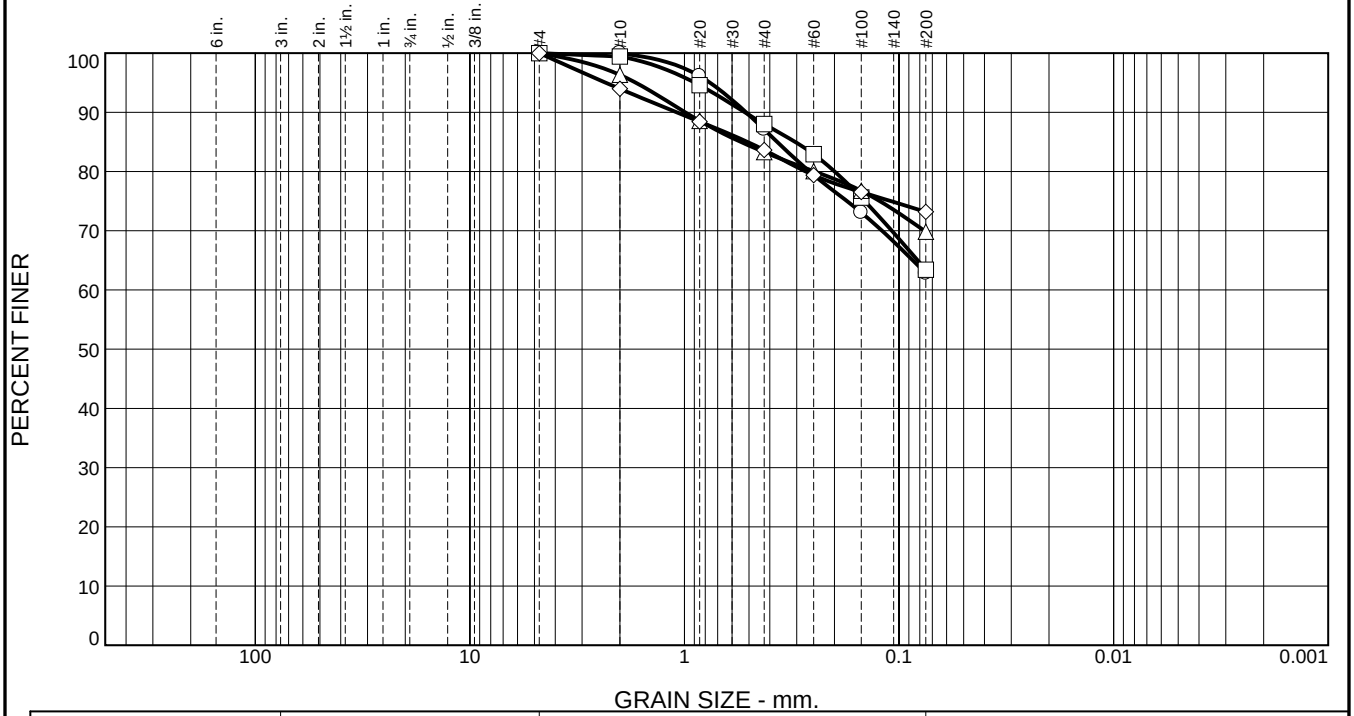
DIKE A

Suelos, PSC
Calle Chile 258, San Juan, P.R. 00917-2103
Tel. (787) 753-0147. Email: suelosinc@gmail.com

CLASSIFICATION TESTS

Suelos, PSC
Calle Chile 258, San Juan, P.R. 00917-2103
Tel. (787) 753-0147. Email: suelosinc@gmail.com

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	12.9	24.3	62.8	
□	0.0	0.0	0.0	0.6	11.4	24.6	63.4	
△	0.0	0.0	0.0	3.7	13.0	13.5	69.8	
◇	0.0	0.0	0.0	6.0	10.4	10.4	73.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	45	23	0.3696							
□	41	18	0.3045							
△	41	18	0.5458							
◇	65	22	0.5084							

Material Description	USCS	AASHTO
○ sandy lean clay	CL	A-7-6(12)
□ sandy lean clay	CL	A-7-6(12)
△ sandy lean clay	CL	A-7-6(14)
◇ fat clay with sand	CH	A-7-6(31)

Project No. 5068 **Client:**

Project: Dike A, Gurabo, PR

○ **Source of Sample:** A-1 **Depth:** 4-5.5' **Sample Number:** S-3

□ **Source of Sample:** A-1 **Depth:** 9-10.5' **Sample Number:** S-5

△ **Source of Sample:** A-1 **Depth:** 19-20.5' **Sample Number:** S-7

◇ **Source of Sample:** A-1 **Depth:** 29-30.5' **Sample Number:** S-9

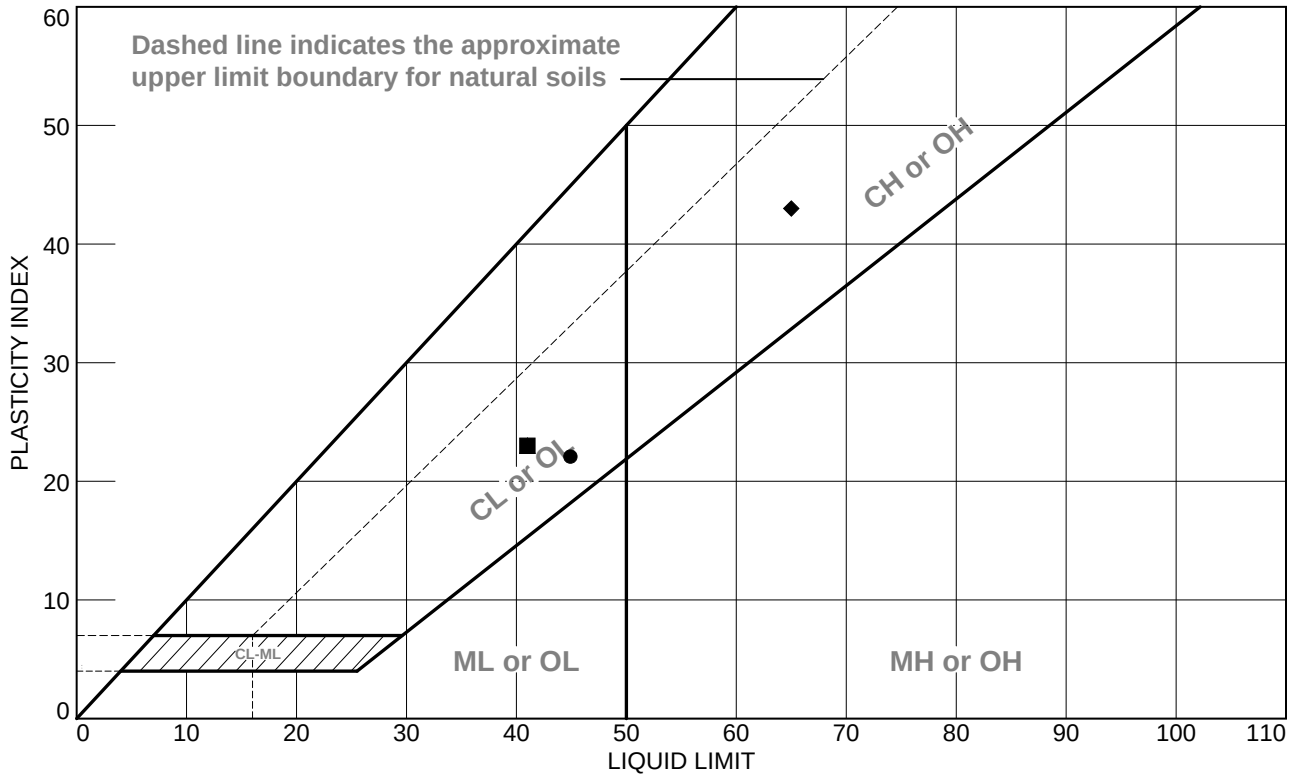
SUELOS, INC.

San Juan, Puerto Rico

Remarks:

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	A-1	S-3	4-5.5'		23	45	22		CL
■	A-1	S-5	9-10.5'		18	41	23		CL
▲	A-1	S-7	19-20.5'		18	41	23		CL
◆	A-1	S-9	29-30.5'		22	65	43		CH

SUELOS, INC.

San Juan, Puerto Rico

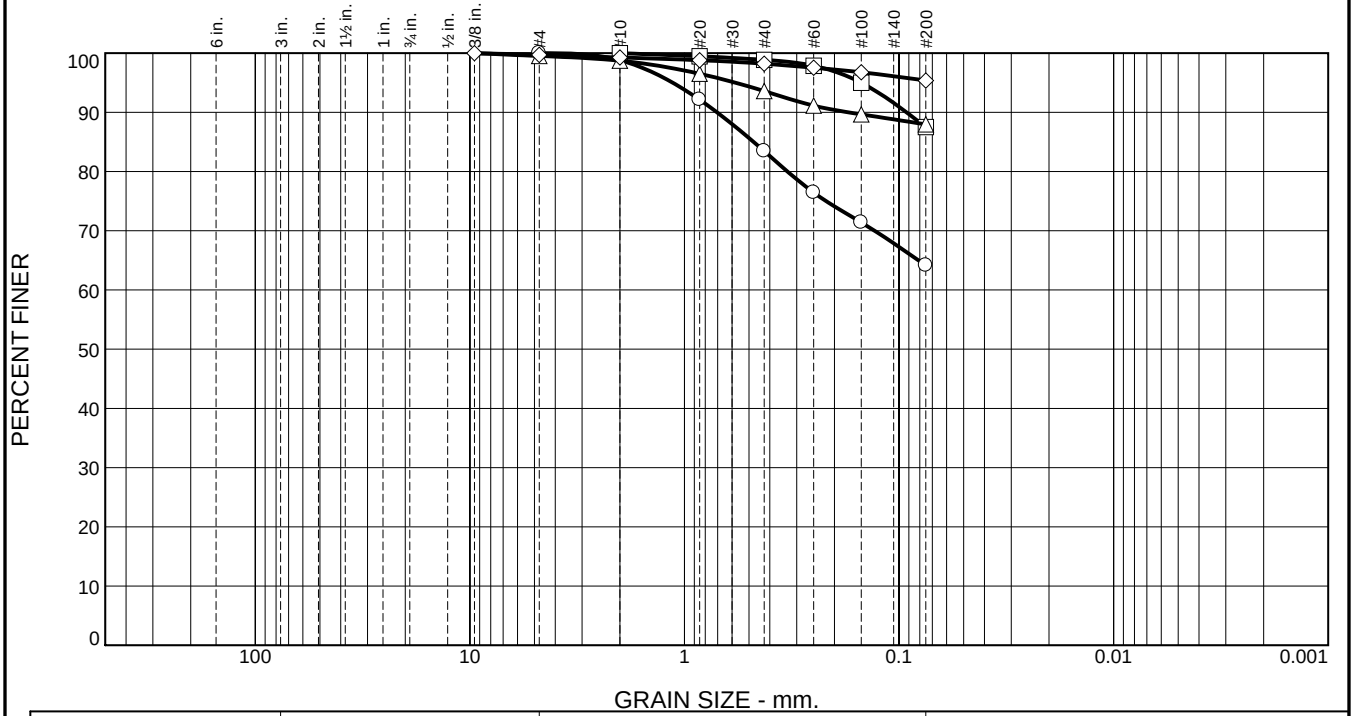
Client:

Project: Dike A, Gurabo, PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	1.2	15.4	19.3	64.1	
□	0.0	0.0	0.0	0.0	1.1	11.4	87.5	
△	0.0	0.0	0.5	0.8	5.1	5.6	88.0	
◇	0.0	0.0	0.3	0.4	1.1	2.8	95.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	52	19	0.4762							
□	48	18								
△	70	25								
◇	80	26								

Material Description	USCS	AASHTO
○ sandy fat clay	CH	A-7-6(19)
□ lean clay	CL	A-7-6(27)
△ fat clay	CH	A-7-6(44)
◇ fat clay	CH	A-7-6(59)

Project No. 5068 **Client:**

Project: Dike A, Gurabo, PR

○ **Source of Sample:** A-2 **Depth:** 4-5.5' **Sample Number:** S-3

□ **Source of Sample:** A-2 **Depth:** 9-10.5' **Sample Number:** S-5

△ **Source of Sample:** A-2 **Depth:** 19-20.5' **Sample Number:** S-7

◇ **Source of Sample:** A-2 **Depth:** 29-30.5' **Sample Number:** S-9

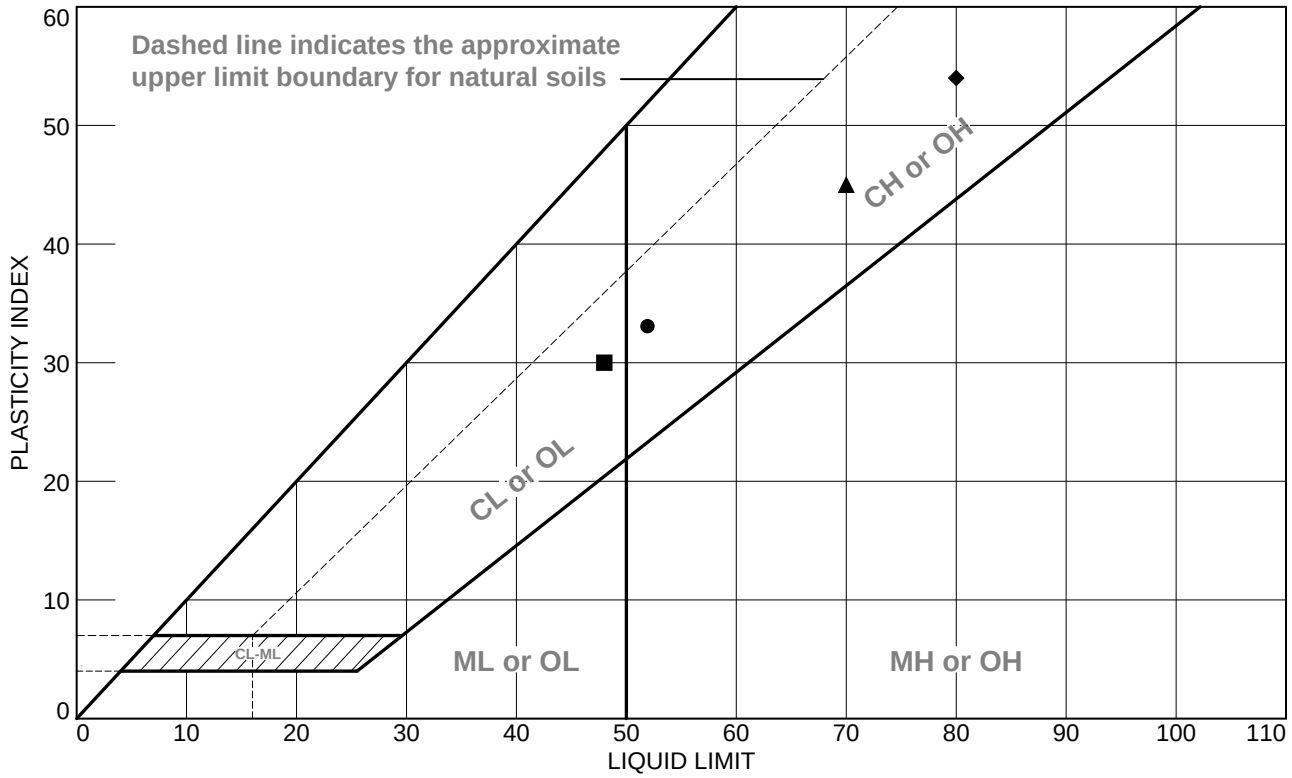
SUELOS, INC.

San Juan, Puerto Rico

Remarks:

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	A-2	S-3	4-5.5'		19	52	33		CH
■	A-2	S-5	9-10.5'		18	48	30		CL
▲	A-2	S-7	19-20.5'		25	70	45		CH
◆	A-2	S-9	29-30.5'		26	80	54		CH

SUELOS, INC.

San Juan, Puerto Rico

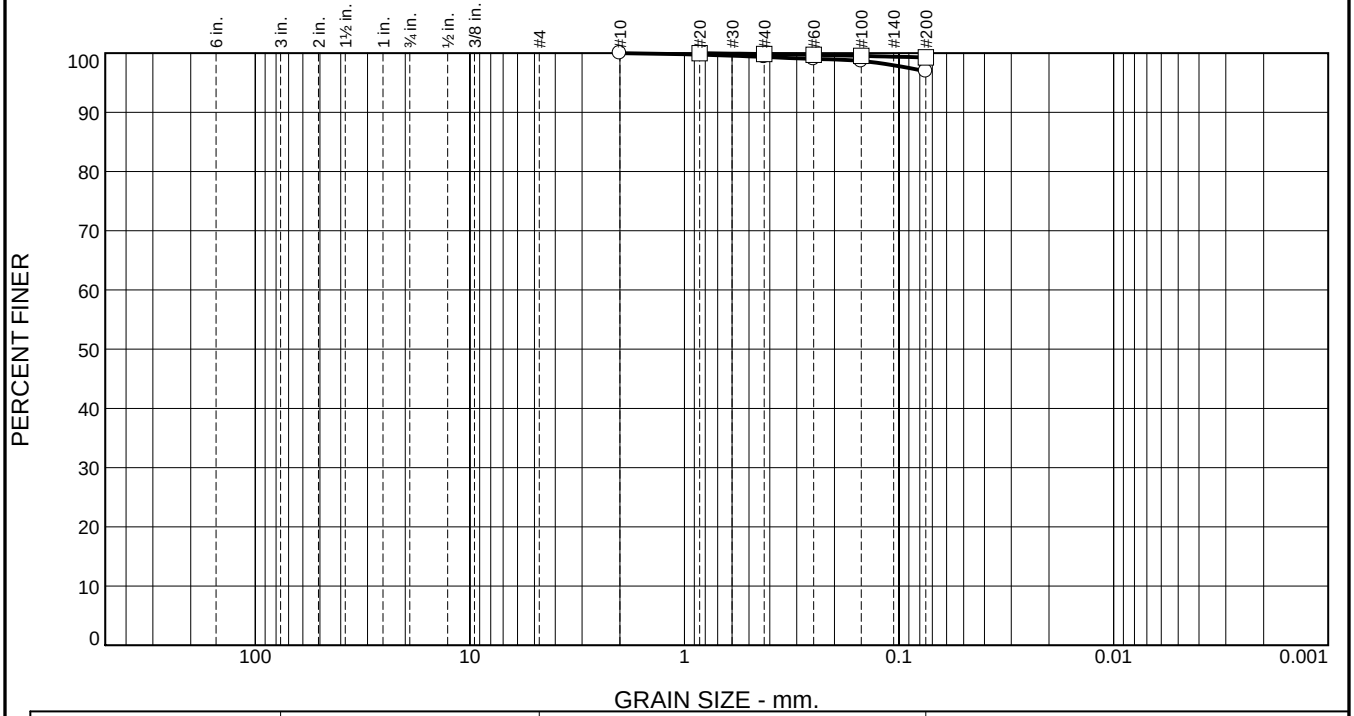
Client:

Project: Dike A, Gurabo, PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.6	2.5	96.9	
□	0.0	0.0	0.0	0.0	0.2	0.5	99.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	55	30								
□	64	33								

Material Description	USCS	AASHTO
○ elastic silt	MH	A-7-5(29)
□ elastic silt	MH	A-7-5(38)

Project No. 5068 **Client:**

Project: Dike A, Gurabo, PR

○ **Source of Sample:** A-6 **Depth:** 4-5.5' **Sample Number:** S-3

□ **Source of Sample:** A-6 **Depth:** 9-10.5' **Sample Number:** S-5

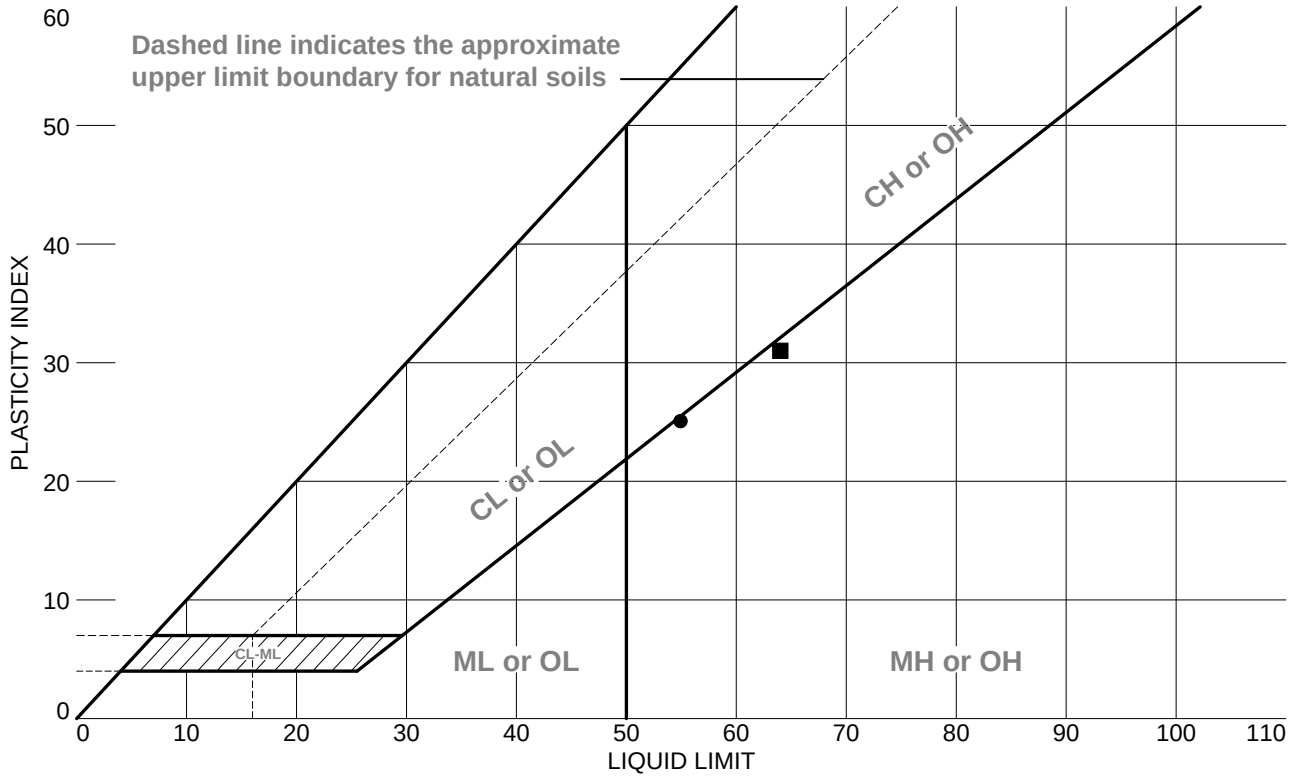
Remarks:

SUELOS, INC.

San Juan, Puerto Rico

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	A-6	S-3	4-5.5'		30	55	25		MH
■	A-6	S-5	9-10.5'		33	64	31		MH

SUELOS, INC.

San Juan, Puerto Rico

Client:

Project: Dike A, Gurabo, PR

Project No.: 5068

Figure

BORING LOGS

Suelos, PSC
Calle Chile 258, San Juan, P.R. 00917-2103
Tel. (787) 753-0147. Email: suelosinc@gmail.com

BORING LOGS

The description of subsurface profile and results of field and laboratory tests, as enclosed, pertain to conditions actually encountered at the borings location proper and at the depths indicated. Profile tracings between borings, when give, represent a reasonable interpolation of subsoil characteristics and should not be taken to indicate true intermediate conditions.

NOTES:

N	**-**	**Number of blows required to drive the sampling spoon a distance of 12" with a 140 lbs hammer falling 30".**
NW	**-**	**No water.**
WH	**-**	**Weight of hammer.**
WR	**-**	**Weight of Rods.**
W	**-**	**Natural moisture content in % of dry weight.**
qu	**-**	**Unconfined compressive strength in tons/sq ft.**
*****	**-**	**Penetrometer value.**

Suelos, PSC
Calle Chile 258, San Juan, P.R. 00917-2103
Tel. (787) 753-0147. Email: suelosinc@gmail.com

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE A, GURABO, P.R.

BORING NO.: A-1

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 09/22/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 09/22/21	Date : 09/22/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 60.5	Depth: 50'	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	7-7-10		Yellowish brown to strong brown clay, some silt, trace roots	17	3.0*	18
	2	100	8-9-11		Strong brown, very stiff silt, little fine sand	20		9
5	3	100	8-11-11		Very stiff, strong brown clay with some silt, dry (A-7-6)	22	3.0*	18
	4	100	7-9-11		-same as above;	20	3.0*'	21
10	5	100	8-8-10		-same as above; A-7-6 -Dike Material-	18	3.5	18
15	6	100	9-10-12		-trace sub-angular gravel	22	3.5*	22
20	7	100	6-7-8		Gray, grayish brown, olive, clay, slightly, moist stiff-very stiff (A-7-6) -Native Soil-	15	3.0*	24
25	8	100	7-9-11		-same as above;	20	3.0*	23
30	9	100	6-8-10		-same as above; (A-7-6)	18	3.0*	24
35	10	100	6-8-9		-same as above;	17	3.0*	29
40	11	100	4-5-6		-same as above;	11	2.5*	35

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE A, GURABO, P.R.

BORING NO.: A-1

Job No. 5068

Sheet 2 of 2

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	5-6-8		-moist		14	1.5*	32
50	13	100	13-21-23		Fine-medium grained sand, trace subrounded gravel, wet, olive gray		44		32
55	14	100	10-11-12		Medium-density, medium-coarse sand, grayish brown		23		20
60	15	100	13-24-20		Coarse sub-rounded-round gravel with some sand, grayish brown		44		13
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE A, GURABO, P.R.

BORING NO.: A-2

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 09/16/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 09/16/21	Date : 09/16/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 60.5	Depth: 45'	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	6-6-8		Yellowish brown, strong brown silty clay, some silt, trace roots, stiff, very stiff, dry	14	4.5+*	31
	2	100	8-10-10			20		12
	3	100	6-6-7		-slightly moist (A-7-6)	13		18
5								
	4	100	6-8-7		-moist	15		19
					-Dike Material-			
	5	100	7-10-14		-moist (A-7-6)	24		18
10								
	6	100	10-12-11		Dark grayish brown sandy clay, very stiff	23	4.5*	15
15								
	7	100	15-27-28		Hard, yellowish brown to strong brown clay, moist (A-7-6)	55	4.25*	24
20								
	8	100	13-20-20		-few sand	40	4.5+*	17
25								
	9	100	14-15-17		-same as above; (A-7-6)	32	4.5+*	28
30								
	10	100	5-7-8		-moist	15	3.5	24
35								
	11	100	4-7-10		Medium density, medium grained sand, some silt	17		18
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE A, GURABO, P.R.

BORING NO.: A-2

Job No. 5068

Sheet 2 of 2

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	6-7-9		-no silt		16		19
50	13	100	10-12-15		-no silt		27		24
55	14	100	11-12-9		Clayey sand with few meidum, sub-angular, angular gravel, gray to strong brown colored (residual soil)		21		26
60	15	22	50/5"------		Silty sand with severely weathered rock fragments (residual soil)		50/5"		24
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE A, GURABO, P.R.

BORING NO.: A-3

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 09/22/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 09/22/21	Date : 09/22/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 60.5	Depth: 35'	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	6-7-9		Strong brown sandy silt fine medium grained, dry, trace fine roots	16		13
	2	100	10-15-18		-same as above;	33		9
	3	100	10-11-16		-Dike Material-	27		11
5								
	4	100	12-9-13			22		13
	5	100	8-11-15		Strong brown silty clay with few fine sand, stiff	26	4.5+*	19
10					-Dike Material-			
	6	100	6-7-9		-same as above;	16	4.5+*	16
15								
	7	100	3-5-4		Loose, medium grained silty sand, dark grayish brown	9		12
20					-Native Soil-			
	8	100	4-3-3		-trace clay pockets	6		15
25								
	9	100	3-2-2		Loose dark olive fine grained, silty sand	4		21
30								
	10	100	7-9-6		Medium density, fine-medium grained silty sand, few subrounded gravel, gray, olive, wet	15		23
35								
	11	100	8-9-10		Medium density coarse grained sand, grayish brown colored	19		17
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE A, GURABO, P.R.

BORING NO.: A-3

Job No. 5068

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	9-8-11		-same as above;		19		19
50	13	100	9-8-13		-same as above;		21		13
55	14	100	8-12-16		Dense clayey sand with some medium subrounded-round gravel		28		7
60	15	100	13-18-20		-same as above;		38		16
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE A, GURABO, P.R.

BORING NO.: A-4

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 09/17/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 09/17/21	Date : 09/17/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 60.5	Depth: 45'	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	6-11-13		Dark, strong brown silt,some fine sand, roots	24		9
	2	100	10-9-12			21		10
	3	100	7-18-17		Strong brown, sandy silt, very stiff-hard	35		13
5								
	4	100	9-11-13		-Dike Material-	24		13
	5	100	6-8-15		-same as above;	23		21
10								
	6	100	4-5-7		Dark olive brown silt with some fine sand, moist	12		21
15								
	7	100	5-4-6		Dark olive gray, clay, few silt -Native Soil-	10	2.0*	27
20								
	8	100	3-4-4		-silty clay	8	2.0*	29
25								
	9	100	3-3-5		-same as above;	8	1.5*	22
30								
	10	100	5-6-12		Very stiff, strong brown clay, few fine sand lenses	18	3.15*	24
35								
	11	100	11-28-27		Silty sand with some round-subrounded gravel	55		15
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE A, GURABO, P.R.

BORING NO.: A-4

Job No. 5068

Sheet 2 of 2

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	5-9-12		Medium density, loose grained sand, some round-subrounded gravel		21		18
50	13	100	6-11-14		-same as above;		25		16
55	14	100	7-11-15		Strong brown, silty sand, some subrounded gravel		26		19
60	15	56	31-50/4"---		Coarse grained sand, strong brown, few round-subrounded gravel		50/4"		20
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE A, GURABO, P.R.

BORING NO.: A-5

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 09/22/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 09/22/21	Date : 09/22/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 60.5	Depth: 40'	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	1-2-4		Loose-strong brown medium gravel sand, trace roots	6		20
	2	100	2-3-2			5		20
	3	100	1-1-2		Strong brown, medium silty sand, few fine sand -Dredged Material-	3	1.0*	28
5	4	100	2-2-2		-same as above;	4	2.0*	35
	5	100	1-1-1		Dark gray, dark brown clay, some medium grained sand	2	1.0*	18
10	6	100	3-2-2		Loose, gray colored fine grained sand -Dredged Material-	4		9
15	7	100	4-3-4		-same as above;	7		26
20	8	100	2-1-2		Dark gray, soft clayey silt, trace sand, thinly layered -Dredged Material-	3	1.0*	28
25	9	100	3-2-3		-same as above;	5	0.5*	44
30	10	100	4-6-7		Gray sand, loose to medium density, medium-coarse grained trace round-subrounded small-coarse gravel -Native Soil-	13		17
35	11	100	5-7-11		-same as above;	18		9
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE A, GURABO, P.R.

BORING NO.: A-5

Job No. 5068

Sheet 2 of 2

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	7-10-12		-same as above;		22		12
50	13	100	11-13-18		-same as above;		31		10
55	14	22	50/5"------		Gravel, subrounded, angular gravel, coarse, some sand, medium gravel		50/5"		19
60	15	0	50/0"------		-no recovery		50/0"		--
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE A, GURABO, P.R.

BORING NO.: A-6

Job No. 5068

Sheet 1 of 1

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 09/21/21	WATER LEVEL:	N < 100 = 35.5
Hammer: 140#	Method : AUGER	Date Completed: 09/21/21	Date : 09/21/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 35.5	Depth: 25'	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	1-1-1		Strong brown, medium, clay, some silt, fine sand traces, trace roots	2	2.5*	64
	2	100	1-2-1			3	2.0*	33
5	3	100	1-1-1		Soft elastic silt, gray colored (A-7-5)	2	0.5*	46
	4	100	1-1-1		-same as above; -Dredged Material-	2	0.5*	59
10	5	100	1-1-1		-same as above; (A-7-5)	2	0.5*	67
15	6	100	1-1-1		-same as above;	2		48
20	7	100	1-2-1		-sand traces	3	0.75	40
25	8	100	3-6-7		Medium density, gray colored, medium-coarse grained sand, some subrounded-round gravel -Native Soil-	13		18
30	9	100	4-6-9		Strong brown fine-coarse sand, trace small gravel	15		29
35	10	0	50/2"-----		-no recovery	50/2"		--
					END OF TEST HOLE - 35.5 FT			
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

DRILLING APPENDIX

Suelos, PSC
Calle Chile 258, San Juan, P.R. 00917-2103
Tel. (787) 753-0147. Email: suelosinc@gmail.com

APPENDIX NO. 1

General

Comprised in this report is a description of the project as made know to **SUELOS, PSC**. and details of the project with pertinent recommendations for the design of foundations and other earth related structures. It should be considered that the design recommendations are relative to the project aspects discussed and subject to the limitations imposed by all practical considerations in the determination of subsoil conditions.

The field and laboratory data shown in boring logs represent subsoil conditions encountered at the borehole proper. The analysis and conclusions herein presented and discussed are based on such results and on a reasonable interpolation of subsoil characteristics. Whenever cross-sections with a schematic representation of the interpreted subsoil stratification between borings are included, the same should not be taken to represent true intermediate conditions but are rather given for general comparison purposes only.

Copy of this report should be made available to the Project Designers for their information and guidance, as well as to the Contractor and Resident Engineer, in order to secure maximum protection in the case of possible unexpected variations. Any such variations as well as any changes or modifications to the scope of project described after submittance of this report shall be notified by writing to these Consultants in order to evaluate same and decide upon the need to alter or modify the recommendations given.

APPENDIX NO. 2

Field and Laboratory Work

Field exploration was made by **SUELOS, PSC.**, a private laboratory to the services of these Consultants. The field work consisted of a visual observation of the area and existing structures at the site, if any, and of performance of test borings as indicated.

Test borings were made in accordance to the "Standard Penetration Test and Split-Spoon Sampling of Soils Method", as proposed by the Standards of the American Society for testing and Materials Designation ASTM D-1586, Latest Revision.

The testing hole is bored either by manual and mechanical augers or by driving a 2.5 inch inside diameter casing into the ground which is washed clean internally each time a soil sample is to be secured below its reach. While sampling, the Standard Penetration Test is performed and the "N" values recorded. This is the number of blows required to drive the split-spoon sampler 12 inches into the ground using a 140 lbs. hammer with a free fall of 30 inches.

The value gives an indication of the consistency of cohesive soils and the relative density of granular soils as shown in the following table:

COHESIVE SOILS

"N" Values	Consistency	Unconfined Comp. Strength (TSF)
less than 2	very soft	less than 0.25
2 - 4	soft	0.25 - 0.50
4 - 8	medium	0.50 - 1.00
8 - 15	stiff	1.00 - 2.00
15 - 30	very stiff	2.00 - 4.00
over 30	hard	over 4.00

GRANULAR SOILS

"N" Values	Relative Density
0 - 5	very loose
5 - 10	loose
10 - 30	medium
30 - 50	dense
over 50	very dense

Depth of water surface shown on logs indicate the phreatic level found either prior to use of any casing and water or taken 24 hours after the test borings was completed and the casing, if any, is pulled out. The information given, unless otherwise indicated, is not a adequate for study of deep excavations and is only to be used as an approximate level in the study of a normal foundation of the project. Phreatic or underground water levels may vary with seasonal rainshower variations thus water may appear where none is shown and the reader of this report should be aware of this fact. For excavations where ground water levels are of utmost importance special studies consisting of long range observations on installed wellpoint-type devices should be performed. Where deep excavations are contemplated, as in pumping stations, study of artesian or sub-artesian aquifers should be made by means of deep test borings and pumping tests.

DIAMOND CORE DRILLING

Whenever drilling through rock is necessary the same is made following the "Diamond Core Drilling for Site Investigation" method as proposed by the standards of the American Society for Testing and Materials Designation ASTM D-2113-L.R. In general a double tube core barrel with diamond bit is rotated under pressure into the rock. The drilled rock enters into the barrel using circulating water as cooling agent. At intervals of 2 to 5 feet the barrel is lifted and the core is removed. The length of each core run as well as the length of the core recovered is noted.

LABORATORY WORK

➢Water Contents

The natural moisture content was determined for all samples, except for those with high percentage of gravel or coarse sand.

The tests follow standards of the American Society for Testing and Materials ASTM Designation D-2216, Latest Revision. The water or moisture content of a given soil mass is by definition the ratio of the weight of water to the oven dry weight of the soil, expressed as a percentage.

➢Unconfined Compression Tests

All suitable samples of cohesive soil recovered from the split-spoon sampler were tested in unconfined compression. The ratio of the maximum load required for failure to the corrected cross sectional area of the sample expressed in tons per square foot is defined as the unconfined compressive strength.

➢**Examination and Description**

Soil samples are classified according to their constituents, the following terminology used to denote the approximate percentage by weight of each component.

Description Term	Percent by Weight
Trace	1 - 10
Little to some	10 - 20
Sandy, silty clayey	20 - 35
and	35 - 50

The examined samples are related into one of the following main groups; boulders, gravel, sand, clay, and silt. On peat, the presence of the decomposed and partly decomposed vegetable matter, is used for identification. The differentiation between a clay and a silt is based on the presence or lack of plasticity, dilatancy and dry strength rather than on grain size. The description of the soil includes: color, odor, minerals, presence of foreign matter, geological history, etc. These descriptions as well as the results of the laboratory testing are used in grouping similar samples into a stratigraphic unit as shown on the final boring logs. Therefore, the data on subsurface exploration logs represent subsoil conditions at the precise locations of the boreholes only.

GEOTECHNICAL REPORT ON
DREDGE DISPOSAL AREA B
CARRAIZO RESERVOIR
DREDGING PROJECT
GURABO, PUERTO RICO



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Suelos, PSC

Soil & Construction Materials Laboratory and Environmental Drilling Services

GEOTECHNICAL REPORT ON
DREDGE DISPOSAL AREA B
CARRAIZO RESERVOIR DREDGING PROJECT
GURABO, PUERTO RICO

CSA GROUP
Requested for

Boring Logs Performed & Supervised By
***SUELOS, PSC.**

Submitted on November 24, 2021
Job No. 5068-Dike B.rep

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GEOTECHNICAL REPORT ON
DREDGE DISPOSAL AREA B
CARRAIZO RESERVOIR DREDGING PROJECT
GURABO, PUERTO RICO
November 24, 2021

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BORING LOGS
DRILLING APPENDIXES

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GEOTECHNICAL REPORT ON
DREDGE DISPOSAL AREA B
CARRAIZO RESERVOIR DREDGING PROJECT
GURABO, PUERTO RICO

1.0 INTRODUCTION

This report presents the results of the geotechnical investigation performed at the dredge disposal area "B" (hereafter named Dike B) which has been used as disposal site for dredged material from the Carraizo reservoir. Dike B is located at the town of Gurabo, at the site presented in **Figure 1**.

The subsoil exploration and geotechnical consulting services were commissioned by **CSA Group and GLM Engineering Group**, following the terms and conditions stated in our approved proposals.

The original objective of the exploration was to determine the capacity of Dike B to receive sediment in connection with the new dredging plan of the Carraizo reservoir, with the possibility of increasing the height of the present levees. In recent conversations with Eng. Gregory Morris, from GLM, we were informed that the deposition approach at Dike B will consider geotubes to contain newly imported sediments. These geotubes would be staked in the interior of the containment area, away from the interior face of the levees.

In view of this approach, our field investigation and geotechnical analyses were geared to provide information regarding soil type and strength parameters (cohesion and internal friction angle) of the existing sediments over which the geotubes would be staked.

2.0 GENERAL PROJECT DESCRIPTION AND BACKGROUND INFORMATION

About two (2) decades ago, dredging contractor Weeks Marine was contracted by the Puerto Rico Aqueduct and Sewer Authority to dredge six million cubic meters of sediment from the Carraízo reservoir. The disposal of the dredged sediment required Weeks Marine to design and build 3 confined disposal areas which had combined capacity of seven million cubic meters. The construction of the disposal areas included excavating and compacting two million cubic meters of soil into levees as high as 17 meters. **Figure 2** shows an aerial picture of Dike B taken more than 20 years ago.



Figure 1. General location of Dike B.



Figure 2. Historic picture of Dike B.

3.0 WORK PERFORMED

As originally intended, the plan to increase the capacity of the dike consisted of rising the height of the levees approximately 2 meters. Based on this approach, our technical proposal considered 6 SPT borings located at the top of the levees and natural grounds, 2 borings located at the interior of the dike, and 3 CPT'. Subsequently, complementary work was requested from GLM, which included 2 borings in natural grounds and 1 additional boring in the interior of the dike.

As previously mentioned, the work plan considers placing the future dredge material inside geotubes which would be stacked up in layers inside the dike. A preliminary array of geotubes inside Dike B is presented in **Figure 3**. A typical cross section showing the geotubes staked up inside the dike is presented in **Figure 4**.

From **Figure 4** it is worth noting that the array of geotubes lays flat on the containment area, away from the interior face of the levees. This layout suggest that the current state of stresses in the levees will remain unchanged, and thus the present safety factors of the levees would not be significantly affected.



Figure 3. Preliminary array of geotubes inside Dike B (provided by GLM).

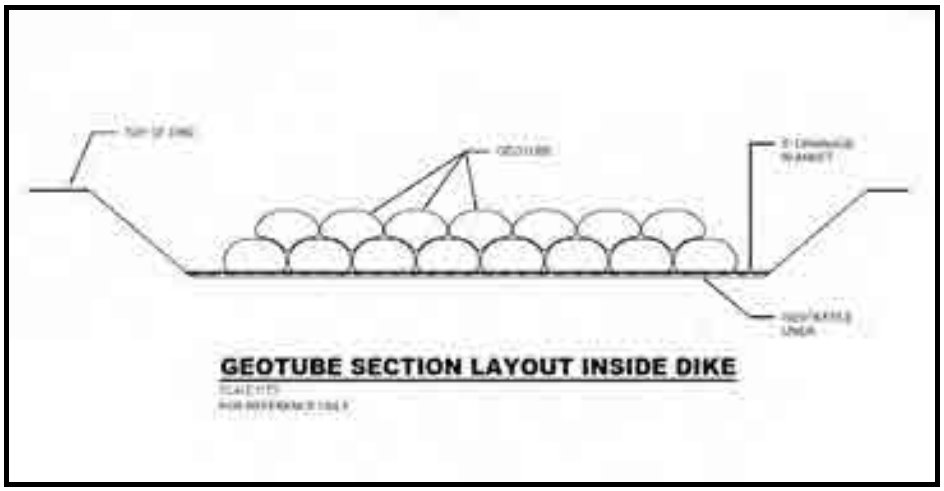

Figure 4. Stacking up geotubes inside the dike.

The SPT borings were performed using the Power Auger Method. Borings were located at the field using hand-held GSP and their elevation were inferred from the topographic plan provided to us by CSA. Table #1 shows this information.

Soil samples were secured at vertical intervals not exceeding five (5) feet by means of a 1.375" I.D. Split Spoon Sampler according to ASTM Designation D-1586 and/or D-1452. As part of the work, Unconfined Compressive Strength Tests were performed on clayey samples while Natural Moisture Contents were performed on all collected samples. Results of the comprehensive laboratory program are included in appendix **"Laboratory Results"** enclosed at the back of this report.



Figure 5. **Borings and CPT locations at Dike B**.

TABLE 1; Boring Coordinates and Inferred Elevations

Boring I.D.	Latitude	Longitude	Elevation (m)*
B-1	18.268140°	-65.989378°	60.57
B-2	18.269083°	-65.991393°	60.52
B-3	18.269125°	-65.990528°	57.1
B-4	18.268947°	-65.988107°	60.56
B-5	18.269431°	-65.988205°	56.75
B-6	18.270055°	-65.987365°	60.83
B-7	18.271250°	-65.988878°	62.5
B-8	18.271544°	-65.990420°	63.45
B-9	18.271279°	-65.991697°	60.12
B-10	18.272535°	-65.990000°	Not determined
B-11	18.272158°	-65.988545°	Not determined
CPT-B1	18.268250°	-65.989652°	60.3
CPT-B2	18.268945°	-65.991230°	60.33
CPT-B4	18.269044°	-65.988046°	60.79

*** Elevations inferred from the topographic information provided to us.**

4.0 GENERAL SITE GEOLOGY

Based on the U.S.G.S. Geological Maps of the Aguas Buenas and Gurabo Quadrangles, Dike B lays over almost entirely over hydrothermally altered rocks made of hard, light-gray and grayish-green altered, metamorphosed, and sheared volcanic and plutonic rocks.

Figure 6 presents portion of the aforementioned Geologic Quadrangles that shows the boundaries of the above listed geologic unit.

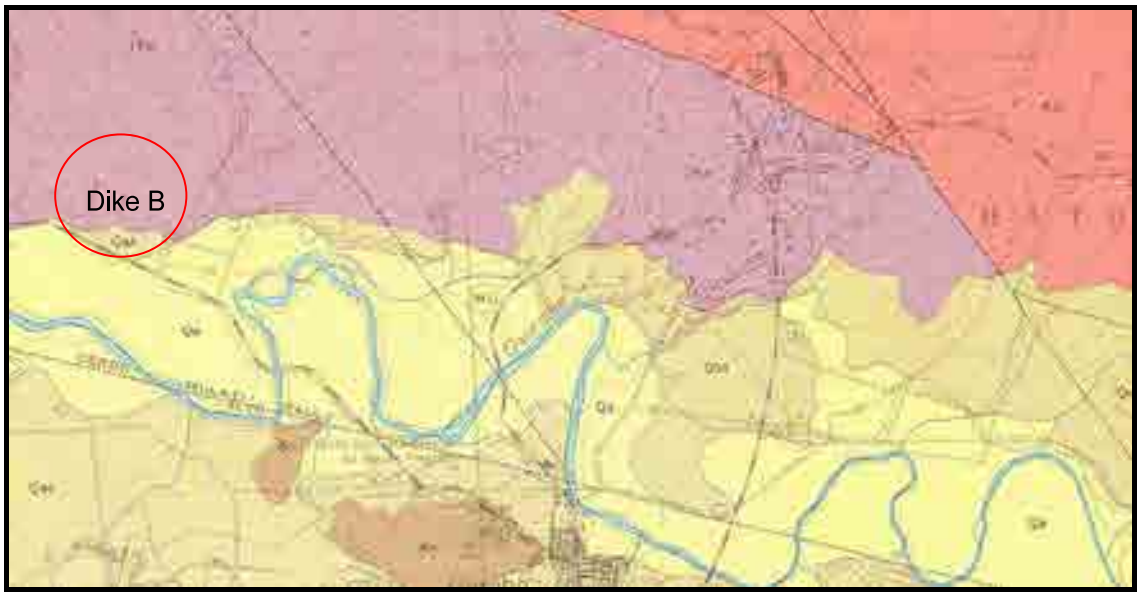

Figure 6. Geologic setting.

5.0 GEOTECHNICAL SUBSOIL CONDITIONS

5.1 Soil Composition of Levees

Borings B-1, B-2, B-4 and B-6 were drilled from the top of the levees in order to characterize their soil composition. The levees that make up the containment site B are made of stiff consistency, relatively well compacted yellowish-brown to olive gray silty to sandy clay, sandy silt and silty sand in variable proportions. The fill material comprising the levees extends to depths between 20 and 50 ft, depending on the boring location. The fill material shows AASHTO Soil Classification A-6, A-2-6, A-2-7 and A-7-6.

Standard Penetration Tests (SPT) resulted with N-values between 9 and 31 blows per foot, 20 bpf on average. The natural moisture content of this material varies mostly from 8 to 26 percent, while the unconfined compressive strength is in the order of 1 to 4.5 tons per square foot.

The native soils appear between 20 and 50 ft deep from the top of the levees (boring dependent). Yellowish-brown, brown and gray are the most common hues in the medium to hard silty/sandy clay (AASHTO A-7-6). The N-values recorded by the SPT vary from 11 to 31 blows per foot, but most N-values fall in the 15 to 20 bpf range. Natural moisture contents range from 13 to 32 percent and unconfined compressive strengths from 1.25 to 4.5 tsf.

5.2 Dredge Material

Boring B-3, B-5 and B-9 where located inside the containment area with the intent of sampling the dredged material. These borings show the presence of 14 to 19 ft of dredged fill made mostly of soft , normally consolidated, dark gray to dark brown plastic silt with variable sand content (AASTHO A-7-5). At boring locations, the soft/loose sediments are capped by firm, desiccated material that shows medium to stiff consistency and a higher over-consolidation ratio ($2<OCR<3$). The thickness of this cap varies from 3 ft to 5 ft. There are large extensions of land in the containment area that were found flooded or saturated. It appears that in these areas a desiccated soil cap does not exist. Rather, very soft soils prevail in these areas, where not even a bulldozer was able to access.

Standard Penetration Tests in the soft dredged material resulted with N-values between 0 (weight of hammer) to 5 blows per foot. Most unconfined compressive strength obtained qu values of 0.5 tsf, consistent with the soft consistency noted from the samples. Natural moisture contents in the dredge material range from 30% to 80% in the soft elastic silt.

Atterberg Limits in the dredge material reveal average LL and PL of 69% and 37%, respectively. Grain Size Analyses disclosed fine contents in the range of 43% and 99%. The USCS for this material corresponds to MH and SM.

5.3 Natural Soils (Highland)

Boring B-7, B-8, B-10 and B-11 where located at the highland, in natural grounds. Boring 7 and 8 disclosed low plasticity silt, sandy silt and rock fragments delivered from parent rock formation. AASHTO soil classifications resulted in A-2-7, A-6, A-2-6, A-2-4 and A-1-b in these two borings.

Compared to borings 7 and 8, borings 10 and 11 were located on higher grounds. Residual to saprolitic material, and severely weathered rock sampled as fine-to-coarse sand, silt and rock fragments, were sampled in borings 10 and 11.

Standard Penetration Tests in borings 7, 8, 10 and 11 recorded refusal count (>100 bpf) starting at 2 to 8 feet deep. Natural moisture contents range from 3 to 15 percent.

Atterberg Limits in the native ground vary from 31% to 42%.The average Plastic Limit corresponds to 19%. The USCS for this material range from CL to GC.

6.0 CPT RESULTS

The implementation of the CPT allowed the refinement of the stratigraphy and strength parameters of the fill material making up the levees in Dike B. Detailed tabulated data is included as an appendix to this report.

The CPT data was used to classify the soil, using the friction ratio between the cone sleeve and point. Using the guidelines presented by Robertson (1986), it was found that the levees consist mainly of material that behaves like sandy silt. This agrees with the visual descriptions of SPT samples and AASTHO soil classifications previously discussed in this report.

Making reference to CPT B4, an average uncorrected tip stress value (**qc**) of 76.39 tsf and an average sleeve stress of 2.13 tsf was recorded from the top of the levee to about 15 feet deep. From 15 to about 20 feet deep, the average uncorrected tip stress value (**qc**) corresponds to 22.26 tsf and an average sleeve stress to 1.46 tsf. Below 20 ft deep, the native soils obtained average **qc** of 29.29 tsf and average sleeve stress of 1.69 tsf. In terms of strength parameters, CPT data shows an average effective stress friction angle of **46**° for the levee material **(42°< φ < 50°)**. Complete tabulated data for this and other CPT's is included at the end of this report.

6.1 Groundwater

Observations on the groundwater table level were performed after drilling completion. The following table shows the groundwater table level as recorded from the borings.

TABLE 2; Summary of Water Levels

Boring I.D.	Depth to Groundwater (ft)
B-1	Not observed
B-2	Not observed
B-3	Not observed
B-4	Not observed
B-5	Not observed
B-6	Not observed
B-7	Not observed
B-8	Not observed
B-9	Not observed
B-10	Not observed
B-11	Not observed

7.0 STRENGTH, COMPRESSION AND CONSOLIDATION PARAMETERS FOR DREDGED MATERIAL

Taking into account that the new dredge material will be encapsulated in geotubes staked in the interior of the containment area, the geotechnical work for Dike B is chiefly geared to provide strength, compression and consolidation parameters of the existing dredge. Table 3 presents a summary of these parameters. Strength, compression and consolidation parameters for the fill material comprising the levees are also provided. These parameters are based on well known geotechnical correlations and our experience dealing with similar soils.

TABLE 3; Strength, Compression and Consolidation Parameters

Soil Layer	Moist Unit Weight	Undrained Shear Strength (Su)	Effective Stress Friction Angle (φ)	Compression Ratio (Cc')	Coefficient of Consolidation (Cv)
Levee Fill (A-2-6, A-2-7, A-6)	128 pcf	2,400 psf	36°	0.05 to 0.08	0.17 ft^2/day
Desiccated Dredge Cap	115 pcf	1,000 psf	26°	0.108 to 0.15	0.10 to 0.15 ft^2/day
Normally Consolidated Sediments (A-7-5)	105 pcf	500 psf	26°	0.19 to 0.22	0.10 to 0.15 ft^2/day
Native Soils (A-7-6)	118 pcf	2,000 to 3,000 psf	24°	0.08 to 0.15	0.06 to 0.04 ft^2/day

The main input for foundation and slope stability analysis are geometry, magnitude of pore-water pressures, unit weight of materials involved, and shear strength of the materials that intersect the failure surface. For the latter, a drained or undrained shear strength may be applicable for the materials that intersect the failure surface depending on the hydraulic conductivity of the materials and rate of loading involved. For instance, if the loading (or failure rate) is slow enough that pore-water pressures do not develop, drained or effective shear strength parameters shall be employed.

During and shortly after construction or fill placement, it can be conceived that loading rates occur relatively fast. Under this scenario, undrained shear strength parameters are typically used. This appears to be the loading scenario for the geotubes, as they will be filled rapidly in the field.

8.0 BEARING CAPACITY CONSIDERATIONS

The information obtained from boring B-3, B-5 and B-9 was used to described soil conditions in the interior of the containment area. Making reference to **Figure 3** and **4**, and in lieu of more specific information regarding the array and placement rate of geotubes for this project, we have considered that an area of 200 ft long by 200 ft wide would be loaded with geotubes at a time. This area was used to calculate the existing sediment bearing capacity using Hansen, Vesic and Meyerhof Bearing Capacity Factors (General Shear). Using a typical safety factor of 3, the results indicate an

average allowable soil bearing pressure of 1.13 ksf for general shear failure. Using a unit weight of 105 pcf for the new dredge, a 11 ft high column of new dredge could be placed over the existing sediments without experience a bearing capacity failure. Based reinforcement using high tensile strength geotextiles can be considered for this application. The geotube manufacturer and/or the specialty contractor performing this work shall be involved in the design and specifications of basal reinforcement.

9.0 CONSOLIDATION ANALYSIS

The soil profile found in boring B-3 was used to conduct consolidation settlement analyses. This boring disclosed 5 ft of over-consolidated, desiccated dredge followed by 14 ft of soft, normally consolidated sediments.

Our settlement prediction for geotubes underlain by soft sediments ignores immediate settlement. The magnitude of primary consolidation is far more important in soft clay and silt. Primary consolidation occurs when the pore water in saturated clay is drained (squeezed out) by the stress increase superimposed on the soil. As the pore water drains a reduction in void ratio and hence, settlement occurs.

We have used empirical correlations to estimate compression and consolidation parameters for the weak sediments (see Table 2). Considering that the new column of dredge should be limited to 11 ft due to bearing capacity constrains, the expected blanket-type load would be in the order of 1,155 psf. Under this load scenario, primary consolidation settlements would be in the order of 7 to 10 inches during a period of 15 years. Differential settlements between 6 and 8 inches shall be expected in areas adjacent to the levees, where the thickness of the existing dredge material is less.

10.0 RECOMMENDED MONITORING PROGRAM

In view of the weak soil conditions, we strongly recommend the monitoring of the new dredge placement. If the geotubes are filled or staked up too rapidly, local shear failures could be induced in the existing sediments. Therefore, it is very important to monitor the rate of new dredge placement.

Field instrumentations should include, as a minimum, measurements of settlement and pore pressure at the middle of the weak layer, and the installation of one inclinometer per station for monitoring lateral soil displacement. **Shear waves and soil lateral displacement may occur, if the fill deposition and stabilization process is not monitored carefully**. The fill rate deposition would be established and possibly modified according to the results of the monitoring program.

A minimum of 8 monitoring stations are required for this site. The location of these 8 stations are presented in **Figure 7**.



Figure 7. Location of monitoring stations.

The instrumentation shall be installed prior to new dredge deposition. Each monitoring location shall be comprised of one (1) surface settlement plate, one (1) piezometer at the middle of the compressible layer and one (1) inclinometer. SPT borings shall first be performed at the location of each monitoring station to establish the correct depth and soil strata for installation of the instrumentation.

11.0 LIMITATIONS OF REPORT

The final and comprehensive design for the dredge deposition program will undoubtedly require the participation of this office as Geotechnical Consultants. Suelos, PSC. shall be able to install and evaluate the monitoring program recommended herein. Therefore, the Geotechnical Engineer must be involved during dredge deposition works to monitor the field instrumentation and present additional recommendations as needed.

12.0 GENERAL COMMENTS

The observance or supervision of new dredge deposition over weak deposits is, in general, is a very delicate matter. In some cases this service is not rendered by the Soils Engineer who made the subsoil investigation. In a large number of projects fill and earthwork operations are successfully completed due to the prevalence of ideal and uniform conditions and to the fact that they are being performed by a competent and responsible contractor. But there are cases, where the lack of proper techniques and the lack of adequate supervision has given rise to the occurrence of geotechnical problems and failures.

Conscious of the above exposed problem, we wish to state that the validity of our recommendations is subordinated to the observance and monitoring of new dredge deposition by us. If the contract is awarded to another experienced Soils Engineer, he shall receive a copy of this report, evaluate the same and adopt it as his own, or request additional soil data to verify our recommendations or modify them in accordance to his personal knowledge and judgement, thus assuming full responsibility for his recommendations and the report itself.

The above conclusions and recommendations are being based on a number of representative tests which we consider appropriate to enable us to prepare recommendations for the project. But the testing of every square meter of land to be occupied by the proposed four sites would be economically unfeasible and variations might be encountered in the soil profile, especially, at intermediate areas between boreholes. These variations shall be evaluated by the project geotechnical engineer to provide the corresponding solution. The standard procedures followed during the drilling of the test borings are discussed in detail in the Appendix to this soil report.

This report has been prepared taking into consideration the design factors presently known to us. The project designers shall be alert of any item that might have been overlooked, that could require clarification or that may need additional recommendations to those discussed herein.

Respectfully submitted,



IVAN JACKSON MADURO, P.E., M.S.C.E., CWI
Partner

mgn

Reference No. 5068-Dike B.rep

APPENDIXES

DIKE B

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CPT RESULTS

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Suelos, PSC.

Soil & Construction Materials Laboratory and Environmental Drilling Services

Test Id: CPT B1 Date: 5-Oct-21
Site: DIKE B Cone Id: 3045.123xx
Location: Gurabo
Project: Diques Density 120 PCF
Operator | w: RTH | Nicolas

Depth (ft)	Sleeve Stress (tsf)	TIPStresUNC (tsf)	TIPStresCOR (tsf)	Ratio COR (%)	Pore Pressure (tsf)	Overburden (tsf)	Eff. Overburden (tsf)	SPT N60c (blows/ft)	Friction Angle (deg)	Su (tsf)	OCR ()	FC (%)
0	0	0	0	0	0	0.00E+00	0.00E+00	-99	0	0	-99	-99
0.18334	0	-0.03	-0.03	0	0	1.10E-02	5.28E-03	-99	-99	-7.13	-99	-99
0.29906	-0.0008	-0.03	-0.03	3.076	0	1.79E-02	8.61E-03	-99	-99	-7.13	-99	-99
0.4113	-0.0015	-0.03	-0.03	5.941	0	2.47E-02	1.19E-02	-99	-99	-7.13	-99	-99
0.52353	-0.0004	-0.03	-0.03	1.657	0	3.14E-02	1.51E-02	-99	-99	-7.13	-99	-99
0.63647	0.0004	-0.03	-0.03	-1.448	-0.003	3.82E-02	1.83E-02	-99	-99	-7.13	-99	-99
0.7494	0.0004	-0.03	-0.03	-1.448	-0.003	4.50E-02	2.16E-02	-99	-99	-7.13	-99	-99
0.86721	0.0004	0.1	0.1	0.37	0	5.20E-02	2.50E-02	-99	-99	0	-99	-99
0.99827	0.0004	-0.03	-0.03	-1.486	0	5.99E-02	2.88E-02	-99	-99	-7.13	-99	-99
1.1349	0.0008	-0.03	-0.03	-3.029	0	6.81E-02	3.27E-02	-99	-99	-7.13	-99	-99
1.26735	0.0022	0.1	0.1	2.228	0	7.60E-02	3.65E-02	-99	-99	-7.13	-99	-99
1.4012	0.0022	0.1	0.1	2.228	0	8.41E-02	4.04E-02	-99	-99	-7.13	-99	-99
1.53434	0.002	0.1	0.1	2.031	0	9.21E-02	4.42E-02	-99	-99	-7.13	-99	-99
1.67238	0.0005	0.1	0.1	0.53	0	1.00E-01	4.82E-02	-99	-99	-7.13	-99	-99
1.81319	0.0022	0.1	0.1	2.228	0	1.09E-01	5.22E-02	-99	-99	-7.13	-99	-99
1.95401	0.0022	0.1	0.1	2.228	0	1.17E-01	5.63E-02	-99	-99	-7.13	-99	-99
2.09552	0.0021	0.1	0.1	2.057	0	1.26E-01	6.04E-02	-99	-99	-7.13	-99	-99
2.23564	0.0004	0.1	0.1	0.372	-0.003	1.34E-01	6.44E-02	-99	-99	-7.13	-99	-99
2.37646	0.0004	-0.03	-0.03	-1.448	-0.003	1.43E-01	6.84E-02	-99	-99	-7.13	-99	-99
2.51588	0.0005	0.1	0.1	0.535	-0.003	1.51E-01	7.25E-02	-99	-99	-7.13	-99	-99
2.65809	0.0021	-0.03	-0.03	-8.194	0	1.60E-01	7.66E-02	-99	-99	-7.13	-99	-99
2.79751	0.0005	-0.03	-0.03	-2.129	0	1.68E-01	8.06E-02	-99	-99	-7.13	-99	-99
2.93763	0.0021	0.1	0.1	2.1	-0.003	1.76E-01	8.46E-02	-99	-99	-7.13	-99	-99
3.07915	0.0004	0.1	0.1	0.37	0	1.85E-01	8.87E-02	-99	-99	-7.13	-99	-99
3.22066	0.0004	0.1	0.1	0.372	-0.003	1.93E-01	9.28E-02	-99	-99	-7.13	-99	-99
3.36218	0.0004	0.1	0.1	0.372	-0.003	2.02E-01	9.68E-02	-99	-99	-7.13	-99	-99
3.5023	0.0004	0.1	0.1	0.372	-0.003	2.10E-01	1.01E-01	-99	-99	-7.13	-99	-99
3.64381	0.0004	0.1	0.1	0.37	0	2.19E-01	1.05E-01	-99	-99	-7.13	-99	-99
3.78602	0.0006	0.1	0.1	0.562	0	2.27E-01	1.09E-01	-99	-99	-7.13	-99	-99
3.92475	0.0022	0.1	0.1	2.228	0	2.36E-01	1.13E-01	-99	-99	-7.13	-99	-99
4.06556	0.0021	0.1	0.1	2.046	0	2.44E-01	1.17E-01	-99	-99	-7.13	-99	-99
4.20359	0.0004	0.1	0.1	0.37	0	2.52E-01	1.21E-01	-99	-99	-7.13	-99	-99
4.3458	-0.0009	0.1	0.1	-0.851	0	2.61E-01	1.25E-01	-99	-99	-7.13	-99	-99
4.48453	0.0022	0.1	0.1	2.243	-0.003	2.69E-01	1.29E-01	-99	-99	-7.13	-99	-99
4.60374	0.0022	0.1	0.1	2.228	0	2.76E-01	1.33E-01	-99	-99	-7.13	-99	-99
4.65811	0.0022	0.1	0.1	2.228	0	2.80E-01	1.34E-01	-99	-99	-7.13	-99	-99
4.72434	0.0286	0.1	0.1	28.426	0	2.84E-01	1.36E-01	-99	-99	-7.13	-99	-99
4.77244	0.0576	-0.03	-0.03	-230.252	0	2.86E-01	1.37E-01	-99	-99	-7.13	-99	-99
4.82263	0.0879	-0.03	-0.03	-342.446	-0.003	2.89E-01	1.39E-01	-99	-99	-7.13	-99	-99
4.87282	0.1183	0.1	0.1	118.477	-0.003	2.92E-01	1.40E-01	-99	-99	-7.13	-99	-99
4.92371	0.149	-0.03	-0.03	-595.449	0	2.95E-01	1.42E-01	-99	-99	-7.13	-99	-99
4.9746	0.2256	0.1	0.1	226.004	-0.003	2.99E-01	1.43E-01	-99	-99	-7.13	-99	-99
5.24299	1.6361	96.16	96.17	1.701	0.036	3.15E-01	1.51E-01	52	49.37	-7.13	-99	19.04
5.34058	2.388	116.7	116.71	2.046	0.059	3.20E-01	1.54E-01	63	50.06	-7.13	-99	19.11
5.44376	3.3036	121.21	121.24	2.725	0.133	3.27E-01	1.57E-01	66	50.14	-7.13	-99	21.71
5.58179	4.0089	118.2	118.26	3.39	0.285	3.35E-01	1.61E-01	76	49.94	-7.13	0.19	24.43
5.71703	3.3728	101.42	101.48	3.324	0.278	3.43E-01	1.65E-01	65	49.24	-7.13	0.16	25.65
5.77489	2.9229	82.01	82.06	3.562	0.243	3.47E-01	1.66E-01	53	48.32	-7.13	0.08	28.73
5.86969	2.5166	85.01	85.06	2.959	0.23	3.52E-01	1.69E-01	55	48.41	-7.13	0.05	26.03
5.92128	2.3697	82.63	82.68	2.866	0.22	3.55E-01	1.71E-01	53	48.25	-7.13	0.04	25.94

5.96171	2.3786	81.38	81.43	2.921	0.217	3.58E-01	1.72E-01	52	48.16	-7.13	0.03	26.33
6.00773	2.3372	77	77.04	3.034	0.217	3.61E-01	1.73E-01	49	47.89	-7.13	0.03	27.38
6.05722	2.338	71.74	71.78	3.257	0.204	3.63E-01	1.74E-01	46	47.55	-7.13	0.01	29.06
6.10811	2.409	61.59	61.63	3.909	0.191	3.67E-01	1.76E-01	49	46.85	-7.13	0	33.35
6.1583	2.476	51.45	51.49	4.809	0.198	3.70E-01	1.77E-01	55	46.01	-7.13	0	38.84
6.21128	2.5357	48.19	48.23	5.257	0.201	3.73E-01	1.79E-01	77	45.67	-7.13	0	41.21
6.26217	2.5617	44.94	44.98	5.695	0.214	3.76E-01	1.80E-01	72	45.3	-7.13	0.01	43.6
6.32909	2.541	44.06	44.11	5.761	0.223	3.80E-01	1.82E-01	70	45.16	-7.13	0.02	44.1
6.40787	2.5531	39.55	39.6	6.448	0.233	3.85E-01	1.85E-01	63	44.59	-7.13	0.03	47.81
6.49222	2.5427	36.3	36.35	6.995	0.259	3.90E-01	1.87E-01	58	44.11	-7.13	0.06	50.76
6.55775	2.5726	33.79	33.84	7.602	0.252	3.94E-01	1.89E-01	54	43.71	-7.13	0.05	53.62
6.61142	2.5116	33.29	33.34	7.534	0.243	3.97E-01	1.90E-01	53	43.6	-7.13	0.03	53.7
6.67416	2.4692	34.42	34.47	7.164	0.24	4.00E-01	1.92E-01	54	43.72	-7.13	0.03	52.13
6.72784	2.4319	36.67	36.72	6.623	0.249	4.04E-01	1.94E-01	58	43.99	-7.13	0.03	49.55
6.76967	2.4165	36.17	36.22	6.671	0.262	4.06E-01	1.95E-01	57	43.89	-7.13	0.05	49.92
6.8101	2.383	34.54	34.6	6.888	0.278	4.09E-01	1.96E-01	54	43.63	-7.13	0.07	51.31
6.85681	2.354	32.54	32.6	7.221	0.307	4.11E-01	1.98E-01	51	43.3	-7.13	0.11	53.26
6.89794	2.3178	31.54	31.6	7.336	0.298	4.14E-01	1.99E-01	50	43.11	-7.13	0.09	54.13
6.93489	2.2115	30.66	30.72	7.2	0.278	4.16E-01	2.00E-01	48	42.95	-7.13	0.06	54.27
6.97462	2.1815	30.41	30.46	7.161	0.269	4.19E-01	2.01E-01	48	42.87	-7.13	0.05	54.32
7.01226	2.1418	30.28	30.34	7.06	0.259	4.21E-01	2.02E-01	48	42.83	-7.13	0.03	54.11
7.05339	2.0969	30.53	30.59	6.856	0.252	4.23E-01	2.03E-01	48	42.84	-7.13	0.02	53.39
7.09452	1.8834	31.03	31.09	6.059	0.249	4.26E-01	2.04E-01	49	42.89	-7.13	0.02	50.75
7.13496	1.6734	32.16	32.21	5.195	0.246	4.28E-01	2.06E-01	50	43.04	-7.13	0.02	47.36
7.18306	1.4236	34.42	34.47	4.13	0.249	4.31E-01	2.07E-01	36	43.35	-7.13	0.02	42.42
7.21861	1.239	34.92	34.97	3.543	0.249	4.33E-01	2.08E-01	27	43.4	-7.13	0.02	39.82
7.25695	1.0399	36.3	36.35	2.861	0.246	4.35E-01	2.09E-01	23	43.56	2.39	0.01	36.18
7.31342	0.7466	37.05	37.09	2.013	0.233	4.39E-01	2.11E-01	23	43.63	-7.13	0	31.4
7.34618	0.5765	37.42	37.47	1.539	0.23	4.41E-01	2.12E-01	19	43.65	-7.13	0	28.26
7.75957	-0.0444	-0.03	-0.02	231.886	0.029	4.66E-01	2.24E-01	-99	-99	-7.13	-99	-99
7.8962	-0.045	-0.03	-0.02	235.208	0.029	4.74E-01	2.27E-01	-99	-99	-7.13	-99	-99
8.02447	-0.0454	-0.03	-0.02	237.51	0.029	4.82E-01	2.31E-01	-99	-99	-7.13	-99	-99
8.14856	-0.0444	-0.03	-0.02	231.886	0.029	4.89E-01	2.35E-01	-99	-99	-7.13	-99	-99
8.26985	-0.0444	-0.03	-0.02	231.886	0.029	4.96E-01	2.38E-01	-99	-99	-7.13	-99	-99
8.38488	-0.0444	-0.03	-0.02	231.886	0.029	5.03E-01	2.42E-01	-99	-99	-7.13	-99	-99
8.53127	-0.0444	-0.03	-0.02	231.886	0.029	5.12E-01	2.46E-01	-99	-99	-7.13	-99	-99
8.68045	-0.0444	-0.03	-0.02	231.886	0.029	5.21E-01	2.50E-01	-99	-99	-7.13	-99	-99
8.83312	-0.0444	-0.03	-0.02	231.886	0.029	5.30E-01	2.54E-01	-99	-99	-7.13	-99	-99
8.99695	-0.0444	-0.03	-0.02	231.886	0.029	5.40E-01	2.59E-01	-99	-99	-7.13	-99	-99
9.16355	-0.0444	-0.03	-0.02	231.886	0.029	5.50E-01	2.64E-01	-99	-99	-7.13	-99	-99
9.32946	-0.0444	-0.03	-0.02	231.886	0.029	5.60E-01	2.69E-01	-99	-99	-7.13	-99	-99
9.49677	-0.0444	-0.03	-0.02	231.886	0.029	5.70E-01	2.74E-01	-99	-99	-7.13	-99	-99
9.66269	-0.0444	-0.03	-0.02	231.886	0.029	5.80E-01	2.78E-01	-99	-99	-7.13	-99	-99
9.83069	-0.0444	-0.03	-0.02	231.886	0.029	5.90E-01	2.83E-01	-99	-99	-7.13	-99	-99
9.9973	-0.0444	-0.03	-0.02	231.886	0.029	6.00E-01	2.88E-01	-99	-99	-7.13	-99	-99
10.166	-0.043	-0.03	-0.02	224.646	0.029	6.10E-01	2.93E-01	-99	-99	-7.13	-99	-99
10.3347	-0.0439	-0.03	-0.02	229.425	0.029	6.20E-01	2.98E-01	-99	-99	-7.13	-99	-99
10.50341	-0.043	-0.03	-0.02	224.566	0.029	6.30E-01	3.03E-01	-99	-99	-7.13	-99	-99
10.67071	-0.0425	-0.03	-0.02	222.125	0.029	6.40E-01	3.07E-01	-99	-99	-7.13	-99	-99
10.83942	-0.0425	-0.03	-0.02	222.125	0.029	6.50E-01	3.12E-01	-99	-99	-7.13	-99	-99
11.00811	-0.0439	-0.03	-0.02	229.58	0.029	6.61E-01	3.17E-01	-99	-99	-7.13	-99	-99
11.17682	-0.0428	-0.03	-0.02	223.752	0.029	6.71E-01	3.22E-01	-99	-99	-7.13	-99	-99
11.34064	-0.0425	-0.03	-0.02	222.125	0.029	6.80E-01	3.27E-01	-99	-99	-7.13	-99	-99
11.39292	-0.0425	-0.03	-0.02	222.125	0.029	6.84E-01	3.28E-01	-99	-99	-7.13	-99	-99
11.45845	-0.0436	-0.03	-0.02	228.187	0.029	6.88E-01	3.30E-01	-99	-99	-7.13	-99	-99
11.53165	-0.0444	-0.03	-0.02	231.886	0.029	6.92E-01	3.32E-01	-99	-99	-7.13	-99	-99
11.61042	-0.0437	-0.03	-0.02	228.543	0.029	6.97E-01	3.34E-01	-99	-99	-7.13	-99	-99
11.69687	0.0478	-0.03	-0.02	-241.884	0.026	7.02E-01	3.37E-01	-99	-99	-7.13	-99	-99
11.78609	0.3333	-0.03	-0.02	-1742.57	0.029	7.07E-01	3.39E-01	-99	-99	-7.13	-99	-99
11.87393	0.6143	-0.03	-0.02	-3211.7	0.029	7.12E-01	3.42E-01	-99	-99	-7.13	-99	-99
11.96246	0.8975	-0.03	-0.02	-4537.44	0.026	7.18E-01	3.45E-01	-99	-99	-7.13	-99	-99
12.26013	2.0901	60.22	60.24	3.469	0.143	7.36E-01	3.53E-01	43	43.47	-7.13	-99	31.98
12.36679	2.9673	61.47	61.49	4.825	0.123	7.42E-01	3.56E-01	58	43.53	-7.13	-99	36.49
12.4602	2.9035	108.06	108.08	2.686	0.126	7.48E-01	3.59E-01	51	46.18	-7.13	-99	22.58
12.53897	2.9733	142.5	142.53	2.086	0.143	7.52E-01	3.61E-01	67	47.38	-7.13	-99	17.7
12.6059	3.25	150.89	150.93	2.153	0.185	7.56E-01	3.63E-01	71	47.6	-7.13	-99	17.56

12.67073	3.6769	145.13	145.18	2.533	0.23	7.60E-01	3.65E-01	68	47.41	-7.13	-99	19.45
12.73486	3.7654	145.51	145.55	2.587	0.236	7.64E-01	3.67E-01	68	47.4	-7.13	-99	19.64
12.79691	3.4648	144.38	144.43	2.399	0.23	7.68E-01	3.69E-01	68	47.34	-7.13	-99	18.94
12.85756	3.2823	145.51	145.55	2.255	0.23	7.72E-01	3.70E-01	68	47.36	-7.13	-99	18.28
12.92517	3.23	135.74	135.78	2.379	0.233	7.76E-01	3.72E-01	63	47.03	-7.13	-99	19.35
12.99349	3.0153	125.59	125.65	2.4	0.282	7.80E-01	3.74E-01	59	46.66	-7.13	-99	20.07
13.05972	2.5909	128.22	128.28	2.02	0.262	7.84E-01	3.76E-01	60	46.73	-7.13	-99	18.22
13.12246	2.0644	119.58	119.63	1.726	0.249	7.87E-01	3.78E-01	56	46.4	-7.13	-99	17.34
13.18938	1.6261	110.69	110.73	1.468	0.223	7.91E-01	3.80E-01	39	46.03	-7.13	-99	16.58
13.25909	1.2907	105.43	105.47	1.224	0.21	7.96E-01	3.82E-01	37	45.78	-7.13	-99	15.51
13.32253	0.8912	100.04	100.08	0.89	0.201	7.99E-01	3.84E-01	35	45.52	-7.13	-99	13.66
13.37899	0.5355	94.41	94.45	0.567	0.198	8.03E-01	3.85E-01	33	45.23	-7.13	-99	11.43
13.43267	0.1975	84.51	84.55	0.234	0.191	8.06E-01	3.87E-01	23	44.68	-7.13	-99	8.53
13.48078	-0.0464	79.5	79.54	-0.058	0.181	8.09E-01	3.88E-01	-99	-99	-7.13	-99	-99
13.52051	-0.047	77.88	77.91	-0.06	0.178	8.11E-01	3.89E-01	-99	-99	-7.13	-99	-99
13.7652	-0.0462	-0.15	-0.14	32.1	0.033	8.26E-01	3.96E-01	-99	-99	-7.13	-99	-99
13.88371	-0.0462	-0.15	-0.14	32.1	0.033	8.33E-01	4.00E-01	-99	-99	-7.13	-99	-99
14.02662	-0.0463	-0.15	-0.14	32.164	0.033	8.42E-01	4.04E-01	-99	-99	-7.13	-99	-99
14.16952	-0.048	-0.15	-0.14	33.32	0.033	8.50E-01	4.08E-01	-99	-99	-7.13	-99	-99
14.31243	-0.0467	-0.15	-0.14	32.441	0.033	8.59E-01	4.12E-01	-99	-99	-7.13	-99	-99
14.47276	-0.0462	-0.03	-0.02	250.19	0.033	8.68E-01	4.17E-01	-99	-99	-7.13	-99	-99
14.65402	-0.0462	-0.15	-0.14	31.954	0.029	8.79E-01	4.22E-01	-99	-99	-7.13	-99	-99
14.83945	-0.0462	-0.15	-0.14	32.1	0.033	8.90E-01	4.27E-01	-99	-99	-7.13	-99	-99
15.02139	-0.0462	-0.15	-0.14	32.1	0.033	9.01E-01	4.33E-01	-99	-99	-7.13	-99	-99
15.20264	-0.0462	-0.15	-0.14	32.1	0.033	9.12E-01	4.38E-01	-99	-99	-7.13	-99	-99
15.38529	-0.0462	-0.15	-0.14	32.1	0.033	9.23E-01	4.43E-01	-99	-99	-7.13	-99	-99
15.57211	-0.0462	-0.15	-0.14	32.1	0.033	9.34E-01	4.49E-01	-99	-99	-7.13	-99	-99
15.76034	-0.0451	-0.15	-0.14	31.355	0.033	9.46E-01	4.54E-01	-99	-99	-7.13	-99	-99
15.94646	-0.0454	-0.15	-0.14	31.554	0.033	9.57E-01	4.59E-01	-99	-99	-7.13	-99	-99
16.13329	-0.0462	-0.15	-0.14	32.1	0.033	9.68E-01	4.65E-01	-99	-99	-7.13	-99	-99
16.31872	-0.0462	-0.15	-0.14	32.1	0.033	9.79E-01	4.70E-01	-99	-99	-7.13	-99	-99
16.493	-0.0462	-0.15	-0.14	32.1	0.033	9.90E-01	4.75E-01	-99	-99	-7.13	-99	-99
16.58502	-0.0462	-0.15	-0.14	32.1	0.033	9.95E-01	4.78E-01	-99	-99	-7.13	-99	-99
16.68262	-0.0462	-0.15	-0.14	32.1	0.033	1.00E+00	4.81E-01	-99	-99	-7.13	-99	-99
16.77394	0.0359	-0.15	-0.14	-24.931	0.033	1.01E+00	4.83E-01	-99	-99	-7.13	-99	-99
16.85062	0.1215	-0.15	-0.14	-84.398	0.033	1.01E+00	4.85E-01	-99	-99	-7.13	-99	-99
16.92173	0.2009	-0.15	-0.14	-139.537	0.033	1.02E+00	4.87E-01	-99	-99	-7.13	-99	-99
16.99423	0.3456	-0.15	-0.14	-240.072	0.033	1.02E+00	4.89E-01	-99	-99	-7.13	-99	-99
17.23961	1.3876	45.06	45.07	3.079	0.055	1.03E+00	4.97E-01	23	40.16	2.94	-99	34.13
17.35603	2.1215	42.56	42.57	4.983	0.065	1.04E+00	5.00E-01	55	39.81	-7.13	-99	42.18
17.46129	2.654	59.34	59.36	4.471	0.081	1.05E+00	5.03E-01	51	41.58	-7.13	-99	35.79
17.52194	2.8357	75.24	75.27	3.767	0.126	1.05E+00	5.05E-01	49	42.8	-7.13	-99	30.44
17.56168	2.9339	81.51	81.54	3.598	0.149	1.05E+00	5.06E-01	42	43.19	-7.13	-99	28.93
17.62511	2.9866	77.75	77.78	3.84	0.168	1.06E+00	5.08E-01	50	42.93	-7.13	-99	30.32
17.68228	2.7271	73.12	73.15	3.728	0.175	1.06E+00	5.09E-01	47	42.6	-7.13	-99	30.63
17.73108	2.3703	66.98	67.01	3.537	0.165	1.06E+00	5.11E-01	43	42.14	-7.13	-99	30.95
17.78475	2.0708	60.84	60.87	3.402	0.156	1.07E+00	5.12E-01	31	41.62	3.99	-99	31.58
17.83913	1.862	54.96	54.99	3.386	0.143	1.07E+00	5.14E-01	35	41.06	3.59	-99	32.8
17.89281	1.5346	54.45	54.48	2.817	0.143	1.07E+00	5.15E-01	28	40.99	3.56	-99	30.49
17.94509	1.2639	54.45	54.48	2.32	0.126	1.08E+00	5.17E-01	28	40.98	3.56	-99	28.13
17.99598	1.1039	47.82	47.84	2.307	0.113	1.08E+00	5.18E-01	24	40.25	3.12	-99	29.67
18.05732	1.1054	47.94	47.96	2.305	0.107	1.08E+00	5.20E-01	25	40.25	3.12	-99	29.62
18.11937	1.2364	51.45	51.47	2.402	0.104	1.09E+00	5.22E-01	26	40.62	3.36	-99	29.24
18.1828	1.2518	39.8	39.82	3.143	0.101	1.09E+00	5.24E-01	25	39.17	2.58	-99	36.15
18.24973	1.1671	33.41	33.43	3.491	0.091	1.10E+00	5.26E-01	21	38.14	2.15	-99	40.3
18.32153	1.1226	26.4	26.42	4.249	0.088	1.10E+00	5.28E-01	22	36.71	1.69	-99	47.33
18.39263	1.2173	16.88	16.9	7.202	0.101	1.10E+00	5.30E-01	21	-99	1.05	-99	66.29
18.46305	1.3046	16.38	16.41	7.952	0.117	1.11E+00	5.32E-01	21	-99	1.02	-99	69.15
18.53345	1.2527	16.63	16.66	7.52	0.126	1.11E+00	5.34E-01	21	-99	1.03	-99	67.56
18.60038	1.2315	15.76	15.78	7.804	0.126	1.12E+00	5.36E-01	20	-99	0.98	-99	69.61
18.66381	1.2869	15	15.03	8.563	0.12	1.12E+00	5.38E-01	-99	-99	0.93	-99	72.87
18.72725	1.297	13.5	13.53	9.589	0.123	1.12E+00	5.39E-01	-99	-99	0.83	-99	78.12
18.7872	1.2818	13.63	13.66	9.386	0.149	1.13E+00	5.41E-01	-99	-99	0.83	-99	77.36
18.84576	1.2507	13	13.03	9.598	0.149	1.13E+00	5.43E-01	-99	-99	0.79	-99	79.07
18.90571	1.2067	12.12	12.15	9.93	0.139	1.13E+00	5.45E-01	-99	-99	0.73	-99	81.69
18.96427	1.1711	11.87	11.9	9.842	0.13	1.14E+00	5.46E-01	-99	-99	0.72	-99	82.01

19.02631	1.1326	11.5	11.53	9.826	0.139	1.14E+00	5.48E-01	-99	-99	0.69	-99	82.8
19.09184	1.0789	10.75	10.77	10.014	0.143	1.15E+00	5.50E-01	-99	-99	0.64	-99	85.07
19.15528	1.0294	10.62	10.65	9.665	0.152	1.15E+00	5.52E-01	-99	-99	0.63	-99	84.47
19.21941	1.021	10.5	10.53	9.698	0.159	1.15E+00	5.54E-01	-99	-99	0.62	-99	84.88
19.28424	1.069	11.5	11.53	9.268	0.181	1.16E+00	5.55E-01	-99	-99	0.69	-99	81.33
19.34838	1.1858	12.25	12.29	9.649	0.201	1.16E+00	5.57E-01	-99	-99	0.74	-99	80.69
19.41391	1.3452	15.63	15.67	8.584	0.204	1.17E+00	5.59E-01	-99	-99	0.96	-99	71.94
19.47456	1.4855	23.02	23.06	6.441	0.204	1.17E+00	5.61E-01	29	-99	1.46	-99	57.48
19.53242	1.6238	28.4	28.45	5.708	0.214	1.17E+00	5.63E-01	35	-99	1.82	-99	51.22
19.58888	1.7228	27.53	27.57	6.249	0.214	1.18E+00	5.64E-01	34	-99	1.76	-99	53.49
19.64674	1.7885	26.53	26.57	6.732	0.21	1.18E+00	5.66E-01	33	-99	1.69	-99	55.62
19.70391	1.7957	24.9	24.94	7.2	0.204	1.18E+00	5.68E-01	31	-99	1.58	-99	58.19
19.75898	1.7505	23.65	23.69	7.39	0.201	1.19E+00	5.69E-01	29	-99	1.5	-99	59.74
19.81056	1.6981	22.27	22.31	7.612	0.194	1.19E+00	5.71E-01	28	-99	1.41	-99	61.57
19.86284	1.644	21.77	21.81	7.539	0.191	1.19E+00	5.72E-01	27	-99	1.37	-99	61.83
19.91862	1.5681	23.65	23.68	6.621	0.188	1.20E+00	5.74E-01	29	-99	1.5	-99	57.5
19.97648	1.4912	25.65	25.69	5.805	0.185	1.20E+00	5.75E-01	32	-99	1.63	-99	53.4
20.03852	1.4291	26.9	26.94	5.305	0.181	1.20E+00	5.77E-01	33	-99	1.71	-99	50.86
20.10265	1.4106	21.27	21.3	6.623	0.172	1.21E+00	5.79E-01	26	-99	1.34	-99	59.62
20.16749	1.3413	18.51	18.55	7.232	0.178	1.21E+00	5.81E-01	23	-99	1.15	-99	64.35
20.23998	1.3498	18.26	18.3	7.376	0.198	1.21E+00	5.83E-01	23	-99	1.14	-99	65.06
20.31737	1.3866	17.88	17.92	7.737	0.188	1.22E+00	5.85E-01	22	-99	1.11	-99	66.56
20.39614	1.3928	18.14	18.17	7.664	0.188	1.22E+00	5.87E-01	22	-99	1.13	-99	66.05
20.47282	1.3422	26.15	26.19	5.125	0.181	1.23E+00	5.90E-01	32	35.97	1.66	-99	50.75
20.5495	1.3203	31.79	31.82	4.149	0.172	1.23E+00	5.92E-01	26	37.14	2.04	-99	43.78
20.62618	1.2898	32.29	32.32	3.991	0.168	1.24E+00	5.94E-01	20	37.21	2.07	-99	42.9
20.70566	1.2266	27.9	27.94	4.39	0.165	1.24E+00	5.96E-01	23	36.3	1.78	-99	46.91
20.78722	1.0266	24.15	24.18	4.246	0.162	1.25E+00	5.99E-01	20	35.38	1.53	-99	48.9
20.87157	0.9542	18.39	18.42	5.181	0.162	1.25E+00	6.01E-01	22	-99	1.14	-99	57.76
20.95522	0.9724	16.38	16.42	5.924	0.168	1.26E+00	6.04E-01	20	-99	1.01	-99	62.84
21.03609	1.0321	14.63	14.66	7.038	0.175	1.26E+00	6.06E-01	18	-99	0.89	-99	69.02
21.10789	1.1253	14.75	14.79	7.606	0.204	1.27E+00	6.08E-01	18	-99	0.9	-99	70.53
21.19921	1.2205	16.76	16.8	7.266	0.201	1.27E+00	6.11E-01	20	-99	1.03	-99	66.62
21.29123	1.2782	25.52	25.57	4.999	0.217	1.28E+00	6.13E-01	31	-99	1.62	-99	50.74
21.37837	1.4821	48.44	48.49	3.056	0.23	1.28E+00	6.16E-01	23	39.37	3.14	-99	33.05
21.45854	1.5603	52.83	52.87	2.951	0.236	1.29E+00	6.18E-01	26	39.83	3.44	-99	31.47
21.53731	1.5815	47.94	47.98	3.296	0.207	1.29E+00	6.20E-01	29	39.27	3.11	-99	34.22
21.61957	1.681	44.56	44.6	3.769	0.185	1.30E+00	6.23E-01	27	38.83	2.88	-99	37.14
21.70183	1.7973	36.17	36.21	4.964	0.188	1.30E+00	6.25E-01	44	37.59	2.32	-99	44.65
21.78479	1.8214	36.67	36.71	4.962	0.194	1.31E+00	6.27E-01	44	37.65	2.36	-99	44.42
21.86774	1.7371	34.79	34.84	4.987	0.214	1.31E+00	6.30E-01	42	37.31	2.23	-99	45.35
21.95279	1.6433	28.53	28.57	5.751	0.217	1.32E+00	6.32E-01	34	-99	1.81	-99	51.28
22.03645	1.4986	25.4	25.44	5.89	0.22	1.32E+00	6.35E-01	30	-99	1.61	-99	53.85
22.1194	1.2902	22.77	22.81	5.656	0.214	1.33E+00	6.37E-01	27	-99	1.43	-99	55.16
22.20375	1.1084	20.14	20.18	5.493	0.201	1.33E+00	6.40E-01	24	-99	1.25	-99	57.02
22.2881	1.1097	20.77	20.8	5.334	0.191	1.34E+00	6.42E-01	25	-99	1.3	-99	55.86
22.37246	1.2276	24.52	24.56	4.998	0.198	1.34E+00	6.44E-01	29	-99	1.55	-99	51.47
22.44844	1.5052	34.17	34.21	4.4	0.21	1.35E+00	6.47E-01	27	37.04	2.19	-99	43.56
22.52303	1.737	35.79	35.83	4.847	0.201	1.35E+00	6.49E-01	43	37.3	2.3	-99	44.41
22.59692	1.6799	42.31	42.35	3.967	0.21	1.36E+00	6.51E-01	25	38.27	2.73	-99	38.65
22.66803	1.6195	54.96	55	2.944	0.227	1.36E+00	6.53E-01	26	39.75	3.57	-99	30.94
22.73565	1.5447	65.85	65.9	2.344	0.233	1.36E+00	6.55E-01	31	40.73	4.3	-99	26.05
22.79909	1.4723	71.99	72.04	2.044	0.23	1.37E+00	6.57E-01	28	41.19	4.71	-99	23.6
22.86183	1.3353	73.62	73.66	1.813	0.233	1.37E+00	6.58E-01	29	41.3	4.82	-99	22.15
22.92945	1.3887	61.97	62.01	2.239	0.223	1.38E+00	6.60E-01	29	40.35	4.04	-99	26.22
23.00125	1.4592	50.07	50.12	2.912	0.217	1.38E+00	6.62E-01	24	39.14	3.25	-99	31.98
23.08003	1.4665	34.92	34.96	4.195	0.207	1.39E+00	6.65E-01	27	37.01	2.24	-99	42.44
23.16368	1.4436	25.77	25.82	5.592	0.207	1.39E+00	6.67E-01	30	-99	1.63	-99	52.6
23.25151	1.6021	19.51	19.56	8.191	0.23	1.40E+00	6.70E-01	-99	-99	1.21	-99	65.91
23.33935	1.8057	26.03	26.08	6.925	0.246	1.40E+00	6.72E-01	31	-99	1.64	-99	56.54
23.42231	1.8973	40.8	40.86	4.644	0.269	1.41E+00	6.75E-01	32	37.85	2.63	-99	41.65
23.49969	2.0725	43.06	43.12	4.806	0.304	1.41E+00	6.77E-01	34	38.14	2.78	-99	41.4
23.57776	2.193	36.42	36.49	6.011	0.32	1.42E+00	6.79E-01	43	-99	2.33	-99	47.87
23.65445	2.1145	33.29	33.35	6.34	0.298	1.42E+00	6.81E-01	39	-99	2.12	-99	50.37
23.72764	1.8623	29.28	29.34	6.348	0.285	1.42E+00	6.83E-01	34	-99	1.86	-99	52.65
23.79945	1.7897	26.4	26.46	6.765	0.278	1.43E+00	6.85E-01	31	-99	1.66	-99	55.8

23.87055	1.8731	28.03	28.09	6.669	0.278	1.43E+00	6.88E-01	33	-99	1.77	-99	54.41
23.94026	2.283	35.42	35.47	6.436	0.275	1.44E+00	6.90E-01	41	-99	2.27	-99	49.6
24.003	2.432	50.2	50.25	4.839	0.282	1.44E+00	6.91E-01	39	38.91	3.25	-99	39.28
24.05808	2.4613	66.85	66.91	3.678	0.285	1.44E+00	6.93E-01	39	40.5	4.36	-99	31.5
24.10896	2.4746	70.99	71.04	3.483	0.278	1.45E+00	6.94E-01	33	40.82	4.64	-99	30.06
24.17101	2.4909	63.47	63.53	3.921	0.272	1.45E+00	6.96E-01	37	40.19	4.13	-99	33.01
24.23793	2.5084	57.71	57.77	4.342	0.291	1.45E+00	6.98E-01	33	39.65	-7.13	-99	35.71
24.30486	2.544	51.82	51.89	4.903	0.301	1.46E+00	7.00E-01	40	39.02	-7.13	-99	39.04
24.55372	2.2385	48.69	48.76	4.591	0.304	1.47E+00	7.07E-01	37	38.6	3.15	-99	38.88
24.65202	1.9657	38.42	38.48	5.108	0.282	1.48E+00	7.10E-01	44	37.19	2.46	-99	44.16
24.7531	1.7914	28.66	28.71	6.239	0.272	1.49E+00	7.13E-01	33	-99	1.81	-99	52.72
24.85279	1.5263	21.64	21.69	7.035	0.259	1.49E+00	7.16E-01	25	-99	1.34	-99	60.49
24.92528	1.3892	18.39	18.44	7.535	0.256	1.50E+00	7.18E-01	21	-99	1.13	-99	65.36
24.98872	1.3073	18.76	18.81	6.949	0.259	1.50E+00	7.20E-01	22	-99	1.15	-99	63.2
25.05355	1.26	16.26	16.31	7.725	0.269	1.50E+00	7.22E-01	19	-99	0.98	-99	68.63
25.1135	1.2344	14.13	14.18	8.703	0.278	1.51E+00	7.23E-01	-99	-99	0.84	-99	74.63
25.17276	1.2212	13.38	13.43	9.091	0.278	1.51E+00	7.25E-01	-99	-99	0.79	-99	77
25.2362	1.1758	12.12	12.18	9.653	0.285	1.51E+00	7.27E-01	-99	-99	0.71	-99	80.92
25.30033	1.1392	12.25	12.31	9.256	0.291	1.52E+00	7.29E-01	-99	-99	0.72	-99	79.63
25.38399	1.1111	12	12.06	9.215	0.298	1.52E+00	7.31E-01	-99	-99	0.7	-99	80.04
25.46764	1.0919	12	12.06	9.055	0.298	1.53E+00	7.34E-01	-99	-99	0.7	-99	79.61
25.55268	1.0686	12.5	12.56	8.507	0.304	1.53E+00	7.36E-01	-99	-99	0.73	-99	77.07
25.64052	1.0956	14.25	14.32	7.653	0.311	1.54E+00	7.38E-01	16	-99	0.85	-99	71.44
25.72975	1.1925	17.26	17.32	6.883	0.324	1.54E+00	7.41E-01	20	-99	1.05	-99	64.78
25.81619	1.2259	24.15	24.21	5.062	0.337	1.55E+00	7.44E-01	27	-99	1.51	-99	51.97
25.90194	1.2736	31.54	31.62	4.028	0.417	1.55E+00	7.46E-01	24	35.67	2	-99	43.4
25.98977	1.4418	29.53	29.61	4.869	0.404	1.56E+00	7.49E-01	33	-99	1.86	-99	47.66
26.07691	1.5128	26.15	26.23	5.767	0.398	1.57E+00	7.51E-01	29	-99	1.64	-99	52.89
26.15987	1.5531	42.93	43.01	3.611	0.401	1.57E+00	7.53E-01	24	37.5	2.76	-99	37.03
26.24562	1.5657	32.16	32.24	4.856	0.395	1.58E+00	7.56E-01	36	35.72	2.04	-99	46.17
26.33624	1.5633	24.4	24.48	6.387	0.388	1.58E+00	7.59E-01	27	-99	1.52	-99	56.15
26.42617	1.5569	22.14	22.22	7.006	0.385	1.59E+00	7.61E-01	25	-99	1.37	-99	59.92
26.514	1.5822	27.15	27.23	5.81	0.395	1.59E+00	7.64E-01	30	-99	1.7	-99	52.34
26.59417	1.5622	25.27	25.36	6.161	0.408	1.60E+00	7.66E-01	28	-99	1.58	-99	54.78
26.67016	1.5688	24.02	24.11	6.508	0.424	1.60E+00	7.68E-01	27	-99	1.49	-99	56.82
26.74475	1.5697	23.9	23.98	6.545	0.424	1.61E+00	7.70E-01	27	-99	1.49	-99	57.03
26.81934	1.6681	26.28	26.36	6.328	0.414	1.61E+00	7.72E-01	29	-99	1.64	-99	54.56
26.89323	1.6922	29.78	29.86	5.667	0.388	1.61E+00	7.75E-01	33	-99	1.88	-99	50.22
26.96155	1.6711	25.15	25.22	6.625	0.369	1.62E+00	7.77E-01	28	-99	1.57	-99	56.3
27.02708	1.6871	20.89	20.96	8.048	0.353	1.62E+00	7.78E-01	-99	-99	1.28	-99	64.05
27.09261	1.6813	20.26	20.34	8.268	0.349	1.63E+00	7.80E-01	-99	-99	1.24	-99	65.28
27.15883	1.5392	24.02	24.09	6.389	0.349	1.63E+00	7.82E-01	27	-99	1.49	-99	56.46
27.22715	1.425	22.14	22.21	6.416	0.337	1.63E+00	7.84E-01	25	-99	1.37	-99	58.14
27.29826	1.328	18.64	18.7	7.101	0.33	1.64E+00	7.86E-01	21	-99	1.13	-99	63.78
27.37215	1.2272	18.76	18.83	6.518	0.333	1.64E+00	7.88E-01	21	-99	1.14	-99	61.85
27.44465	1.3572	21.77	21.84	6.216	0.337	1.65E+00	7.90E-01	24	-99	1.34	-99	57.85
27.51576	1.6641	31.16	31.23	5.328	0.349	1.65E+00	7.93E-01	34	-99	1.97	-99	48.33
27.57989	1.9285	59.21	59.29	3.253	0.366	1.66E+00	7.94E-01	26	39.06	3.84	-99	31.31
27.63496	2.1021	78.88	78.99	2.661	0.55	1.66E+00	7.96E-01	35	40.65	5.15	-99	25.55
27.70259	2.155	70.74	70.88	3.04	0.689	1.66E+00	7.98E-01	31	40.03	4.6	-99	28.34
27.7472	2.2189	71.11	71.2	3.117	0.411	1.67E+00	7.99E-01	31	40.06	4.63	-99	28.6
27.82318	2.2897	67.48	67.54	3.39	0.272	1.67E+00	8.01E-01	30	39.75	4.39	-99	30.29
27.91241	2.1805	56.83	56.87	3.834	0.185	1.68E+00	8.04E-01	31	38.76	3.68	-99	34.1
28.00304	2.1093	42.18	42.2	4.999	0.088	1.68E+00	8.07E-01	46	36.98	2.7	-99	42.37
28.10063	2.006	27.28	27.3	7.349	0.097	1.69E+00	8.09E-01	30	-99	1.71	-99	56.87
28.19335	1.9008	25.27	25.3	7.514	0.113	1.69E+00	8.12E-01	28	-99	1.57	-99	58.79
28.28258	1.7876	25.77	25.8	6.928	0.126	1.70E+00	8.15E-01	28	-99	1.61	-99	56.76
28.37251	1.6854	25.4	25.43	6.628	0.143	1.70E+00	8.17E-01	28	-99	1.58	-99	56.15
28.45686	1.5598	22.89	22.92	6.804	0.149	1.71E+00	8.20E-01	25	-99	1.41	-99	58.7
28.54191	1.4634	21.39	21.42	6.831	0.152	1.71E+00	8.22E-01	23	-99	1.31	-99	60.14
28.62208	1.4172	21.64	21.69	6.535	0.217	1.72E+00	8.24E-01	24	-99	1.33	-99	58.99
28.69946	1.3292	22.39	22.48	5.912	0.443	1.72E+00	8.27E-01	24	-99	1.38	-99	56.29
28.77544	1.2372	27.03	27.12	4.563	0.437	1.73E+00	8.29E-01	20	-99	1.69	-99	48.08
28.85003	1.1651	23.77	23.86	4.884	0.427	1.73E+00	8.31E-01	26	-99	1.47	-99	51.6
28.92462	1.1491	19.26	19.35	5.94	0.411	1.74E+00	8.33E-01	21	-99	1.17	-99	59.41
29.00409	1.1121	15.63	15.71	7.078	0.408	1.74E+00	8.35E-01	17	-99	0.93	-99	67.56

29.08426	1.0271	13.38	13.46	7.632	0.401	1.75E+00	8.38E-01	14	-99	0.78	-99	72.86
29.16652	0.9383	13.13	13.21	7.105	0.398	1.75E+00	8.40E-01	14	-99	0.76	-99	71.7
29.25087	0.8779	13.38	13.46	6.524	0.398	1.76E+00	8.42E-01	14	-99	0.77	-99	69.38
29.33662	0.8505	13.13	13.21	6.44	0.398	1.76E+00	8.45E-01	14	-99	0.76	-99	69.54
29.42097	0.8706	13.38	13.46	6.47	0.398	1.77E+00	8.47E-01	14	-99	0.77	-99	69.2
29.50741	0.9992	13.13	13.21	7.566	0.404	1.77E+00	8.50E-01	14	-99	0.76	-99	73.11
29.59594	1.2736	15.63	15.71	8.105	0.414	1.78E+00	8.52E-01	-99	-99	0.92	-99	70.56
29.68099	1.5627	27.28	27.36	5.711	0.43	1.78E+00	8.55E-01	29	-99	1.7	-99	51.93
29.75977	1.906	38.55	38.64	4.933	0.453	1.79E+00	8.57E-01	41	36.06	2.45	-99	43.51
29.83645	2.1031	46.69	46.79	4.495	0.482	1.79E+00	8.59E-01	33	37.21	2.99	-99	39.13
29.91104	2.048	53.58	53.68	3.815	0.479	1.80E+00	8.61E-01	29	38.01	3.45	-99	34.78
29.98354	1.7915	65.98	66.07	2.711	0.463	1.80E+00	8.64E-01	28	39.2	4.28	-99	27.73
30.05255	1.4835	65.48	65.57	2.263	0.45	1.80E+00	8.66E-01	23	39.14	4.24	-99	25.71
30.12296	1.1919	59.72	59.8	1.993	0.434	1.81E+00	8.68E-01	21	38.6	3.86	-99	25.34
30.19685	0.9973	52.45	52.53	1.898	0.411	1.81E+00	8.70E-01	19	37.83	3.38	-99	26.31
30.27702	0.9335	38.93	39.01	2.393	0.395	1.82E+00	8.72E-01	17	36.01	2.47	-99	32.82
30.36137	0.9504	26.03	26.1	3.641	0.382	1.82E+00	8.74E-01	14	33.42	1.61	-99	45.02
30.44363	0.9912	19.51	19.59	5.06	0.379	1.83E+00	8.77E-01	21	-99	1.18	-99	56.06
30.52241	1.165	16.88	16.96	6.869	0.385	1.83E+00	8.79E-01	18	-99	1	-99	65.2
30.597	1.2422	22.14	22.22	5.59	0.392	1.84E+00	8.81E-01	23	-99	1.35	-99	55.45
30.67228	1.4161	30.78	30.86	4.588	0.388	1.84E+00	8.83E-01	22	-99	1.93	-99	45.95
30.74548	1.5851	27.65	27.73	5.716	0.392	1.85E+00	8.86E-01	29	-99	1.72	-99	51.7
30.81938	1.7557	34.79	34.88	5.033	0.456	1.85E+00	8.88E-01	37	-99	2.2	-99	45.48
30.89048	1.9976	36.3	36.4	5.488	0.498	1.85E+00	8.90E-01	38	-99	2.3	-99	46.29
31.11565	2.4092	32.16	32.27	7.466	0.527	1.87E+00	8.96E-01	34	-99	2.02	-99	54.11
31.19094	2.2616	29.91	30.02	7.535	0.531	1.87E+00	8.98E-01	31	-99	1.87	-99	55.6
31.2725	2.0213	27.15	27.26	7.416	0.518	1.88E+00	9.01E-01	28	-99	1.69	-99	57.08
31.35476	1.7656	25.15	25.25	6.992	0.508	1.88E+00	9.03E-01	26	-99	1.55	-99	57.35
31.43772	1.59	22.89	23	6.914	0.511	1.89E+00	9.05E-01	24	-99	1.4	-99	58.96
31.52068	1.4889	22.52	22.62	6.582	0.514	1.89E+00	9.08E-01	24	-99	1.38	-99	58.29
31.60293	1.5258	23.9	24	6.357	0.527	1.90E+00	9.10E-01	25	-99	1.47	-99	56.44
31.68519	1.7158	29.28	29.39	5.838	0.537	1.90E+00	9.13E-01	30	-99	1.83	-99	51.05
31.76257	1.9344	33.66	33.78	5.727	0.56	1.91E+00	9.15E-01	35	-99	2.12	-99	48.29
31.83995	2.0078	43.18	43.3	4.637	0.592	1.91E+00	9.17E-01	30	36.34	2.75	-99	40.76
31.90896	2.0172	55.83	55.96	3.605	0.618	1.92E+00	9.19E-01	29	37.87	3.59	-99	33.44
31.97171	2.0197	65.48	65.6	3.079	0.634	1.92E+00	9.21E-01	27	38.79	4.24	-99	29.38
32.02608	1.9859	78.75	78.88	2.518	0.644	1.92E+00	9.22E-01	33	39.83	5.12	-99	24.93
32.07348	1.9961	84.64	84.76	2.355	0.608	1.92E+00	9.24E-01	29	40.22	5.51	-99	23.46
32.1195	2.0681	89.9	90.01	2.298	0.563	1.93E+00	9.25E-01	31	40.54	5.86	-99	22.61
32.1655	2.1945	88.77	88.88	2.469	0.534	1.93E+00	9.26E-01	31	40.46	5.79	-99	23.51
32.21012	2.3913	87.64	87.75	2.725	0.518	1.93E+00	9.28E-01	36	40.39	5.71	-99	24.74
32.25752	2.57	84.01	84.11	3.055	0.508	1.94E+00	9.29E-01	35	40.14	5.47	-99	26.53
32.30771	2.7241	77.12	77.22	3.528	0.498	1.94E+00	9.31E-01	32	39.66	5.01	-99	29.27
32.3586	2.8626	69.48	69.58	4.114	0.489	1.94E+00	9.32E-01	36	39.06	4.5	-99	32.58
32.41088	3.0223	66.23	66.33	4.557	0.492	1.95E+00	9.33E-01	46	38.78	4.29	-99	34.66
32.46107	3.1817	66.35	66.46	4.788	0.505	1.95E+00	9.35E-01	68	38.78	4.29	-99	35.38
32.51266	3.3216	63.6	63.7	5.214	0.521	1.95E+00	9.36E-01	65	38.53	4.11	-99	37.24
32.56634	3.4858	60.59	60.7	5.742	0.556	1.95E+00	9.38E-01	62	38.23	-7.13	-99	39.44
32.62211	3.7059	60.09	60.21	6.155	0.592	1.96E+00	9.40E-01	62	38.18	-7.13	-99	40.71
32.67788	3.626	55.83	55.95	6.48	0.589	1.96E+00	9.41E-01	57	-99	3.59	-99	42.63
32.73783	3.2749	48.82	48.94	6.692	0.582	1.96E+00	9.43E-01	50	-99	3.12	-99	45.17
32.79779	3.0277	46.31	46.43	6.521	0.582	1.97E+00	9.45E-01	48	-99	2.96	-99	45.5
32.86053	2.769	48.57	48.69	5.687	0.579	1.97E+00	9.46E-01	50	-99	3.11	-99	42.39
32.92326	2.5103	47.69	47.81	5.251	0.576	1.98E+00	9.48E-01	49	36.74	3.05	-99	41.32
32.97555	2.2947	52.95	53.07	4.324	0.582	1.98E+00	9.50E-01	27	37.37	3.4	-99	36.78
33.01459	2.0107	59.72	59.83	3.361	0.566	1.98E+00	9.51E-01	24	38.07	3.85	-99	31.64
33.2767	-0.05	60.59	60.69	-0.082	0.485	2.00E+00	9.58E-01	-99	-99	-7.13	-99	-99
33.566	-0.0518	0.1	0.11	-47.533	0.042	2.01E+00	9.67E-01	-99	-99	-7.13	-99	-99
33.78559	-0.0518	-0.03	-0.02	313.822	0.042	2.03E+00	9.73E-01	-99	-99	-7.13	-99	-99
34.01146	-0.0518	-0.03	-0.02	313.822	0.042	2.04E+00	9.80E-01	-99	-99	-7.13	-99	-99
34.25196	-0.0518	-0.03	-0.02	313.822	0.042	2.06E+00	9.87E-01	-99	-99	-7.13	-99	-99
34.48201	-0.0518	-0.03	-0.02	301.874	0.039	2.07E+00	9.93E-01	-99	-99	-7.13	-99	-99
34.69463	-0.0509	0.1	0.11	-46.715	0.042	2.08E+00	9.99E-01	-99	-99	-7.13	-99	-99
34.89819	-0.0511	0.1	0.11	-46.873	0.042	2.09E+00	1.01E+00	-99	-99	-7.13	-99	-99
35.0871	-0.0518	0.1	0.11	-47.82	0.039	2.11E+00	1.01E+00	-99	-99	-7.13	-99	-99
35.2579	-0.0507	0.1	0.11	-46.563	0.042	2.12E+00	1.02E+00	-99	-99	-7.13	-99	-99

35.33598	-0.0512	0.1	0.11	-46.992	0.042	2.12E+00	1.02E+00	-99	-99	-7.13	-99	-99
35.4252	-0.0499	0.1	0.11	-45.82	0.042	2.13E+00	1.02E+00	-99	-99	-7.13	-99	-99
35.51304	-0.0499	0.1	0.11	-46.097	0.039	2.13E+00	1.02E+00	-99	-99	-7.13	-99	-99
35.60227	-0.0508	0.1	0.11	-46.638	0.042	2.14E+00	1.03E+00	-99	-99	-7.13	-99	-99
35.68941	-0.053	-0.03	-0.02	320.827	0.042	2.14E+00	1.03E+00	-99	-99	-7.13	-99	-99
35.77585	-0.0477	0.1	0.11	-43.796	0.042	2.15E+00	1.03E+00	-99	-99	-7.13	-99	-99
35.85951	-0.0391	0.1	0.11	-36.083	0.039	2.15E+00	1.03E+00	-99	-99	-7.13	-99	-99
35.93619	0.0344	0.1	0.11	31.725	0.039	2.16E+00	1.04E+00	-99	-99	-7.13	-99	-99
36.01218	0.1918	0.1	0.11	177.082	0.039	2.16E+00	1.04E+00	-99	-99	-7.13	-99	-99
36.1746	0.8402	34.42	34.43	2.441	0.049	2.17E+00	1.04E+00	14	34.11	2.15	-99	34.85
36.28474	1.5444	37.55	37.56	4.112	0.055	2.18E+00	1.05E+00	18	34.65	2.36	-99	41
36.40395	1.9064	45.81	45.83	4.16	0.068	2.18E+00	1.05E+00	22	35.88	2.91	-99	38.23
36.52107	1.9571	70.99	71.01	2.756	0.11	2.19E+00	1.05E+00	28	38.49	4.59	-99	27.11
36.63051	1.9618	85.14	85.16	2.304	0.11	2.20E+00	1.06E+00	28	39.51	5.53	-99	23.17
36.73996	1.4108	74.24	74.25	1.9	0.052	2.20E+00	1.06E+00	24	38.71	4.8	-99	22.54
36.81874	1.0142	71.11	71.11	1.426	0.004	2.21E+00	1.06E+00	23	38.45	4.59	-99	20.24
36.89124	1.1075	81.13	81.13	1.365	-0.013	2.21E+00	1.06E+00	20	39.2	5.26	-99	18.61
37.12407	1.2191	62.47	62.48	1.951	0.042	2.23E+00	1.07E+00	20	37.64	4.02	-99	24.63
37.21957	1.293	63.72	63.73	2.029	0.049	2.23E+00	1.07E+00	21	37.75	4.1	-99	24.83
37.31369	1.5489	64.85	64.86	2.388	0.049	2.24E+00	1.08E+00	25	37.83	4.17	-99	26.44
37.39874	1.6828	61.22	61.23	2.748	0.046	2.24E+00	1.08E+00	24	37.48	3.93	-99	28.77
37.47612	1.7706	51.7	51.71	3.424	0.046	2.25E+00	1.08E+00	25	36.45	3.3	-99	33.75
37.56116	1.9754	45.94	45.95	4.299	0.052	2.25E+00	1.08E+00	30	35.7	2.91	-99	38.7
37.6483	2.1788	40.93	40.94	5.322	0.068	2.26E+00	1.08E+00	39	-99	2.58	-99	43.88
37.73893	2.4228	44.19	44.2	5.481	0.075	2.26E+00	1.09E+00	43	-99	2.79	-99	43.21
37.83513	2.5142	43.43	43.45	5.786	0.081	2.27E+00	1.09E+00	42	-99	2.74	-99	44.4
37.92994	2.3476	43.06	43.07	5.45	0.078	2.28E+00	1.09E+00	41	-99	2.72	-99	43.51
38.01707	2.235	39.68	39.69	5.631	0.075	2.28E+00	1.10E+00	38	-99	2.49	-99	45.34
38.10491	2.0391	38.8	38.81	5.253	0.071	2.29E+00	1.10E+00	37	-99	2.43	-99	44.5
38.18508	1.9393	46.82	46.83	4.141	0.071	2.29E+00	1.10E+00	22	35.72	2.97	-99	37.86
38.25479	1.9146	48.19	48.21	3.972	0.068	2.30E+00	1.10E+00	23	35.89	3.06	-99	36.82
38.31474	0	44.44	44.45	0	0.062	2.30E+00	1.10E+00	11	-99	-7.13	-99	-99
38.37191	0	41.68	41.69	0	0.059	2.30E+00	1.11E+00	10	-99	-7.13	-99	-99
38.43813	0	38.42	38.44	0	0.055	2.31E+00	1.11E+00	9	-99	-7.13	-99	-99
38.50993	0	45.94	45.95	0	0.068	2.31E+00	1.11E+00	11	-99	-7.13	-99	-99
38.56152	0	51.07	51.09	0	0.088	2.31E+00	1.11E+00	12	-99	-7.13	-99	-99
38.59916	0	55.96	55.98	0	0.097	2.32E+00	1.11E+00	13	-99	-7.13	-99	-99

Suelos, PSC.

Soil & Construction Materials Laboratory and Environmental Drilling Services

Test Id: CPT B2 f Date: 5-Oct-21
Site: DIKE B Cone Id: 3045.123xx
Location: Gurabo
Project: Diques S Density 120 PCF
Operator | w: RTH | Nicolas

Depth (ft)	Sleeve Stress (tsf)	TIPStresUNC (tsf)	TIPStresCOR (tsf)	Ratio COR (%)	Pore Pressure (tsf)	Overburden (tsf)	Eff. Overburde (tsf)	SPT N60c (blows/ft)	Friction Angle (deg)	Su (tsf)	OCR ()	FC (%)
0	0	0	0	0	0	0.00E+00	0.00E+00	-99	0	0	-99	-99
0.22918	0	0	0	0	-0.001	1.38E-02	6.60E-03	-99	-99	-7.13	-99	-99
0.36432	0	0	0	0	-0.001	2.19E-02	1.05E-02	-99	-99	-7.13	-99	-99
0.50156	0	0	0	0	-0.001	3.01E-02	1.44E-02	-99	-99	-7.13	-99	-99
0.74537	0	0	0	0	-0.001	4.47E-02	2.15E-02	-99	-99	-7.13	-99	-99
0.95365	0	0	0	0	-0.001	5.72E-02	2.75E-02	-99	-99	-7.13	-99	-99
1.15636	0	0	0	0	-0.001	6.94E-02	3.33E-02	-99	-99	-7.13	-99	-99
1.34654	0	0	0	0	-0.001	8.08E-02	3.88E-02	-99	-99	-7.13	-99	-99
1.51511	0	0	0	0	-0.001	9.09E-02	4.36E-02	-99	-99	-7.13	-99	-99
1.68021	0	0	0	0	-0.001	1.01E-01	4.84E-02	-99	-99	-7.13	-99	-99
1.84252	0	0	0	0	-0.001	1.11E-01	5.31E-02	-99	-99	-7.13	-99	-99
2.00622	0	0	0	0	-0.001	1.20E-01	5.78E-02	-99	-99	-7.13	-99	-99
2.16783	0.0016	0	0	-599.319	-0.001	1.30E-01	6.24E-02	-99	-99	-7.13	-99	-99
2.33014	0	0	0	0	-0.001	1.40E-01	6.71E-02	-99	-99	-7.13	-99	-99
2.48548	0	0	0	0	-0.001	1.49E-01	7.16E-02	-99	-99	-7.13	-99	-99
2.60948	0	0	0	0	-0.001	1.57E-01	7.52E-02	-99	-99	-7.13	-99	-99
2.70212	0	0	0	0	-0.001	1.62E-01	7.78E-02	-99	-99	-7.13	-99	-99
2.79408	0	0	0	0	-0.001	1.68E-01	8.05E-02	-99	-99	-7.13	-99	-99
2.88533	0	0	0	0	-0.001	1.73E-01	8.31E-02	-99	-99	-7.13	-99	-99
2.99191	0.0016	0	0	-595.395	-0.001	1.80E-01	8.62E-02	-99	-99	-7.13	-99	-99
3.0971	0.0003	0	0	-96.55	-0.001	1.86E-01	8.92E-02	-99	-99	-7.13	-99	-99
3.20019	0.0016	0	0	-615.411	-0.001	1.92E-01	9.22E-02	-99	-99	-7.13	-99	-99
3.3019	0.0019	0	0	-707.841	-0.001	1.98E-01	9.51E-02	-99	-99	-7.13	-99	-99
3.405	0.0002	0	0	-59.952	-0.001	2.04E-01	9.81E-02	-99	-99	-7.13	-99	-99
3.5074	0	0	0	0	-0.001	2.10E-01	1.01E-01	-99	-99	-7.13	-99	-99
3.60701	0.0017	0	0	-666.434	-0.001	2.16E-01	1.04E-01	-99	-99	-7.13	-99	-99
3.70732	0.0001	0	0	-35.618	-0.001	2.22E-01	1.07E-01	-99	-99	-7.13	-99	-99
3.80903	-0.0019	0	0	710.195	-0.001	2.29E-01	1.10E-01	-99	-99	-7.13	-99	-99
3.90655	0.0009	0	0	-361.77	-0.001	2.34E-01	1.13E-01	-99	-99	-7.13	-99	-99
4.00616	0	0	0	0	-0.001	2.40E-01	1.15E-01	-99	-99	-7.13	-99	-99
4.10299	-0.0019	0	0	711.177	-0.001	2.46E-01	1.18E-01	-99	-99	-7.13	-99	-99
4.1636	-0.0006	0	0	241.867	-0.001	2.50E-01	1.20E-01	-99	-99	-7.13	-99	-99
4.23883	0	0	0	0	-0.001	2.54E-01	1.22E-01	-99	-99	-7.13	-99	-99
4.27087	0	0	0	0	-0.001	2.56E-01	1.23E-01	-99	-99	-7.13	-99	-99
4.31197	0	0	0	0	-0.001	2.59E-01	1.24E-01	-99	-99	-7.13	-99	-99
4.36561	0	0	0	0	-0.001	2.62E-01	1.26E-01	-99	-99	-7.13	-99	-99
4.42204	0	0	0	0	-0.001	2.65E-01	1.27E-01	-99	-99	-7.13	-99	-99
4.47567	0	0	0	0	-0.001	2.69E-01	1.29E-01	-99	-99	-7.13	-99	-99
4.52931	0	0	0	0	-0.001	2.72E-01	1.30E-01	-99	-99	-7.13	-99	-99
4.58156	0	0	0	0	-0.001	2.75E-01	1.32E-01	-99	-99	-7.13	-99	-99
4.6345	0	0	0	0	-0.001	2.78E-01	1.34E-01	-99	-99	-7.13	-99	-99
4.68814	0	0	0	0	-0.001	2.81E-01	1.35E-01	-99	-99	-7.13	-99	-99
4.74038	0	0	0	0	-0.001	2.84E-01	1.37E-01	-99	-99	-7.13	-99	-99
4.79123	0.0068	0	0	-2582.43	-0.001	2.88E-01	1.38E-01	-99	-99	-7.13	-99	-99
4.84139	0.0151	0	0	-5744.46	-0.001	2.91E-01	1.39E-01	-99	-99	-7.13	-99	-99
4.89155	0.0234	0	0	-8906.29	-0.001	2.94E-01	1.41E-01	-99	-99	-7.13	-99	-99
4.941	0.0316	0	0	-12024.3	-0.001	2.97E-01	1.42E-01	-99	-99	-7.13	-99	-99
4.99185	0.293	0	0	*********	-0.001	3.00E-01	1.44E-01	-99	-99	-7.13	-99	-99
5.0441	0.522	0	0	*********	-0.001	3.03E-01	1.45E-01	-99	-99	-7.13	-99	-99
5.23566	1.6215	85.12	85.13	1.905	0.018	3.14E-01	1.51E-01	46	48.88	-7.13	-99	21.22

5.30672	1.9018	107.44	107.45	1.77	0.076	3.18E-01	1.53E-01	58	49.76	-7.13	-99	18.44
5.36733	2.0015	140.41	140.42	1.425	0.073	3.22E-01	1.55E-01	57	50.75	-7.13	-99	14.56
5.42445	2.1025	154.07	154.08	1.365	0.041	3.26E-01	1.56E-01	62	51.06	-7.13	-99	13.6
5.49062	2.3734	146.05	146.06	1.625	0.047	3.29E-01	1.58E-01	59	50.82	-7.13	-99	15.33
5.55889	2.6758	138.78	138.79	1.928	0.034	3.34E-01	1.60E-01	75	50.58	-7.13	-99	17.18
5.62925	2.9378	136.65	136.65	2.15	0.005	3.38E-01	1.62E-01	74	50.47	-7.13	-99	18.31
5.69891	3.0713	136.15	136.14	2.256	-0.014	3.42E-01	1.64E-01	73	50.41	-7.13	-99	18.8
5.76857	3.4299	128	128.01	2.68	0.041	3.46E-01	1.66E-01	69	50.12	-7.13	-99	21.06
5.84101	3.5939	116.97	116.98	3.072	0.089	3.51E-01	1.68E-01	75	49.72	-7.13	-99	23.37
5.91346	3.8191	105.31	105.32	3.626	0.044	3.55E-01	1.70E-01	68	49.25	-7.13	-99	26.36
5.98591	3.4438	92.02	92.01	3.743	-0.021	3.59E-01	1.72E-01	59	48.65	-7.13	-99	28.14
6.05835	3.0196	77.1	77.1	3.917	-0.008	3.64E-01	1.75E-01	62	47.86	-7.13	-99	30.69
6.1315	2.8068	68.32	68.33	4.108	0.038	3.68E-01	1.77E-01	55	47.29	-7.13	-99	32.78
6.20673	2.5738	60.43	60.42	4.26	-0.017	3.72E-01	1.79E-01	48	46.7	-7.13	-99	34.84
6.28127	2.326	57.67	57.66	4.034	-0.053	3.77E-01	1.81E-01	46	46.43	-7.13	-99	34.65
6.34884	2.1189	52.4	52.4	4.044	-0.027	3.81E-01	1.83E-01	42	45.95	-7.13	-99	35.95
6.41362	2.0829	46.01	46.01	4.527	-0.021	3.85E-01	1.85E-01	49	45.3	-7.13	-99	39.49
6.4798	2.0425	42.25	42.24	4.835	-0.017	3.89E-01	1.87E-01	45	44.85	-7.13	-99	41.8
6.5418	1.9473	36.48	36.48	5.338	-0.021	3.93E-01	1.88E-01	58	44.1	-7.13	-99	45.77
6.60101	1.8888	32.85	32.84	5.751	-0.017	3.96E-01	1.90E-01	52	43.54	-7.13	-99	48.84
6.65674	1.8486	31.59	31.59	5.852	-0.005	3.99E-01	1.92E-01	50	43.3	-7.13	-99	49.82
6.71873	1.8209	31.22	31.22	5.833	0.008	4.03E-01	1.94E-01	49	43.2	-7.13	-99	49.97
6.77864	1.7786	31.22	31.22	5.696	0.041	4.07E-01	1.95E-01	49	43.15	-7.13	-99	49.53
6.83367	1.7465	30.71	30.72	5.685	0.031	4.10E-01	1.97E-01	48	43.03	-7.13	-99	49.78
6.89149	1.6988	29.34	29.34	5.79	0.028	4.14E-01	1.99E-01	46	42.75	-7.13	-99	50.93
6.94443	1.6427	28.71	28.72	5.721	0.031	4.17E-01	2.00E-01	45	42.6	-7.13	-99	51.09
6.99598	1.552	27.96	27.96	5.55	0.031	4.20E-01	2.02E-01	44	42.43	-7.13	-99	51.01
7.04474	1.4469	27.08	27.08	5.342	0.018	4.23E-01	2.03E-01	42	42.23	-7.13	-99	50.89
7.08933	1.3189	26.95	26.95	4.893	0.002	4.25E-01	2.04E-01	42	42.17	-7.13	-99	49.4
7.13739	1.1809	27.71	27.7	4.263	-0.017	4.28E-01	2.06E-01	29	42.28	-7.13	-99	46.56
7.18476	1.0449	28.33	28.33	3.689	-0.034	4.31E-01	2.07E-01	22	42.36	-7.13	-99	43.83
7.22725	0.9229	28.33	28.32	3.258	-0.043	4.34E-01	2.08E-01	22	42.33	-7.13	-99	41.92
7.27184	0.7949	28.33	28.32	2.806	-0.05	4.36E-01	2.09E-01	22	42.3	1.86	-99	39.74
7.31433	0.6729	28.21	28.2	2.386	-0.053	4.39E-01	2.11E-01	18	42.25	1.85	-99	37.58
7.82563	0.0486	-0.13	-0.13	-36.193	-0.043	4.70E-01	2.25E-01	-99	-99	-7.13	-99	-99
7.97889	0.0485	-0.13	-0.13	-36.114	-0.043	4.79E-01	2.30E-01	-99	-99	-7.13	-99	-99
8.12796	0.0503	-0.13	-0.13	-37.477	-0.043	4.88E-01	2.34E-01	-99	-99	-7.13	-99	-99
8.27703	0.0504	-0.13	-0.13	-37.505	-0.043	4.97E-01	2.38E-01	-99	-99	-7.13	-99	-99
8.42471	0.0504	-0.13	-0.13	-37.505	-0.043	5.06E-01	2.43E-01	-99	-99	-7.13	-99	-99
8.55707	0.0504	-0.13	-0.13	-37.505	-0.043	5.13E-01	2.46E-01	-99	-99	-7.13	-99	-99
8.68385	0.0504	-0.13	-0.13	-37.505	-0.043	5.21E-01	2.50E-01	-99	-99	-7.13	-99	-99
8.81133	0.0504	-0.13	-0.13	-37.505	-0.043	5.29E-01	2.54E-01	-99	-99	-7.13	-99	-99
8.9409	0.0504	-0.13	-0.13	-37.505	-0.043	5.37E-01	2.58E-01	-99	-99	-7.13	-99	-99
9.06977	0.0504	-0.13	-0.13	-37.505	-0.043	5.44E-01	2.61E-01	-99	-99	-7.13	-99	-99
9.15684	0.0504	-0.13	-0.13	-37.505	-0.043	5.49E-01	2.64E-01	-99	-99	-7.13	-99	-99
9.23556	0.0504	-0.13	-0.13	-37.505	-0.043	5.54E-01	2.66E-01	-99	-99	-7.13	-99	-99
9.34911	0.0504	-0.13	-0.13	-37.505	-0.043	5.61E-01	2.69E-01	-99	-99	-7.13	-99	-99
9.45987	0.0504	-0.13	-0.13	-37.505	-0.043	5.68E-01	2.72E-01	-99	-99	-7.13	-99	-99
9.58107	0.0504	-0.13	-0.13	-37.505	-0.043	5.75E-01	2.76E-01	-99	-99	-7.13	-99	-99
9.70159	0.0504	-0.13	-0.13	-37.505	-0.043	5.82E-01	2.79E-01	-99	-99	-7.13	-99	-99
9.82349	0.0499	-0.13	-0.13	-37.153	-0.043	5.89E-01	2.83E-01	-99	-99	-7.13	-99	-99
9.95445	0.049	-0.13	-0.13	-36.484	-0.043	5.97E-01	2.87E-01	-99	-99	-7.13	-99	-99
10.08472	0.0509	-0.13	-0.13	-37.879	-0.043	6.05E-01	2.90E-01	-99	-99	-7.13	-99	-99
10.21359	0.0512	-0.13	-0.13	-38.158	-0.043	6.13E-01	2.94E-01	-99	-99	-7.13	-99	-99
10.34385	0.049	-0.13	-0.13	-36.477	-0.043	6.21E-01	2.98E-01	-99	-99	-7.13	-99	-99
10.47272	0.0504	-0.13	-0.13	-37.505	-0.043	6.28E-01	3.02E-01	-99	-99	-7.13	-99	-99
10.60369	0.0504	-0.13	-0.13	-37.505	-0.043	6.36E-01	3.05E-01	-99	-99	-7.13	-99	-99
10.73395	0.0504	-0.13	-0.13	-37.505	-0.043	6.44E-01	3.09E-01	-99	-99	-7.13	-99	-99
10.86491	0.0504	-0.13	-0.13	-37.505	-0.043	6.52E-01	3.13E-01	-99	-99	-7.13	-99	-99
10.99587	0.0504	-0.13	-0.13	-37.505	-0.043	6.60E-01	3.17E-01	-99	-99	-7.13	-99	-99
11.12474	0.0502	-0.13	-0.13	-37.384	-0.043	6.68E-01	3.20E-01	-99	-99	-7.13	-99	-99
11.23968	0.0504	-0.13	-0.13	-37.505	-0.043	6.74E-01	3.24E-01	-99	-99	-7.13	-99	-99
11.31561	0.0504	-0.13	-0.13	-37.505	-0.043	6.79E-01	3.26E-01	-99	-99	-7.13	-99	-99
11.41593	0.0504	-0.13	-0.13	-37.505	-0.043	6.85E-01	3.29E-01	-99	-99	-7.13	-99	-99
11.44658	0.0504	-0.13	-0.13	-37.505	-0.043	6.87E-01	3.30E-01	-99	-99	-7.13	-99	-99
11.48976	0.0504	-0.13	-0.13	-37.505	-0.043	6.89E-01	3.31E-01	-99	-99	-7.13	-99	-99

11.54271	0.0504	-0.13	-0.13	-37.505	-0.043	6.93E-01	3.32E-01	-99	-99	-7.13	-99	-99
11.59634	0.0504	-0.13	-0.13	-37.505	-0.043	6.96E-01	3.34E-01	-99	-99	-7.13	-99	-99
11.64859	0.0504	-0.13	-0.13	-37.505	-0.043	6.99E-01	3.36E-01	-99	-99	-7.13	-99	-99
11.70223	0.0514	-0.13	-0.13	-38.298	-0.043	7.02E-01	3.37E-01	-99	-99	-7.13	-99	-99
11.75448	0.114	-0.13	-0.13	-84.905	-0.043	7.05E-01	3.39E-01	-99	-99	-7.13	-99	-99
11.80672	0.2222	-0.13	-0.13	-165.51	-0.043	7.08E-01	3.40E-01	-99	-99	-7.13	-99	-99
11.85966	0.3319	-0.13	-0.13	-247.19	-0.043	7.12E-01	3.42E-01	-99	-99	-7.13	-99	-99
11.9133	0.443	-0.13	-0.13	-329.948	-0.043	7.15E-01	3.43E-01	-99	-99	-7.13	-99	-99
11.96624	0.8413	-0.13	-0.13	-626.539	-0.043	7.18E-01	3.45E-01	-99	-99	-7.13	-99	-99
12.01849	1.3792	-0.13	-0.13	-1027.17	-0.043	7.21E-01	3.46E-01	-99	-99	-7.13	-99	-99
12.22468	3.7634	87.13	87.17	4.317	0.212	7.34E-01	3.52E-01	62	45.27	-7.13	-99	30.65
12.28598	4.3821	94.78	94.83	4.621	0.261	7.37E-01	3.54E-01	134	45.64	-7.13	-99	30.69
12.34031	4.7986	104.3	104.37	4.597	0.351	7.40E-01	3.55E-01	148	46.06	-7.13	-99	29.6
12.39395	4.974	110.95	111.04	4.479	0.461	7.44E-01	3.57E-01	157	46.32	-7.13	0.04	28.61
12.44411	5.0492	108.82	108.93	4.635	0.546	7.47E-01	3.58E-01	154	46.21	-7.13	0.1	29.27
12.49984	4.9824	101.04	101.16	4.925	0.559	7.50E-01	3.60E-01	142	45.86	-7.13	0.11	30.9
12.55626	4.8391	96.03	96.14	5.033	0.549	7.53E-01	3.62E-01	135	45.6	-7.13	0.1	31.77
12.62035	4.5024	91.77	91.88	4.901	0.533	7.57E-01	3.64E-01	129	45.37	-7.13	0.08	31.88
12.67956	4.2509	94.4	94.52	4.498	0.575	7.61E-01	3.65E-01	133	45.48	-7.13	0.12	30.34
12.73807	3.9745	88.76	88.87	4.472	0.559	7.64E-01	3.67E-01	125	45.17	-7.13	0.1	30.93
12.79102	3.7054	88.13	88.26	4.198	0.614	7.68E-01	3.68E-01	62	45.11	-7.13	0.15	30.13
12.84257	3.4443	87.76	87.88	3.919	0.607	7.71E-01	3.70E-01	61	45.07	-7.13	0.14	29.24
12.89551	3.3113	86.13	86.22	3.84	0.481	7.74E-01	3.71E-01	60	44.97	-7.13	0.04	29.18
12.95124	3.1341	81.11	81.17	3.861	0.3	7.77E-01	3.73E-01	57	44.66	-7.13	-99	29.91
13.00906	2.9483	75.22	75.25	3.918	0.167	7.81E-01	3.75E-01	53	44.28	-7.13	-99	30.97
13.05921	2.8384	69.95	69.95	4.058	-0.034	7.84E-01	3.76E-01	49	43.9	-7.13	-99	32.32
13.10379	2.653	65.57	65.56	4.047	-0.034	7.86E-01	3.77E-01	46	43.57	-7.13	-99	33.07
13.14211	2.4855	61.68	61.67	4.03	-0.04	7.89E-01	3.79E-01	43	43.25	-7.13	-99	33.78
13.18112	2.3671	55.54	55.53	4.263	-0.043	7.91E-01	3.80E-01	39	42.7	-7.13	-99	35.96
13.22152	2.2715	52.9	52.9	4.294	-0.037	7.93E-01	3.81E-01	37	42.44	-7.13	-99	36.72
13.26401	2.1716	48.52	48.51	4.477	-0.037	7.96E-01	3.82E-01	45	41.97	-7.13	-99	38.56
13.3065	2.1174	45.26	45.25	4.679	-0.03	7.98E-01	3.83E-01	42	41.59	-7.13	-99	40.25
13.3483	2.1405	44.88	44.87	4.77	-0.04	8.01E-01	3.84E-01	42	41.53	-7.13	-99	40.68
13.3901	2.1718	45.51	45.5	4.774	-0.05	8.03E-01	3.86E-01	42	41.58	-7.13	-99	40.49
13.42911	2.2135	47.01	47	4.709	-0.056	8.06E-01	3.87E-01	43	41.74	-7.13	-99	39.8
13.46881	2.2278	45.88	45.87	4.856	-0.053	8.08E-01	3.88E-01	42	41.6	-7.13	-99	40.65
13.50573	2.2448	43.38	43.37	5.176	-0.05	8.10E-01	3.89E-01	60	41.28	-7.13	-99	42.54
13.54335	2.2806	40.62	40.61	5.616	-0.04	8.13E-01	3.90E-01	56	40.92	-7.13	-99	44.94
13.57957	2.315	39.11	39.11	5.92	-0.04	8.15E-01	3.91E-01	54	40.7	-7.13	-99	46.47
13.61789	2.3513	37.48	37.48	6.274	-0.034	8.17E-01	3.92E-01	52	40.45	-7.13	-99	48.21
13.65481	2.3861	37.48	37.48	6.366	-0.001	8.19E-01	3.93E-01	52	40.43	-7.13	-99	48.47
13.68824	2.4175	38.36	38.37	6.301	0.041	8.21E-01	3.94E-01	53	40.55	-7.13	-99	47.9
13.72029	2.4477	40.62	40.63	6.024	0.083	8.23E-01	3.95E-01	56	40.84	-7.13	-99	46.16
13.75233	2.4778	42.62	42.65	5.81	0.115	8.25E-01	3.96E-01	59	41.09	-7.13	-99	44.76
13.78298	2.5067	45.38	45.42	5.519	0.167	8.27E-01	3.97E-01	63	41.42	-7.13	-99	42.92
13.9007	2.1936	54.03	54.06	4.057	0.157	8.34E-01	4.00E-01	37	42.29	-7.13	-99	35.58
14.14452	0.3569	57.29	57.31	0.623	0.089	8.49E-01	4.07E-01	20	42.5	-7.13	-99	16.04
14.48028	0.0448	-0.25	-0.26	-17.365	-0.034	8.69E-01	4.17E-01	-99	-99	-7.13	-99	-99
14.61403	0.0448	-0.25	-0.26	-17.365	-0.034	8.77E-01	4.21E-01	-99	-99	-7.13	-99	-99
14.74987	0.0448	-0.25	-0.26	-17.365	-0.034	8.85E-01	4.25E-01	-99	-99	-7.13	-99	-99
14.8871	0.0448	-0.25	-0.26	-17.365	-0.034	8.93E-01	4.29E-01	-99	-99	-7.13	-99	-99
15.02084	0.0448	-0.25	-0.26	-17.365	-0.034	9.01E-01	4.33E-01	-99	-99	-7.13	-99	-99
15.15807	0.0444	-0.25	-0.26	-17.242	-0.034	9.10E-01	4.37E-01	-99	-99	-7.13	-99	-99
15.29252	0.0432	-0.25	-0.26	-16.766	-0.034	9.18E-01	4.40E-01	-99	-99	-7.13	-99	-99
15.42905	0.0448	-0.25	-0.26	-17.365	-0.034	9.26E-01	4.44E-01	-99	-99	-7.13	-99	-99
15.5635	0.0448	-0.25	-0.26	-17.365	-0.034	9.34E-01	4.48E-01	-99	-99	-7.13	-99	-99
15.69515	0.0443	-0.25	-0.26	-17.182	-0.034	9.42E-01	4.52E-01	-99	-99	-7.13	-99	-99
15.82681	0.0434	-0.25	-0.26	-16.82	-0.034	9.50E-01	4.56E-01	-99	-99	-7.13	-99	-99
15.95569	0.0444	-0.25	-0.26	-17.214	-0.034	9.57E-01	4.60E-01	-99	-99	-7.13	-99	-99
16.08734	0.0429	-0.25	-0.26	-16.641	-0.034	9.65E-01	4.63E-01	-99	-99	-7.13	-99	-99
16.22179	0.0429	-0.25	-0.26	-16.641	-0.034	9.73E-01	4.67E-01	-99	-99	-7.13	-99	-99
16.35484	0.0429	-0.25	-0.26	-16.641	-0.034	9.81E-01	4.71E-01	-99	-99	-7.13	-99	-99
16.48928	0.0433	-0.25	-0.26	-16.789	-0.034	9.89E-01	4.75E-01	-99	-99	-7.13	-99	-99
16.62234	0.0448	-0.25	-0.26	-17.365	-0.034	9.97E-01	4.79E-01	-99	-99	-7.13	-99	-99
16.75539	0.0444	-0.25	-0.26	-17.238	-0.034	1.01E+00	4.83E-01	-99	-99	-7.13	-99	-99
16.89052	0.0429	-0.25	-0.26	-16.641	-0.034	1.01E+00	4.86E-01	-99	-99	-7.13	-99	-99

17.02566	0.0429	-0.25	-0.26	-16.641	-0.034	1.02E+00	4.90E-01	-99	-99	-7.13	-99	-99
17.15941	0.0429	-0.25	-0.26	-16.641	-0.034	1.03E+00	4.94E-01	-99	-99	-7.13	-99	-99
17.29107	0.0429	-0.25	-0.26	-16.641	-0.034	1.04E+00	4.98E-01	-99	-99	-7.13	-99	-99
17.42412	0.0434	-0.25	-0.26	-16.834	-0.034	1.05E+00	5.02E-01	-99	-99	-7.13	-99	-99
17.55508	0.0442	-0.25	-0.26	-17.142	-0.034	1.05E+00	5.06E-01	-99	-99	-7.13	-99	-99
17.68395	0.0429	-0.25	-0.26	-16.641	-0.034	1.06E+00	5.09E-01	-99	-99	-7.13	-99	-99
17.81143	0.1384	-0.25	-0.26	-53.675	-0.034	1.07E+00	5.13E-01	-99	-99	-7.13	-99	-99
17.93334	0.3377	-0.25	-0.26	-131.004	-0.034	1.08E+00	5.17E-01	-99	-99	-7.13	-99	-99
18.04688	0.4301	-0.25	-0.26	-166.838	-0.034	1.08E+00	5.20E-01	-99	-99	-7.13	-99	-99
18.24194	0.8201	74.59	74.59	1.099	-0.005	1.10E+00	5.25E-01	24	42.55	-7.13	-99	17.61
18.29836	0.8473	96.78	96.79	0.875	0.025	1.10E+00	5.27E-01	31	43.84	-7.13	-99	13.8
18.34991	0.9545	98.16	98.17	0.972	0.06	1.10E+00	5.29E-01	31	43.9	-7.13	-99	14.4
18.40355	1.1647	102.67	102.68	1.134	0.041	1.10E+00	5.30E-01	33	44.1	-7.13	-99	15.15
18.45997	1.3395	88.26	88.26	1.518	0.028	1.11E+00	5.32E-01	37	43.34	-7.13	-99	18.77
18.51709	1.4629	82.11	82.12	1.781	0.041	1.11E+00	5.33E-01	35	42.96	-7.13	-99	20.91
18.57422	1.5642	82.74	82.75	1.89	0.044	1.11E+00	5.35E-01	35	42.98	-7.13	-99	21.42
18.62994	1.5012	82.62	82.63	1.817	0.063	1.12E+00	5.37E-01	35	42.96	-7.13	-99	21.04
18.68567	1.3521	76.47	76.49	1.768	0.083	1.12E+00	5.38E-01	32	42.55	-7.13	-99	21.53
18.74001	1.2162	74.34	74.36	1.636	0.083	1.12E+00	5.40E-01	31	42.39	-7.13	-99	21.06
18.79365	1.3143	72.71	72.73	1.807	0.089	1.13E+00	5.41E-01	31	42.26	-7.13	-99	22.25
18.84728	1.3603	72.08	72.1	1.887	0.099	1.13E+00	5.43E-01	30	42.2	4.73	-99	22.76
18.89813	1.6366	71.83	71.86	2.278	0.115	1.13E+00	5.44E-01	30	42.17	4.71	-99	24.79
18.95038	1.8897	73.46	73.49	2.571	0.118	1.14E+00	5.46E-01	37	42.27	4.82	-99	25.92
19.00054	2.0357	74.84	74.86	2.719	0.086	1.14E+00	5.47E-01	38	42.35	4.91	-99	26.38
19.0493	2.149	67.95	67.97	3.162	0.099	1.14E+00	5.49E-01	34	41.84	4.45	-99	29.31
19.10224	2.2096	50.15	50.17	4.404	0.115	1.15E+00	5.50E-01	42	40.19	-7.13	-99	37.83
19.15657	2.2403	47.01	47.03	4.764	0.08	1.15E+00	5.52E-01	39	39.81	-7.13	-99	39.98
19.20952	2.2347	36.61	36.64	6.1	0.144	1.15E+00	5.53E-01	46	38.37	-7.13	-99	48.07
19.25758	2.1866	34.73	34.76	6.291	0.157	1.16E+00	5.55E-01	44	38.05	-7.13	-99	49.52
19.30565	2.1996	31.09	31.13	7.065	0.203	1.16E+00	5.56E-01	39	-99	2	-99	53.66
19.34814	2.1718	27.96	28	7.757	0.209	1.16E+00	5.57E-01	35	-99	1.79	-99	57.49
19.38854	2.0225	26.2	26.25	7.705	0.245	1.16E+00	5.58E-01	33	-99	1.67	-99	58.59
19.42616	1.9977	25.7	25.76	7.756	0.277	1.17E+00	5.60E-01	32	-99	1.64	-99	59.1
19.46308	1.9249	25.32	25.38	7.584	0.287	1.17E+00	5.61E-01	32	-99	1.61	-99	58.91
19.50209	1.8821	24.7	24.76	7.603	0.287	1.17E+00	5.62E-01	31	-99	1.57	-99	59.46
19.53692	1.8707	24.57	24.63	7.595	0.296	1.17E+00	5.63E-01	31	-99	1.56	-99	59.53
19.57663	1.8192	24.82	24.89	7.31	0.319	1.18E+00	5.64E-01	31	-99	1.58	-99	58.54
19.61285	1.8284	26.33	26.39	6.928	0.326	1.18E+00	5.65E-01	33	-99	1.68	-99	56.32
19.64838	1.966	29.21	29.28	6.715	0.335	1.18E+00	5.66E-01	36	-99	1.87	-99	53.78
19.68251	2.0971	32.34	32.41	6.47	0.345	1.18E+00	5.67E-01	40	-99	2.08	-99	51.25
19.71525	2.2056	34.98	35.05	6.293	0.345	1.18E+00	5.68E-01	44	-99	2.25	-99	49.39
19.77864	2.3163	44.25	44.32	5.226	0.345	1.19E+00	5.70E-01	55	39.29	-7.13	-99	42.37
19.82253	2.3043	49.14	49.21	4.682	0.345	1.19E+00	5.71E-01	41	39.87	-7.13	-99	39.05
19.8685	2.3479	50.65	50.72	4.63	0.339	1.19E+00	5.72E-01	42	40.03	-7.13	-99	38.45
19.91239	2.3784	53.15	53.23	4.468	0.364	1.20E+00	5.74E-01	44	40.28	-7.13	-99	37.24
19.95488	2.4002	49.77	49.85	4.815	0.381	1.20E+00	5.75E-01	41	39.9	-7.13	-99	39.32
20.00295	2.4939	47.39	47.46	5.254	0.381	1.20E+00	5.76E-01	59	39.62	-7.13	-99	41.44
20.05031	2.5146	46.64	46.71	5.384	0.361	1.20E+00	5.77E-01	58	39.51	-7.13	-99	42.08
20.11371	2.4668	48.89	48.96	5.038	0.326	1.21E+00	5.79E-01	40	39.76	-7.13	-99	40.3
20.18058	2.4227	41.87	41.94	5.777	0.313	1.21E+00	5.81E-01	52	38.86	-7.13	-99	44.93
20.24955	2.3612	42.12	42.18	5.597	0.303	1.22E+00	5.83E-01	52	38.88	-7.13	-99	44.29
20.31851	2.2984	37.73	37.81	6.08	0.348	1.22E+00	5.85E-01	47	38.22	-7.13	-99	47.49
20.38538	2.2376	35.1	35.18	6.36	0.397	1.22E+00	5.87E-01	43	-99	2.26	-99	49.52
20.45295	2.1762	36.86	36.94	5.89	0.429	1.23E+00	5.89E-01	45	38.05	2.38	-99	47.3
20.51843	2.1118	36.36	36.43	5.797	0.364	1.23E+00	5.91E-01	45	37.95	2.34	-99	47.24
20.77478	2.0195	29.34	29.3	6.893	-0.179	1.25E+00	5.98E-01	36	-99	1.87	-99	54.27
20.83957	1.9538	27.96	27.92	6.997	-0.16	1.25E+00	6.00E-01	34	-99	1.78	-99	55.46
20.90574	1.8081	26.58	26.55	6.811	-0.144	1.25E+00	6.02E-01	32	-99	1.69	-99	55.87
20.99143	1.6169	29.21	29.18	5.541	-0.137	1.26E+00	6.05E-01	36	-99	1.86	-99	50.22
21.0785	1.5564	34.73	34.7	4.485	-0.131	1.27E+00	6.07E-01	28	37.52	2.23	-99	43.64
21.16349	1.5436	37.48	37.45	4.121	-0.147	1.27E+00	6.10E-01	30	37.95	2.41	-99	41.08
21.24777	1.4971	33.85	33.81	4.428	-0.176	1.28E+00	6.12E-01	27	37.32	2.17	-99	43.85
21.33625	1.4261	28.33	28.29	5.04	-0.189	1.28E+00	6.15E-01	34	36.21	1.8	-99	49.07
21.42959	1.2258	24.95	24.91	4.921	-0.189	1.29E+00	6.17E-01	30	-99	1.58	-99	50.93
21.52642	1.1671	21.19	21.15	5.517	-0.17	1.29E+00	6.20E-01	26	-99	1.33	-99	56.17
21.62882	1.3836	20.06	20.03	6.908	-0.144	1.30E+00	6.23E-01	24	-99	1.25	-99	61.76

21.72704	1.6774	29.96	29.95	5.601	-0.079	1.30E+00	6.26E-01	36	-99	1.91	-99	49.96
21.82596	2.0419	33.85	33.85	6.032	-0.001	1.31E+00	6.29E-01	41	-99	2.17	-99	49.2
21.92697	2.386	31.22	31.22	7.642	0.028	1.32E+00	6.32E-01	37	-99	1.99	-99	55.17
22.02379	2.3181	28.96	28.97	8.003	0.034	1.32E+00	6.34E-01	-99	-99	1.84	-99	57.5
22.1255	2.1906	30.09	30.09	7.28	0.018	1.33E+00	6.37E-01	36	-99	1.92	-99	54.87
22.22511	1.9745	25.95	25.96	7.607	0.031	1.33E+00	6.40E-01	31	-99	1.64	-99	58.54
22.32751	1.7106	24.82	24.83	6.89	0.034	1.34E+00	6.43E-01	30	-99	1.57	-99	57.38
22.42713	1.5479	24.2	24.2	6.395	0.044	1.35E+00	6.46E-01	29	-99	1.52	-99	56.39
22.53022	1.6445	26.2	26.21	6.274	0.047	1.35E+00	6.49E-01	31	-99	1.66	-99	54.5
22.62496	1.8275	26.7	26.72	6.841	0.063	1.36E+00	6.52E-01	32	-99	1.69	-99	55.84
22.68835	2.0253	26.7	26.72	7.581	0.063	1.36E+00	6.53E-01	32	-99	1.69	-99	57.91
22.74895	2.284	27.83	27.84	8.203	0.063	1.37E+00	6.55E-01	-99	-99	1.76	-99	58.76
22.80886	2.6442	29.71	29.72	8.896	0.063	1.37E+00	6.57E-01	-99	-99	1.89	-99	59.24
22.86738	2.6687	33.6	33.61	7.94	0.063	1.37E+00	6.59E-01	40	-99	2.15	-99	54.61
22.92311	2.6796	41.37	41.38	6.475	0.063	1.38E+00	6.60E-01	49	38.06	-7.13	-99	47.17
22.97605	2.6817	43.5	43.51	6.164	0.038	1.38E+00	6.62E-01	51	38.34	-7.13	-99	45.5
23.03178	2.6847	43.13	43.13	6.225	0.012	1.38E+00	6.63E-01	51	38.27	-7.13	-99	45.81
23.10283	2.62	43.88	43.88	5.97	0.028	1.39E+00	6.65E-01	52	38.35	-7.13	-99	44.8
23.18085	2.2884	56.92	56.92	4.02	0.038	1.39E+00	6.68E-01	34	39.82	3.7	-99	34.77
23.25051	2.0747	73.21	73.22	2.834	0.028	1.40E+00	6.70E-01	34	41.18	4.79	-99	27.11
23.31529	1.9616	79.61	79.61	2.464	0.025	1.40E+00	6.72E-01	37	41.61	5.21	-99	24.59
23.37799	1.9476	85	85	2.291	0.028	1.40E+00	6.73E-01	33	41.94	5.57	-99	23.14
23.43999	1.8999	88.76	88.76	2.14	-0.001	1.41E+00	6.75E-01	35	42.15	5.82	-99	22
23.50477	1.7251	84.5	84.49	2.042	-0.014	1.41E+00	6.77E-01	33	41.88	5.54	-99	21.99
23.56955	1.5418	79.23	79.23	1.946	-0.017	1.41E+00	6.79E-01	31	41.53	5.19	-99	22.13
23.63712	1.3963	78.23	78.23	1.785	-0.008	1.42E+00	6.81E-01	31	41.44	5.12	-99	21.4
23.7026	1.2553	71.96	71.96	1.744	0.018	1.42E+00	6.83E-01	28	40.98	4.7	-99	22
23.76948	1.1112	67.45	67.45	1.648	0.002	1.43E+00	6.85E-01	26	40.61	4.4	-99	22.11
23.83356	1.1429	67.45	67.44	1.695	-0.021	1.43E+00	6.86E-01	26	40.6	4.4	-99	22.38
24.0934	2.0848	59.92	59.93	3.479	0.015	1.45E+00	6.94E-01	35	39.89	3.9	-99	32.08
24.16306	2.3474	51.53	51.53	4.555	0.038	1.45E+00	6.96E-01	40	39.02	3.34	-99	37.98
24.22993	2.6078	50.27	50.28	5.186	0.06	1.45E+00	6.98E-01	58	38.86	-7.13	-99	40.39
24.29541	2.8117	50.65	50.66	5.55	0.057	1.46E+00	7.00E-01	59	38.89	-7.13	-99	41.4
24.35741	2.9081	47.76	47.78	6.087	0.07	1.46E+00	7.02E-01	55	38.54	-7.13	-99	43.84
24.41871	2.904	46.76	46.78	6.208	0.102	1.47E+00	7.03E-01	54	38.4	-7.13	-99	44.51
24.48071	2.7979	46.89	46.9	5.965	0.089	1.47E+00	7.05E-01	54	38.4	-7.13	-99	43.77
24.54549	2.5727	44.63	44.64	5.763	0.063	1.47E+00	7.07E-01	51	38.1	2.88	-99	43.92
24.6061	2.4239	41.5	41.5	5.84	0.034	1.48E+00	7.09E-01	48	-99	2.67	-99	45.28
24.67367	2.3024	36.86	36.86	6.247	-0.005	1.48E+00	7.11E-01	42	-99	2.36	-99	48.41
24.75308	2.1543	33.72	33.72	6.389	-0.017	1.49E+00	7.13E-01	39	-99	2.15	-99	50.32
24.83946	1.9736	31.97	31.96	6.175	-0.024	1.49E+00	7.15E-01	37	-99	2.03	-99	50.61
24.92236	1.8457	32.47	32.47	5.685	-0.024	1.50E+00	7.18E-01	37	-99	2.06	-99	48.83
24.99829	1.7373	31.47	31.46	5.522	-0.03	1.50E+00	7.20E-01	36	-99	2	-99	48.84
25.07421	1.5228	28.08	28.08	5.424	-0.034	1.50E+00	7.22E-01	32	-99	1.77	-99	50.52
25.14945	1.4869	26.7	26.7	5.57	-0.037	1.51E+00	7.24E-01	31	-99	1.68	-99	51.92
25.22607	1.5784	27.96	27.95	5.647	-0.024	1.51E+00	7.27E-01	32	-99	1.76	-99	51.33
25.29782	1.7288	28.71	28.72	6.02	0.044	1.52E+00	7.29E-01	33	-99	1.81	-99	52.04
25.36957	1.8808	28.83	28.85	6.519	0.096	1.52E+00	7.31E-01	33	-99	1.82	-99	53.47
25.44829	1.9755	24.57	24.59	8.032	0.112	1.53E+00	7.33E-01	-99	-99	1.54	-99	60.74
25.53537	1.9283	19.06	19.07	10.109	0.096	1.53E+00	7.35E-01	-99	-99	1.17	-99	71.28
25.62244	1.728	14.79	14.81	11.671	0.067	1.54E+00	7.38E-01	-99	-99	0.88	-99	80.8
25.7123	1.4244	12.54	12.54	11.355	0.034	1.54E+00	7.41E-01	-99	-99	0.73	-99	84.3
25.80983	1.1534	10.91	10.91	10.57	0.025	1.55E+00	7.43E-01	-99	-99	0.62	-99	86.12
25.91153	1.1083	9.9	9.91	11.187	0.015	1.56E+00	7.46E-01	-99	-99	0.56	-99	90.26
26.01254	1.2336	9.53	9.53	12.941	0.021	1.56E+00	7.49E-01	-99	-99	0.53	-99	95.35
26.09543	1.4568	11.03	11.04	13.199	0.025	1.57E+00	7.52E-01	-99	-99	0.63	-99	91.77
26.16509	1.7907	15.17	15.18	11.799	0.031	1.57E+00	7.54E-01	-99	-99	0.91	-99	80.47
26.23824	2.1655	25.07	25.08	8.634	0.038	1.57E+00	7.56E-01	-99	-99	1.57	-99	61.9
26.30232	2.4443	38.99	39	6.267	0.06	1.58E+00	7.58E-01	44	-99	2.49	-99	47.54
26.36293	2.6393	42.25	42.27	6.244	0.099	1.58E+00	7.59E-01	47	-99	2.71	-99	46.18
26.42632	2.702	37.86	37.88	7.132	0.112	1.59E+00	7.61E-01	42	-99	2.42	-99	50.43
26.49529	2.732	32.34	32.37	8.441	0.105	1.59E+00	7.63E-01	-99	-99	2.05	-99	56.55
26.56773	2.5864	27.96	27.97	9.246	0.089	1.59E+00	7.65E-01	-99	-99	1.76	-99	61.24
26.64366	2.3221	25.32	25.34	9.165	0.06	1.60E+00	7.67E-01	-99	-99	1.58	-99	63
26.72098	2.0801	22.57	22.57	9.214	0.044	1.60E+00	7.70E-01	-99	-99	1.4	-99	65.49
26.80388	1.8545	19.18	19.19	9.664	0.041	1.61E+00	7.72E-01	-99	-99	1.17	-99	70.08

26.88608	1.6047	17.3	17.31	9.271	0.041	1.61E+00	7.74E-01	-99	-99	1.05	-99	71.44
26.95713	1.3836	16.92	16.93	8.171	0.038	1.62E+00	7.76E-01	-99	-99	1.02	-99	69.04
27.03376	1.1451	18.05	18.06	6.34	0.034	1.62E+00	7.79E-01	20	-99	1.1	-99	62.17
27.11178	1.1655	16.67	16.68	6.987	0.031	1.63E+00	7.81E-01	19	-99	1	-99	65.94
27.33051	1.3716	32.85	32.88	4.171	0.173	1.64E+00	7.87E-01	24	35.59	2.08	-99	43.33
27.38206	1.5076	44.76	44.79	3.366	0.19	1.64E+00	7.89E-01	25	37.47	2.87	-99	35.45
27.43361	1.6372	52.15	52.19	3.137	0.164	1.65E+00	7.90E-01	23	38.36	3.37	-99	32.44
27.497	1.8723	63.43	63.46	2.95	0.144	1.65E+00	7.92E-01	28	39.47	4.12	-99	29.23
27.58338	2.307	74.59	74.62	3.092	0.141	1.66E+00	7.94E-01	33	40.35	4.86	-99	27.97
27.66906	2.7395	67.07	67.1	4.083	0.144	1.66E+00	7.97E-01	37	39.75	4.36	-99	32.91
27.76031	3.1017	56.66	56.69	5.471	0.144	1.67E+00	8.00E-01	62	38.77	-7.13	-99	39.58
27.85436	3.1618	62.06	62.09	5.092	0.164	1.67E+00	8.02E-01	68	39.27	-7.13	-99	37.2
27.94352	2.9805	59.05	59.08	5.045	0.17	1.68E+00	8.05E-01	43	38.97	-7.13	-99	37.71
28.03129	2.8229	55.79	55.82	5.057	0.161	1.68E+00	8.07E-01	41	38.63	3.61	-99	38.52
28.11976	2.5892	59.92	59.96	4.318	0.164	1.69E+00	8.10E-01	33	39.02	3.88	-99	35.14
28.1936	2.5845	84.62	84.65	3.053	0.157	1.69E+00	8.12E-01	37	40.92	5.53	-99	26.45
28.2563	2.4474	91.14	91.17	2.684	0.144	1.70E+00	8.14E-01	40	41.31	5.96	-99	24.19
28.31899	2.3133	78.35	78.4	2.951	0.225	1.70E+00	8.16E-01	34	40.48	5.11	-99	26.86
28.38656	2.231	70.46	70.49	3.165	0.164	1.70E+00	8.18E-01	31	39.88	4.58	-99	28.9
28.45483	2.0546	57.17	57.2	3.592	0.148	1.71E+00	8.20E-01	31	38.68	3.7	-99	33.11
28.52031	2.0068	52.15	52.18	3.846	0.128	1.71E+00	8.21E-01	28	38.13	3.36	-99	35.28
28.57673	2.0429	50.02	50.04	4.082	0.118	1.72E+00	8.23E-01	27	37.88	3.22	-99	36.72
28.62828	2.0865	41.24	41.27	5.056	0.128	1.72E+00	8.25E-01	45	36.71	2.64	-99	42.9
28.67913	2.0753	36.73	36.76	5.646	0.131	1.72E+00	8.26E-01	40	-99	2.33	-99	46.63
28.73974	1.9444	36.11	36.13	5.381	0.128	1.72E+00	8.28E-01	39	-99	2.29	-99	46.07
28.81636	1.7482	36.61	36.63	4.772	0.131	1.73E+00	8.30E-01	26	35.94	2.33	-99	43.8
28.86234	1.6517	38.49	38.52	4.288	0.141	1.73E+00	8.31E-01	28	36.24	2.45	-99	41.28
28.90901	1.5928	38.36	38.39	4.149	0.144	1.74E+00	8.33E-01	28	36.21	2.44	-99	40.81
28.9529	1.5131	38.11	38.14	3.967	0.131	1.74E+00	8.34E-01	21	36.16	2.42	-99	40.21
28.9933	1.4387	37.61	37.63	3.823	0.115	1.74E+00	8.35E-01	20	36.07	2.39	-99	39.85
29.03022	1.3707	36.36	36.38	3.768	0.105	1.74E+00	8.36E-01	20	35.85	2.31	-99	40.14
29.12565	1.1751	33.85	33.87	3.47	0.083	1.75E+00	8.39E-01	18	35.38	2.14	-99	40.01
29.16467	0.9606	32.34	32.36	2.968	0.086	1.75E+00	8.40E-01	17	35.09	2.04	-99	38.44
29.20437	0.7424	31.22	31.23	2.377	0.089	1.75E+00	8.41E-01	13	34.85	1.96	-99	35.95
29.41405	0.0497	33.72	33.74	0.147	0.102	1.77E+00	8.47E-01	12	35.3	-7.13	-99	14.6
29.62442	0.0499	-0.13	-0.13	-37.365	-0.04	1.78E+00	8.53E-01	-99	-99	-7.13	-99	-99
29.75399	0.0485	-0.13	-0.13	-36.291	-0.04	1.79E+00	8.57E-01	-99	-99	-7.13	-99	-99
29.88635	0.0485	-0.13	-0.13	-36.47	-0.037	1.79E+00	8.61E-01	-99	-99	-7.13	-99	-99
30.02427	0.0485	-0.13	-0.13	-36.47	-0.037	1.80E+00	8.65E-01	-99	-99	-7.13	-99	-99
30.15941	0.0485	-0.13	-0.13	-36.47	-0.037	1.81E+00	8.69E-01	-99	-99	-7.13	-99	-99
30.2862	0.0485	-0.13	-0.13	-36.291	-0.04	1.82E+00	8.72E-01	-99	-99	-7.13	-99	-99
30.37327	0.0485	-0.13	-0.13	-36.291	-0.04	1.82E+00	8.75E-01	-99	-99	-7.13	-99	-99
30.45756	0.0485	-0.13	-0.13	-36.291	-0.04	1.83E+00	8.77E-01	-99	-99	-7.13	-99	-99
30.54812	0.0485	-0.13	-0.13	-36.47	-0.037	1.83E+00	8.80E-01	-99	-99	-7.13	-99	-99
30.65331	0.0485	-0.13	-0.13	-36.291	-0.04	1.84E+00	8.83E-01	-99	-99	-7.13	-99	-99
30.76128	0.0498	-0.13	-0.13	-37.302	-0.04	1.85E+00	8.86E-01	-99	-99	-7.13	-99	-99
30.86995	0.049	-0.13	-0.13	-36.692	-0.04	1.85E+00	8.89E-01	-99	-99	-7.13	-99	-99
30.98001	0.05	0	-0.01	-615.112	-0.04	1.86E+00	8.92E-01	-99	-99	-7.13	-99	-99
31.08381	0.0486	-0.13	-0.13	-36.406	-0.04	1.87E+00	8.95E-01	-99	-99	-7.13	-99	-99
31.19596	0.0485	-0.13	-0.13	-36.291	-0.04	1.87E+00	8.98E-01	-99	-99	-7.13	-99	-99
31.2907	0.0485	-0.13	-0.13	-36.291	-0.04	1.88E+00	9.01E-01	-99	-99	-7.13	-99	-99
31.38544	0.0487	-0.13	-0.13	-36.467	-0.04	1.88E+00	9.04E-01	-99	-99	-7.13	-99	-99
31.47808	0.0504	-0.13	-0.13	-37.688	-0.04	1.89E+00	9.07E-01	-99	-99	-7.13	-99	-99
31.57352	0.0504	-0.13	-0.13	-37.688	-0.04	1.89E+00	9.09E-01	-99	-99	-7.13	-99	-99
31.66756	0.0504	-0.13	-0.13	-37.688	-0.04	1.90E+00	9.12E-01	-99	-99	-7.13	-99	-99
31.76021	0.0504	-0.13	-0.13	-37.688	-0.04	1.91E+00	9.15E-01	-99	-99	-7.13	-99	-99
31.85286	0.0753	-0.13	-0.13	-56.331	-0.04	1.91E+00	9.17E-01	-99	-99	-7.13	-99	-99
31.9455	0.1616	-0.13	-0.13	-120.932	-0.04	1.92E+00	9.20E-01	-99	-99	-7.13	-99	-99
32.03955	0.3695	-0.13	-0.13	-276.516	-0.04	1.92E+00	9.23E-01	-99	-99	-7.13	-99	-99
32.07368	0.4782	-0.13	-0.13	-357.87	-0.04	1.92E+00	9.24E-01	-99	-99	-7.13	-99	-99
32.12384	0.6472	21.94	21.93	2.951	-0.034	1.93E+00	9.25E-01	11	31.9	1.33	-99	44.81
32.18513	0.8616	31.97	31.96	2.696	-0.027	1.93E+00	9.27E-01	13	34.38	2	-99	37.28
32.24783	1.0931	35.1	35.1	3.114	-0.021	1.94E+00	9.29E-01	18	34.97	2.21	-99	37.88
32.31401	1.3404	32.59	32.59	4.113	-0.014	1.94E+00	9.31E-01	22	34.48	2.04	-99	43.25
32.38018	1.4624	31.22	31.21	4.685	-0.008	1.94E+00	9.33E-01	21	-99	1.95	-99	46.11
32.44706	1.459	31.34	31.34	4.655	-0.005	1.95E+00	9.35E-01	22	-99	1.96	-99	45.93

32.51463	1.4406	30.97	30.97	4.652	0.002	1.95E+00	9.36E-01	21	-99	1.93	-99	46.12
32.5822	1.4046	30.71	30.72	4.573	0.012	1.96E+00	9.38E-01	21	-99	1.92	-99	45.97
32.64977	1.4613	37.73	37.74	3.872	0.015	1.96E+00	9.40E-01	19	35.35	2.39	-99	40
32.71037	1.5201	59.92	59.93	2.537	0.025	1.96E+00	9.42E-01	25	38.14	3.86	-99	28.05
32.76611	1.5743	91.89	91.9	1.713	0.021	1.97E+00	9.44E-01	31	40.55	6	-99	19.5
32.81556	1.5916	116.46	116.47	1.367	0.021	1.97E+00	9.45E-01	30	41.81	-7.13	-99	15.6
32.85457	1.7994	140.91	140.92	1.277	0.028	1.97E+00	9.46E-01	36	42.79	-7.13	-99	13.71
32.88522	2.3338	157.58	157.59	1.481	0.034	1.97E+00	9.47E-01	40	43.35	-7.13	-99	14.07
33.09838	2.8227	177.02	177.04	1.594	0.115	1.99E+00	9.53E-01	45	43.89	-7.13	-99	13.88
33.1353	2.8728	174.76	174.78	1.644	0.089	1.99E+00	9.54E-01	45	43.83	-7.13	-99	14.21
33.17501	2.8154	165.48	165.51	1.701	0.115	1.99E+00	9.55E-01	42	43.55	-7.13	-99	14.84
33.20774	2.5765	161.97	162	1.59	0.125	1.99E+00	9.56E-01	41	43.44	-7.13	-99	14.45
33.24189	2.3691	158.71	158.74	1.492	0.131	2.00E+00	9.57E-01	40	43.33	-7.13	-99	14.08
33.27811	2.1767	154.58	154.61	1.408	0.161	2.00E+00	9.58E-01	39	43.19	-7.13	-99	13.81
33.32339	1.8708	141.79	141.82	1.319	0.164	2.00E+00	9.60E-01	36	42.75	-7.13	-99	13.91
33.37284	1.7098	139.78	139.81	1.223	0.154	2.00E+00	9.61E-01	36	42.67	-7.13	-99	13.45
33.41952	1.6428	135.52	135.55	1.212	0.154	2.01E+00	9.63E-01	34	42.5	-7.13	-99	13.6
33.46688	1.5917	135.39	135.42	1.175	0.144	2.01E+00	9.64E-01	34	42.49	-7.13	-99	13.38
33.51495	1.4832	129.13	129.15	1.148	0.138	2.01E+00	9.65E-01	33	42.24	-7.13	-99	13.55
33.57138	1.4387	117.59	117.62	1.223	0.144	2.01E+00	9.67E-01	30	41.74	-7.13	-99	14.68
33.63268	0	107.19	107.21	0	0.135	2.02E+00	9.69E-01	22	-99	-7.13	-99	-99
33.69537	0	94.53	94.55	0	0.141	2.02E+00	9.70E-01	19	-99	-7.13	-99	-99
33.76015	0	87.25	87.28	0	0.141	2.03E+00	9.72E-01	18	-99	-7.13	-99	-99
33.82215	0	72.84	72.86	0	0.128	2.03E+00	9.74E-01	18	-99	-7.13	-99	-99
33.87788	0	66.32	66.34	0	0.128	2.03E+00	9.76E-01	17	-99	-7.13	-99	-99
33.91759	0	67.07	67.09	0	0.115	2.04E+00	9.77E-01	17	-99	-7.13	-99	-99



Suelos, PSC.

Soil & Construction Materials Laboratory and Environmental Drilling Services

Test Id: CPT B4 Date: 6-Oct-21
Site: DIKES Cone Id: 3045.123xx
Location: Gurabo
Project: DIKE B Density 120 PCF
Operator | w: RTH | Nicolas

Depth (ft)	Sleeve Stress (tsf)	TIPStresUNC (tsf)	TIPStresCOR (tsf)	Ratio COR (%)	Pore Pressure (tsf)	Overburden (tsf)	Eff. Overburden (tsf)	SPT N60c (blows/ft)	Friction Angle (deg)	Su (tsf)	OCR ()	FC (%)
0	0	0	0	0	0	0.00E+00	0.00E+00	-99	0	0	-99	-99
0.25305	0.0013	0	0	284.423	0.002	1.52E-02	7.29E-03	-99	-99	-7.13	-99	-99
0.39178	0.0013	0	0	-663.61	-0.001	2.35E-02	1.13E-02	-99	-99	-7.13	-99	-99
0.5326	0.0013	0.13	0.13	1.043	-0.001	3.20E-02	1.53E-02	-99	-99	0.01	-99	-99
0.67341	0.0011	0	0	-581.46	-0.001	4.04E-02	1.94E-02	-99	-99	-7.13	-99	-99
0.81632	-0.0004	0	0	189.547	-0.001	4.90E-02	2.35E-02	-99	-99	-7.13	-99	-99
0.95505	0.0013	0	0	-663.61	-0.001	5.73E-02	2.75E-02	-99	-99	-7.13	-99	-99
1.09586	0.0015	0	0	-745.368	-0.001	6.58E-02	3.16E-02	-99	-99	-7.13	-99	-99
1.23877	0.0028	0	0	-1409.5	-0.001	7.43E-02	3.57E-02	-99	-99	-7.13	-99	-99
1.3775	-0.0003	0	0	173.064	-0.001	8.27E-02	3.97E-02	-99	-99	-7.13	-99	-99
1.51831	0.0013	0	0	-663.61	-0.001	9.11E-02	4.37E-02	-99	-99	-7.13	-99	-99
1.65495	0.0011	0	0	-556.344	-0.001	9.93E-02	4.77E-02	-99	-99	-7.13	-99	-99
1.79437	-0.0003	0	0	175.681	-0.001	1.08E-01	5.17E-02	-99	-99	-7.13	-99	-99
1.93309	0.0013	0	0	-663.61	-0.001	1.16E-01	5.57E-02	-99	-99	-7.13	-99	-99
2.07182	0.0013	0	0	-663.61	-0.001	1.24E-01	5.97E-02	-99	-99	-7.13	-99	-99
2.21473	0.0013	0	0	-663.61	-0.001	1.33E-01	6.38E-02	-99	-99	-7.13	-99	-99
2.34091	0.0013	0	0	-663.61	-0.001	1.41E-01	6.74E-02	-99	-99	-7.13	-99	-99
2.47266	0.0013	0	0	-663.61	-0.001	1.48E-01	7.12E-02	-99	-99	-7.13	-99	-99
2.60372	0.0013	0	0	-663.61	-0.001	1.56E-01	7.50E-02	-99	-99	-7.13	-99	-99
2.73547	0.0013	0	0	-663.61	-0.001	1.64E-01	7.88E-02	-99	-99	-7.13	-99	-99
2.86793	0.0017	0	0	-879.712	-0.001	1.72E-01	8.26E-02	-99	-99	-7.13	-99	-99
2.99829	0.0028	0	0	-1406.23	-0.001	1.80E-01	8.64E-02	-99	-99	-7.13	-99	-99
3.13143	0.0013	0	0	-663.61	-0.001	1.88E-01	9.02E-02	-99	-99	-7.13	-99	-99
3.26389	0.0013	0	0	-663.61	-0.001	1.96E-01	9.40E-02	-99	-99	-7.13	-99	-99
3.39634	0.0013	0	0	-663.61	-0.001	2.04E-01	9.78E-02	-99	-99	-7.13	-99	-99
3.53018	0.0013	0	0	-663.61	-0.001	2.12E-01	1.02E-01	-99	-99	-7.13	-99	-99
3.66194	0.0017	0	0	-864.799	-0.001	2.20E-01	1.06E-01	-99	-99	-7.13	-99	-99
3.79509	0.0032	0	0	-1607.42	-0.001	2.28E-01	1.09E-01	-99	-99	-7.13	-99	-99
3.92754	0.0028	0	0	-1399.04	-0.001	2.36E-01	1.13E-01	-99	-99	-7.13	-99	-99
4.05999	0.0013	0	0	-663.61	-0.001	2.44E-01	1.17E-01	-99	-99	-7.13	-99	-99
4.19244	0.0024	0	0	-1221.39	-0.001	2.52E-01	1.21E-01	-99	-99	-7.13	-99	-99
4.3235	0.0021	0	0	-1078.15	-0.001	2.59E-01	1.25E-01	-99	-99	-7.13	-99	-99
4.45456	0.0032	0	0	-1607.42	-0.001	2.67E-01	1.28E-01	-99	-99	-7.13	-99	-99
4.50823	0.0032	0	0	-1607.42	-0.001	2.71E-01	1.30E-01	-99	-99	-7.13	-99	-99
4.54867	0.0018	0	0	-915.685	-0.001	2.73E-01	1.31E-01	-99	-99	-7.13	-99	-99
4.59467	0.0013	0	0	-663.61	-0.001	2.76E-01	1.32E-01	-99	-99	-7.13	-99	-99
4.64626	0.0013	0.13	0.13	1.043	-0.001	2.79E-01	1.34E-01	-99	-99	-7.13	-99	-99
4.69994	0.0013	0	0	-663.61	-0.001	2.82E-01	1.35E-01	-99	-99	-7.13	-99	-99
4.75083	0.0019	0	0	-960.161	-0.001	2.85E-01	1.37E-01	-99	-99	-7.13	-99	-99
4.8052	0.0028	0	0	-1447.18	-0.001	2.88E-01	1.38E-01	-99	-99	-7.13	-99	-99
4.85609	0.0037	0	0	-1902.92	-0.001	2.91E-01	1.40E-01	-99	-99	-7.13	-99	-99
4.90907	0.0047	0.13	0.13	3.737	-0.001	2.95E-01	1.41E-01	-99	-99	-7.13	-99	-99
4.95996	0.0455	0	0	-23104.8	-0.001	2.98E-01	1.43E-01	-99	-99	-7.13	-99	-99
5.01155	0.1128	0	0	-13218.3	-0.004	3.01E-01	1.44E-01	-99	-99	-7.13	-99	-99
5.22277	0.6605	41.61	41.72	1.583	0.53	3.13E-01	1.50E-01	23	45.79	-7.13	1.17	27.18
5.30712	0.8827	76.45	76.58	1.153	0.627	3.18E-01	1.53E-01	31	48.38	-7.13	1.58	17.74
5.38729	1.1169	97.01	97.41	1.147	1.995	3.23E-01	1.55E-01	39	49.3	-7.13	10.95	15.65
5.46467	1.346	115.18	115.99	1.16	3.998	3.28E-01	1.57E-01	47	49.92	-7.13	30.66	14.39
5.55669	1.5815	120.7	121.54	1.301	4.179	3.33E-01	1.60E-01	49	50.04	-7.13	31.94	14.9
5.64244	1.7032	126.34	127.09	1.34	3.739	3.39E-01	1.63E-01	51	50.16	-7.13	26.47	14.8

5.72609	1.7197	119.82	121.26	1.418	7.127	3.44E-01	1.65E-01	48	49.89	-7.13	66.91	15.59
5.81044	1.8908	119.19	120.58	1.568	6.823	3.49E-01	1.67E-01	48	49.82	-7.13	61.46	16.46
5.8913	1.9288	118.44	119.54	1.614	5.409	3.54E-01	1.70E-01	48	49.74	-7.13	42.87	16.76
5.96799	1.7731	113.18	113.52	1.562	1.698	3.58E-01	1.72E-01	45	49.5	-7.13	7.23	16.9
6.04188	1.7226	113.55	113.75	1.514	0.957	3.63E-01	1.74E-01	45	49.47	-7.13	2.72	16.62
6.11438	1.7519	111.55	111.77	1.567	1.073	3.67E-01	1.76E-01	45	49.35	-7.13	3.25	17.05
6.18479	1.8023	108.41	108.5	1.661	0.41	3.71E-01	1.78E-01	58	49.19	-7.13	0.44	17.79
6.2545	1.7814	106.53	106.56	1.672	0.106	3.75E-01	1.80E-01	57	49.07	-7.13	-99	18
6.31724	1.7665	111.42	111.4	1.586	-0.092	3.79E-01	1.82E-01	44	49.21	-7.13	-99	17.18
6.38068	1.8048	100.52	100.5	1.796	-0.108	3.83E-01	1.84E-01	53	48.75	-7.13	-99	19.15
6.44621	1.9351	94	94.04	2.058	0.187	3.87E-01	1.86E-01	50	48.43	-7.13	-99	21.06
6.51243	2.0459	88.74	88.72	2.306	-0.079	3.91E-01	1.88E-01	47	48.15	-7.13	-99	22.78
6.58005	2.1192	82.6	82.6	2.566	0.009	3.95E-01	1.90E-01	52	47.8	-7.13	-99	24.67
6.64628	2.1643	82.47	82.48	2.624	0.028	3.99E-01	1.91E-01	52	47.75	-7.13	-99	24.94
6.75224	2.0146	89.24	89.23	2.258	-0.033	4.05E-01	1.95E-01	47	48.02	-7.13	-99	22.51
6.85123	1.1385	110.67	110.69	1.029	0.093	4.11E-01	1.97E-01	44	48.86	-7.13	-99	13.88
6.91815	0.5462	135.99	136	0.402	0.048	4.15E-01	1.99E-01	43	49.65	-7.13	-99	7.62
6.96904	0.0958	149.9	150.02	0.064	0.572	4.18E-01	2.01E-01	47	-99	-7.13	0.74	3.48
7.01017	0.0125	157.42	157.59	0.008	0.86	4.21E-01	2.02E-01	49	-99	-7.13	1.7	4.56
7.27228	0.0125	-0.25	-0.25	-4.934	-0.014	4.36E-01	2.09E-01	-99	-99	-7.13	-99	-99
7.42147	0.0125	-0.25	-0.25	-4.934	-0.014	4.45E-01	2.14E-01	-99	-99	-7.13	-99	-99
7.57553	0.0125	-0.25	-0.25	-4.934	-0.014	4.55E-01	2.18E-01	-99	-99	-7.13	-99	-99
7.72959	0.0125	-0.25	-0.25	-4.934	-0.014	4.64E-01	2.23E-01	-99	-99	-7.13	-99	-99
7.88435	0.0125	-0.25	-0.25	-4.934	-0.014	4.73E-01	2.27E-01	-99	-99	-7.13	-99	-99
8.03841	0.0125	-0.25	-0.25	-4.934	-0.014	4.82E-01	2.32E-01	-99	-99	-7.13	-99	-99
8.19666	0.0132	-0.25	-0.25	-5.231	-0.014	4.92E-01	2.36E-01	-99	-99	-7.13	-99	-99
8.35142	0.0112	-0.25	-0.25	-4.433	-0.014	5.01E-01	2.41E-01	-99	-99	-7.13	-99	-99
8.43646	0.012	-0.25	-0.25	-4.741	-0.014	5.06E-01	2.43E-01	-99	-99	-7.13	-99	-99
8.52709	0.0111	-0.25	-0.25	-4.382	-0.014	5.12E-01	2.46E-01	-99	-99	-7.13	-99	-99
8.61632	0.012	-0.25	-0.25	-4.755	-0.014	5.17E-01	2.48E-01	-99	-99	-7.13	-99	-99
8.70625	0.0156	-0.25	-0.25	-6.145	-0.014	5.22E-01	2.51E-01	-99	-99	-7.13	-99	-99
8.79827	0.0369	-0.25	-0.25	-14.578	-0.014	5.28E-01	2.53E-01	-99	-99	-7.13	-99	-99
8.8882	0.0578	-0.25	-0.25	-22.819	-0.014	5.33E-01	2.56E-01	-99	-99	-7.13	-99	-99
8.97882	0.1022	-0.25	-0.25	-40.375	-0.014	5.39E-01	2.59E-01	-99	-99	-7.13	-99	-99
9.25208	0.8737	39.98	40	2.184	0.083	5.55E-01	2.67E-01	24	42.83	2.63	-99	31.35
9.33643	1.2357	56.53	56.54	2.186	0.067	5.60E-01	2.69E-01	34	44.5	-7.13	-99	27
9.4173	1.6171	60.29	60.29	2.682	0.009	5.65E-01	2.71E-01	36	44.76	-7.13	-99	28.66
9.49956	2.0188	59.03	59.04	3.42	0.025	5.70E-01	2.74E-01	35	44.62	-7.13	-99	32.03
9.57903	2.424	60.16	60.25	4.023	0.442	5.75E-01	2.76E-01	45	44.67	-7.13	0.13	34.05
9.65571	2.7202	68.06	68.18	3.99	0.607	5.79E-01	2.78E-01	51	45.22	-7.13	0.38	32.39
9.7324	2.7587	68.18	68.33	4.037	0.74	5.84E-01	2.80E-01	51	45.19	-7.13	0.62	32.53
9.8042	2.7549	61.04	61.14	4.506	0.517	5.88E-01	2.82E-01	60	44.63	-7.13	0.22	35.52
9.87391	2.7456	54.14	54.24	5.062	0.465	5.92E-01	2.84E-01	53	44.02	-7.13	0.14	38.93
9.94153	2.6976	49.38	49.47	5.453	0.449	5.97E-01	2.86E-01	73	43.53	-7.13	0.12	41.45
10.00845	2.6201	46.62	46.72	5.608	0.462	6.01E-01	2.88E-01	69	43.21	-7.13	0.13	42.77
10.07259	2.5114	45.5	45.58	5.51	0.426	6.04E-01	2.90E-01	67	43.05	-7.13	0.09	42.83
10.13742	2.4324	45.87	45.95	5.294	0.384	6.08E-01	2.92E-01	68	43.06	-7.13	0.04	42.04
10.19877	2.4512	45.37	45.45	5.394	0.371	6.12E-01	2.94E-01	67	42.98	-7.13	0.03	42.52
10.25523	2.4192	43.74	43.82	5.521	0.371	6.15E-01	2.95E-01	64	42.76	-7.13	0.03	43.47
10.31309	2.3915	42.61	42.68	5.604	0.31	6.19E-01	2.97E-01	63	42.6	-7.13	-99	44.13
10.36747	2.3708	42.24	42.29	5.606	0.248	6.22E-01	2.99E-01	62	42.53	-7.13	-99	44.28
10.42114	2.3548	42.36	42.41	5.553	0.209	6.25E-01	3.00E-01	62	42.52	-7.13	-99	44.07
10.49434	2.2884	43.99	44.02	5.198	0.148	6.30E-01	3.02E-01	64	42.67	-7.13	-99	42.38
10.56963	2.2784	42.74	42.76	5.328	0.119	6.34E-01	3.04E-01	63	42.49	-7.13	-99	43.23
10.64631	2.4133	44.12	44.16	5.465	0.216	6.39E-01	3.07E-01	64	42.62	-7.13	-99	43.17
10.7216	2.5889	44.12	44.2	5.857	0.41	6.43E-01	3.09E-01	64	42.58	-7.13	0.04	44.35
10.7948	2.5891	45.87	46.05	5.622	0.892	6.48E-01	3.11E-01	67	42.74	-7.13	0.75	43.02
10.8652	2.6703	51.26	51.56	5.179	1.458	6.52E-01	3.13E-01	75	43.27	-7.13	2.02	40.01
10.93422	2.75	57.65	58.28	4.719	3.073	6.56E-01	3.15E-01	56	43.83	-7.13	7.09	36.86
11.00672	2.8483	57.15	58.67	4.855	7.476	6.60E-01	3.17E-01	55	43.75	-7.13	27.46	37.21
11.0827	2.9906	58.78	59.76	5.004	4.826	6.65E-01	3.19E-01	57	43.85	-7.13	14.05	37.44
11.29114	1.4182	83.97	84.52	1.678	2.691	6.78E-01	3.25E-01	40	45.47	-7.13	5.44	20.08
11.35318	0.6552	110.67	111.3	0.589	3.131	6.81E-01	3.27E-01	32	46.7	-7.13	6.88	10.51
11.40617	0.0037	134.48	134.75	0.003	1.313	6.84E-01	3.29E-01	39	-99	-7.13	1.51	8.59
11.4452	-0.0006	146.64	146.89	0	1.225	6.87E-01	3.30E-01	-99	-99	-7.13	1.31	-99
11.47727	-0.0006	145.64	145.86	0	1.096	6.89E-01	3.31E-01	-99	-99	-7.13	1.03	-99

11.70035	-0.0022	-0.25	-0.25	0.893	0.005	7.02E-01	3.37E-01	-99	-99	-7.13	-99	-99
11.83977	-0.0006	-0.38	-0.37	0.149	0.005	7.10E-01	3.41E-01	-99	-99	-7.13	-99	-99
11.97919	-0.0006	-0.38	-0.37	0.149	0.005	7.19E-01	3.45E-01	-99	-99	-7.13	-99	-99
12.11862	-0.0006	-0.38	-0.37	0.149	0.005	7.27E-01	3.49E-01	-99	-99	-7.13	-99	-99
12.2434	-0.0015	-0.38	-0.37	0.397	0.005	7.35E-01	3.53E-01	-99	-99	-7.13	-99	-99
12.35912	-0.0017	-0.38	-0.37	0.447	0.005	7.42E-01	3.56E-01	-99	-99	-7.13	-99	-99
12.47693	-0.0006	-0.38	-0.37	0.149	0.005	7.49E-01	3.59E-01	-99	-99	-7.13	-99	-99
12.59823	-0.0006	-0.38	-0.37	0.149	0.005	7.56E-01	3.63E-01	-99	-99	-7.13	-99	-99
12.73417	-0.0006	-0.38	-0.38	0.149	0.002	7.64E-01	3.67E-01	-99	-99	-7.13	-99	-99
12.88056	-0.0006	-0.38	-0.38	0.149	0.002	7.73E-01	3.71E-01	-99	-99	-7.13	-99	-99
13.02626	-0.0006	-0.38	-0.38	0.149	0.002	7.82E-01	3.75E-01	-99	-99	-7.13	-99	-99
13.17195	-0.0006	-0.38	-0.38	0.149	0.002	7.90E-01	3.79E-01	-99	-99	-7.13	-99	-99
13.31695	-0.0006	-0.25	-0.25	0.256	0.002	7.99E-01	3.84E-01	-99	-99	-7.13	-99	-99
13.46056	-0.0023	-0.38	-0.38	0.606	0.002	8.08E-01	3.88E-01	-99	-99	-7.13	-99	-99
13.60486	-0.0006	-0.38	-0.38	0.149	0.002	8.16E-01	3.92E-01	-99	-99	-7.13	-99	-99
13.74289	-0.0004	-0.38	-0.38	0.096	0.002	8.25E-01	3.96E-01	-99	-99	-7.13	-99	-99
13.88231	0.0011	-0.38	-0.38	-0.303	0.002	8.33E-01	4.00E-01	-99	-99	-7.13	-99	-99
14.02173	-0.0006	-0.25	-0.25	0.224	0.002	8.41E-01	4.04E-01	-99	-99	-7.13	-99	-99
14.16325	-0.0005	-0.38	-0.38	0.136	0.002	8.50E-01	4.08E-01	-99	-99	-7.13	-99	-99
14.30685	0.0013	-0.38	-0.38	-0.346	0.002	8.58E-01	4.12E-01	-99	-99	-7.13	-99	-99
14.45325	-0.0024	-0.38	-0.38	0.647	0.002	8.67E-01	4.16E-01	-99	-99	-7.13	-99	-99
14.60034	-0.0024	-0.38	-0.38	0.638	0.002	8.76E-01	4.21E-01	-99	-99	-7.13	-99	-99
14.74603	-0.0005	-0.38	-0.38	0.141	0.002	8.85E-01	4.25E-01	-99	-99	-7.13	-99	-99
14.89173	0.0013	-0.38	-0.38	-0.344	0.002	8.94E-01	4.29E-01	-99	-99	-7.13	-99	-99
15.03743	-0.0008	-0.38	-0.38	0.207	0.002	9.02E-01	4.33E-01	-99	-99	-7.13	-99	-99
15.18452	-0.002	-0.38	-0.38	0.541	0.002	9.11E-01	4.37E-01	-99	-99	-7.13	-99	-99
15.31558	-0.0006	-0.38	-0.38	0.149	0.002	9.19E-01	4.41E-01	-99	-99	-7.13	-99	-99
15.44942	-0.0003	-0.25	-0.25	0.123	0.002	9.27E-01	4.45E-01	-99	-99	-7.13	-99	-99
15.58606	0.0011	-0.38	-0.38	-0.281	0.002	9.35E-01	4.49E-01	-99	-99	-7.13	-99	-99
15.72478	-0.0006	-0.38	-0.38	0.149	0.002	9.44E-01	4.53E-01	-99	-99	-7.13	-99	-99
15.86142	-0.0006	-0.38	-0.38	0.149	0.002	9.52E-01	4.57E-01	-99	-99	-7.13	-99	-99
15.99736	-0.0006	-0.25	-0.25	0.224	0.002	9.60E-01	4.61E-01	-99	-99	-7.13	-99	-99
16.1305	0.0003	-0.38	-0.38	-0.082	0.002	9.68E-01	4.65E-01	-99	-99	-7.13	-99	-99
16.26295	0.0008	-0.38	-0.38	-0.203	0.002	9.76E-01	4.68E-01	-99	-99	-7.13	-99	-99
16.37728	0	-0.38	-0.38	0.009	0.002	9.83E-01	4.72E-01	-99	-99	-7.13	-99	-99
16.47836	-0.0006	-0.25	-0.25	0.224	0.002	9.89E-01	4.75E-01	-99	-99	-7.13	-99	-99
16.74675	0.0013	-0.38	-0.38	-0.337	-0.001	1.01E+00	4.82E-01	-99	-99	-7.13	-99	-99
16.83877	-0.0003	-0.38	-0.38	0.068	-0.001	1.01E+00	4.85E-01	-99	-99	-7.13	-99	-99
16.93288	0.0013	-0.38	-0.38	-0.345	-0.001	1.02E+00	4.88E-01	-99	-99	-7.13	-99	-99
17.03814	-0.0004	-0.38	-0.38	0.108	-0.001	1.02E+00	4.91E-01	-99	-99	-7.13	-99	-99
17.15107	0.0008	-0.25	-0.25	-0.326	-0.001	1.03E+00	4.94E-01	-99	-99	-7.13	-99	-99
17.22706	-0.0004	-0.38	-0.38	0.114	0.002	1.03E+00	4.96E-01	-99	-99	-7.13	-99	-99
17.32396	0.0011	-0.25	-0.25	-0.43	-0.001	1.04E+00	4.99E-01	-99	-99	-7.13	-99	-99
17.42016	-0.0006	-0.25	-0.25	0.223	-0.001	1.05E+00	5.02E-01	-99	-99	-7.13	-99	-99
17.51427	-0.0006	-0.25	-0.25	0.223	-0.001	1.05E+00	5.04E-01	-99	-99	-7.13	-99	-99
17.60699	-0.0006	-0.25	-0.25	0.223	-0.001	1.06E+00	5.07E-01	-99	-99	-7.13	-99	-99
17.69482	0.0027	-0.25	-0.25	-1.072	-0.001	1.06E+00	5.10E-01	-99	-99	-7.13	-99	-99
17.76941	0.0134	-0.38	-0.38	-3.557	-0.001	1.07E+00	5.12E-01	-99	-99	-7.13	-99	-99
17.83076	0.0222	-0.38	-0.38	-5.895	-0.001	1.07E+00	5.14E-01	-99	-99	-7.13	-99	-99
17.8942	0.0313	-0.38	-0.38	-8.313	-0.001	1.07E+00	5.15E-01	-99	-99	-7.13	-99	-99
17.966	0.0647	-0.38	-0.38	-17.2	-0.001	1.08E+00	5.17E-01	-99	-99	-7.13	-99	-99
18.23927	0.7808	21.18	21.19	3.685	0.041	1.09E+00	5.25E-01	18	35.38	1.34	-99	48.96
18.33338	1.3091	21.31	21.32	6.141	0.051	1.10E+00	5.28E-01	27	-99	1.35	-99	58.1
18.4247	1.6376	27.57	27.58	5.937	0.048	1.11E+00	5.31E-01	35	-99	1.76	-99	52.51
18.48047	1.8133	35.34	35.36	5.127	0.099	1.11E+00	5.32E-01	45	38.39	2.28	-99	45.58
18.52997	1.9635	37.1	37.13	5.288	0.158	1.11E+00	5.34E-01	47	38.66	-7.13	-99	45.32
18.58086	2.0964	38.35	38.4	5.459	0.245	1.12E+00	5.35E-01	49	38.84	-7.13	-99	45.33
18.63663	2.1719	32.34	32.4	6.704	0.31	1.12E+00	5.37E-01	41	-99	2.08	-99	51.93
18.72725	2.0788	29.7	29.77	6.983	0.313	1.12E+00	5.39E-01	38	-99	1.91	-99	54.24
18.81578	1.8476	26.32	26.38	7.005	0.281	1.13E+00	5.42E-01	33	-99	1.68	-99	56.55
18.90292	1.6842	22.81	22.85	7.371	0.193	1.13E+00	5.44E-01	29	-99	1.45	-99	60.4
18.98867	1.541	20.18	20.21	7.625	0.148	1.14E+00	5.47E-01	25	-99	1.27	-99	63.66
19.07162	1.3765	18.05	18.07	7.617	0.116	1.14E+00	5.49E-01	23	-99	1.13	-99	66.03
19.1504	1.2147	15.79	15.81	7.681	0.109	1.15E+00	5.52E-01	20	-99	0.98	-99	69.21
19.22847	1.0712	14.16	14.17	7.562	0.012	1.15E+00	5.54E-01	18	-99	0.87	-99	71.42
19.30446	0.9291	12.41	12.4	7.491	-0.024	1.16E+00	5.56E-01	16	-99	0.75	-99	74.42

19.38184	0.8421	11.28	11.3	7.451	0.106	1.16E+00	5.58E-01	14	-99	0.67	-99	76.63
19.45852	0.8207	11.03	11.05	7.426	0.103	1.17E+00	5.60E-01	14	-99	0.66	-99	77.12
19.53451	1.0445	11.41	11.43	9.135	0.141	1.17E+00	5.63E-01	-99	-99	0.68	-99	81.19
19.6077	1.5053	16.67	16.71	9.01	0.187	1.18E+00	5.65E-01	-99	-99	1.03	-99	71.58
19.67533	2.181	38.73	38.86	5.613	0.633	1.18E+00	5.67E-01	48	38.56	-7.13	0	45.63
19.73458	2.6297	68.06	68.15	3.859	0.458	1.18E+00	5.68E-01	42	41.66	-7.13	-99	31.93
19.78407	2.8168	88.74	88.79	3.173	0.258	1.19E+00	5.70E-01	44	43.02	-7.13	-99	26.43
19.8252	2.8999	99.14	99.18	2.924	0.209	1.19E+00	5.71E-01	49	43.56	-7.13	-99	24.34
19.86564	2.9815	104.65	104.71	2.847	0.261	1.19E+00	5.72E-01	52	43.82	-7.13	-99	23.52
19.9242	3.0996	106.78	106.84	2.901	0.29	1.20E+00	5.74E-01	53	43.91	-7.13	-99	23.55
19.98624	3.1741	92.12	92.21	3.442	0.449	1.20E+00	5.76E-01	46	43.16	-7.13	-99	27.05
20.05037	3.1152	85.98	86.07	3.619	0.442	1.20E+00	5.78E-01	43	42.79	-7.13	-99	28.42
20.24904	2.2558	82.09	82.15	2.746	0.264	1.22E+00	5.83E-01	41	42.5	5.39	-99	25.51
20.29785	2.1438	81.09	81.14	2.642	0.232	1.22E+00	5.85E-01	40	42.43	5.32	-99	25.19
20.36895	1.991	75.33	75.38	2.641	0.242	1.22E+00	5.87E-01	37	42.03	4.94	-99	25.96
20.4547	1.8267	62.17	62.22	2.936	0.264	1.23E+00	5.89E-01	31	40.99	4.06	-99	29.4
20.54462	1.7092	39.73	39.77	4.298	0.206	1.23E+00	5.92E-01	33	38.46	2.57	-99	40.82
20.63943	1.5086	24.69	24.73	6.1	0.203	1.24E+00	5.94E-01	30	-99	1.56	-99	55.06
20.73354	1.3744	19.68	19.74	6.963	0.3	1.24E+00	5.97E-01	24	-99	1.23	-99	62.23
20.82207	1.177	16.67	16.73	7.036	0.297	1.25E+00	6.00E-01	20	-99	1.03	-99	66.02
20.90155	0.9725	14.54	14.6	6.661	0.306	1.25E+00	6.02E-01	18	-99	0.89	-99	67.92
20.97892	0.8949	13.66	13.72	6.521	0.3	1.26E+00	6.04E-01	17	-99	0.83	-99	68.91
21.05282	0.8249	12.53	12.59	6.553	0.264	1.26E+00	6.06E-01	15	-99	0.75	-99	71.07
21.12601	0.7725	11.78	11.84	6.527	0.264	1.27E+00	6.08E-01	14	-99	0.7	-99	72.48
21.19503	0.7402	11.16	11.2	6.606	0.242	1.27E+00	6.10E-01	14	-99	0.66	-99	74.11
21.26544	0.7348	10.78	10.83	6.786	0.238	1.28E+00	6.12E-01	13	-99	0.63	-99	75.58
21.33585	0.7491	10.78	10.83	6.918	0.245	1.28E+00	6.15E-01	13	-99	0.63	-99	76.01
21.40765	0.7686	10.53	10.57	7.27	0.213	1.28E+00	6.17E-01	13	-99	0.62	-99	77.77
21.47806	0.8516	10.78	10.83	7.864	0.245	1.29E+00	6.19E-01	13	-99	0.63	-99	78.99
21.54777	1.0646	11.66	11.72	9.086	0.293	1.29E+00	6.21E-01	-99	-99	0.69	-99	80.43
21.61818	1.2774	13.16	13.23	9.657	0.339	1.30E+00	6.23E-01	-99	-99	0.79	-99	78.84
21.68649	1.4343	19.55	19.64	7.304	0.413	1.30E+00	6.25E-01	24	-99	1.22	-99	63.35
21.75272	1.5216	30.08	30.18	5.042	0.491	1.31E+00	6.27E-01	36	36.46	1.92	-99	47.94
21.81407	1.5918	37.35	37.44	4.251	0.465	1.31E+00	6.28E-01	30	37.75	2.4	-99	41.58
21.87332	1.6593	38.6	38.69	4.289	0.429	1.31E+00	6.30E-01	31	37.92	2.49	-99	41.21
21.93258	1.6931	37.6	37.67	4.495	0.329	1.32E+00	6.32E-01	30	37.75	2.42	-99	42.38
21.9988	1.5971	29.58	29.64	5.389	0.29	1.32E+00	6.34E-01	35	-99	1.88	-99	49.44
22.06781	1.4764	21.56	21.6	6.834	0.232	1.32E+00	6.36E-01	26	-99	1.35	-99	59.98
22.1424	1.2854	16.54	16.59	7.748	0.229	1.33E+00	6.38E-01	20	-99	1.01	-99	68.31
22.2163	1.2275	14.66	14.72	8.341	0.258	1.33E+00	6.40E-01	-99	-99	0.89	-99	72.76
22.29019	1.214	14.66	14.72	8.244	0.3	1.34E+00	6.42E-01	-99	-99	0.89	-99	72.47
22.36269	1.1876	15.04	15.11	7.86	0.339	1.34E+00	6.44E-01	18	-99	0.91	-99	70.78
22.43311	1.1909	15.67	15.74	7.567	0.348	1.35E+00	6.46E-01	19	-99	0.95	-99	68.99
22.50491	1.2307	16.04	16.12	7.632	0.403	1.35E+00	6.48E-01	19	-99	0.98	-99	68.62
22.57601	1.3086	16.67	16.76	7.806	0.462	1.36E+00	6.50E-01	20	-99	1.02	-99	68.24
22.6506	1.3451	17.17	17.28	7.784	0.533	1.36E+00	6.52E-01	20	-99	1.05	-99	67.5
22.73007	1.3878	17.17	17.28	8.03	0.552	1.36E+00	6.55E-01	-99	-99	1.05	-99	68.19
22.81094	1.515	18.8	18.91	8.011	0.552	1.37E+00	6.57E-01	-99	-99	1.16	-99	66.15
22.89459	1.7303	24.94	25.07	6.901	0.656	1.37E+00	6.59E-01	30	-99	1.57	-99	57.22
22.97824	1.9126	28.83	28.99	6.598	0.801	1.38E+00	6.62E-01	34	-99	1.83	0.02	53.61
23.06956	1.9641	27.07	27.2	7.22	0.643	1.38E+00	6.64E-01	32	-99	1.71	-99	56.58
23.15741	1.8798	26.07	26.17	7.183	0.504	1.39E+00	6.67E-01	31	-99	1.65	-99	57.21
23.24873	1.7922	21.18	21.27	8.427	0.429	1.40E+00	6.70E-01	-99	-99	1.32	-99	64.75
23.34493	1.6958	18.42	18.52	9.157	0.462	1.40E+00	6.72E-01	-99	-99	1.13	-99	69.63
23.5938	1.2158	16.42	16.47	7.381	0.261	1.42E+00	6.80E-01	19	-99	1	-99	67.4
23.67536	1.0955	13.54	13.59	8.061	0.261	1.42E+00	6.82E-01	-99	-99	0.81	-99	73.88
23.75901	1.0028	11.28	11.33	8.848	0.264	1.43E+00	6.84E-01	-99	-99	0.66	-99	80.64
23.84058	1.2026	10.9	10.97	10.959	0.342	1.43E+00	6.87E-01	-99	-99	0.63	-99	86.91
23.92144	1.5662	16.54	16.64	9.411	0.481	1.44E+00	6.89E-01	-99	-99	1.01	-99	72.69
24.00091	1.8798	30.96	31.1	6.045	0.682	1.44E+00	6.91E-01	36	-99	1.97	-99	50.7
24.0755	2.1885	34.34	34.47	6.349	0.636	1.45E+00	6.93E-01	40	-99	2.19	-99	49.83
24.1494	2.4666	34.34	34.5	7.151	0.759	1.45E+00	6.96E-01	40	-99	2.19	0	52.08
24.2212	2.5459	32.84	33.01	7.713	0.834	1.45E+00	6.98E-01	38	-99	2.09	0.01	54.35
24.2937	2.3913	31.83	32	7.473	0.801	1.46E+00	7.00E-01	37	-99	2.03	0.01	54.28
24.36481	2.287	30.21	30.37	7.531	0.805	1.46E+00	7.02E-01	35	-99	1.92	0.01	55.38
24.43382	2.2583	28.7	28.86	7.824	0.795	1.47E+00	7.04E-01	33	-99	1.82	0	57.1

24.50284	2.2423	27.82	27.98	8.014	0.763	1.47E+00	7.06E-01	-99	-99	1.76	-99	58.18
24.56836	2.1981	27.2	27.35	8.037	0.75	1.47E+00	7.08E-01	-99	-99	1.71	-99	58.68
24.63459	2.1425	26.7	26.85	7.981	0.737	1.48E+00	7.10E-01	31	-99	1.68	-99	58.89
24.70082	2.1617	27.07	27.22	7.942	0.73	1.48E+00	7.11E-01	31	-99	1.71	-99	58.52
24.77541	2.2148	28.58	28.73	7.71	0.746	1.49E+00	7.14E-01	33	-99	1.81	-99	56.88
24.85139	2.324	32.09	32.25	7.205	0.834	1.49E+00	7.16E-01	37	-99	2.04	0.01	53.41
24.92737	2.5076	40.23	40.44	6.201	1.002	1.50E+00	7.18E-01	46	-99	2.58	0.06	46.76
24.99779	2.5895	42.99	43.23	5.991	1.167	1.50E+00	7.20E-01	49	-99	2.77	0.14	45.09
25.06471	2.5709	38.23	38.45	6.686	1.102	1.50E+00	7.22E-01	44	-99	2.45	0.1	48.96
25.13372	2.4554	31.58	31.72	7.74	0.682	1.51E+00	7.24E-01	36	-99	2.01	-99	55.14
25.20273	2.2624	25.44	25.55	8.854	0.543	1.51E+00	7.26E-01	-99	-99	1.6	-99	62.07
25.27106	2.0543	22.18	22.28	9.221	0.465	1.52E+00	7.28E-01	-99	-99	1.38	-99	65.78
25.34076	1.7596	20.18	20.26	8.684	0.413	1.52E+00	7.30E-01	-99	-99	1.24	-99	66.45
25.40978	1.5937	18.93	19.01	8.384	0.407	1.53E+00	7.32E-01	-99	-99	1.16	-99	67.05
25.48019	1.7513	18.42	18.51	9.459	0.439	1.53E+00	7.34E-01	-99	-99	1.13	-99	70.38
25.5485	2.0858	19.55	19.67	10.604	0.585	1.53E+00	7.36E-01	-99	-99	1.2	-99	71.73
25.61473	2.4657	33.84	34.05	7.242	1.025	1.54E+00	7.38E-01	38	-99	2.15	0.06	52.55
25.67328	2.722	51.26	51.53	5.283	1.306	1.54E+00	7.39E-01	58	38.64	-7.13	0.19	40.34
25.72836	2.9074	53.02	53.26	5.459	1.222	1.54E+00	7.41E-01	60	38.83	-7.13	0.15	40.41
25.78343	3.0595	48.76	48.98	6.246	1.118	1.55E+00	7.43E-01	55	38.33	-7.13	0.1	43.92
25.83711	3.087	44.12	44.32	6.965	1.018	1.55E+00	7.44E-01	50	-99	2.84	0.06	47.43
25.89009	2.9553	41.99	42.15	7.011	0.818	1.55E+00	7.46E-01	47	-99	2.7	0	48.35
25.94168	2.7346	40.61	40.75	6.711	0.678	1.56E+00	7.47E-01	46	-99	2.6	-99	48.08
25.99536	2.4908	33.71	33.84	7.36	0.636	1.56E+00	7.49E-01	38	-99	2.14	-99	52.98
26.04973	2.2882	30.83	30.96	7.391	0.623	1.56E+00	7.50E-01	35	-99	1.95	-99	54.65
26.1041	2.1395	30.96	31.09	6.881	0.656	1.57E+00	7.52E-01	35	-99	1.96	-99	53.17
26.15987	1.9953	29.7	29.83	6.688	0.627	1.57E+00	7.53E-01	33	-99	1.88	-99	53.36
26.21773	1.8891	29.58	29.7	6.36	0.601	1.57E+00	7.55E-01	33	-99	1.87	-99	52.47
26.27699	1.7842	31.21	31.34	5.694	0.627	1.58E+00	7.57E-01	35	-99	1.98	-99	49.46
26.33833	1.8206	31.83	31.97	5.696	0.646	1.58E+00	7.59E-01	36	-99	2.02	-99	49.13
26.40038	1.9472	32.71	32.86	5.926	0.721	1.58E+00	7.60E-01	37	-99	2.08	-99	49.38
26.45893	2.0536	34.59	34.77	5.905	0.898	1.59E+00	7.62E-01	39	-99	2.2	0.01	48.35
26.5161	2.1574	37.22	37.43	5.764	1.018	1.59E+00	7.64E-01	42	-99	2.38	0.05	46.7
26.57047	2.2748	41.99	42.2	5.391	1.051	1.59E+00	7.65E-01	47	37.27	2.69	0.06	43.63
26.61996	2.4717	54.4	54.63	4.525	1.135	1.60E+00	7.67E-01	41	38.78	3.52	0.09	37.08
26.66598	2.5046	65.93	66.17	3.785	1.186	1.60E+00	7.68E-01	37	39.86	4.29	0.11	32.02
26.85908	2.5577	75.45	75.6	3.383	0.724	1.61E+00	7.74E-01	34	40.56	4.92	-99	28.97
26.89672	2.6317	73.95	74.07	3.553	0.62	1.61E+00	7.75E-01	33	40.44	4.82	-99	29.84
26.94343	2.6368	72.07	72.17	3.653	0.526	1.62E+00	7.76E-01	40	40.29	4.7	-99	30.51
26.9992	2.5758	67.93	68.03	3.786	0.471	1.62E+00	7.78E-01	38	39.95	4.42	-99	31.69
27.06751	2.6749	62.17	62.26	4.296	0.462	1.62E+00	7.80E-01	35	39.44	4.04	-99	34.59
27.14071	2.9678	58.91	59.01	5.029	0.513	1.63E+00	7.82E-01	44	39.12	-7.13	-99	37.68
27.20903	3.1605	68.68	68.83	4.592	0.727	1.63E+00	7.84E-01	51	39.97	-7.13	-99	34.31
27.27804	3.2616	75.45	75.64	4.312	0.947	1.64E+00	7.86E-01	42	40.48	-7.13	0.02	32.26
27.32056	3.3152	75.58	75.8	4.374	1.093	1.64E+00	7.87E-01	42	40.48	-7.13	0.06	32.44
27.38052	3.3901	71.57	71.79	4.722	1.102	1.64E+00	7.89E-01	79	40.16	-7.13	0.06	34.21
27.43768	3.4291	64.92	65.11	5.266	0.937	1.65E+00	7.90E-01	72	39.61	-7.13	0.01	37.11
27.49345	3.2222	62.17	62.33	5.169	0.827	1.65E+00	7.92E-01	69	39.35	-7.13	-99	37.39
27.54712	2.6941	62.54	62.69	4.297	0.753	1.65E+00	7.93E-01	35	39.38	4.06	-99	34.5
27.60638	2.1111	61.29	61.43	3.437	0.704	1.66E+00	7.95E-01	27	39.25	3.98	-99	31.61
27.66076	1.5761	60.04	60.17	2.619	0.672	1.66E+00	7.97E-01	26	39.12	3.89	-99	28.39
27.69492	1.24	60.04	60.16	2.061	0.636	1.66E+00	7.98E-01	22	39.12	3.89	-99	25.64
27.73674	0.8285	61.92	62.02	1.336	0.513	1.66E+00	7.99E-01	23	39.28	4.02	-99	21.02
27.76742	0.5267	61.66	61.76	0.853	0.475	1.67E+00	8.00E-01	17	39.25	-7.13	-99	17.45
28.11597	-0.0099	-0.25	-0.25	3.987	0.012	1.69E+00	8.10E-01	-99	-99	-7.13	-99	-99
28.27561	-0.0126	-0.25	-0.25	5.075	0.012	1.70E+00	8.14E-01	-99	-99	-7.13	-99	-99
28.43874	-0.0125	-0.25	-0.25	5.03	0.012	1.71E+00	8.19E-01	-99	-99	-7.13	-99	-99
28.61929	-0.0107	-0.25	-0.25	4.304	0.012	1.72E+00	8.24E-01	-99	-99	-7.13	-99	-99
28.80402	-0.0119	-0.25	-0.25	4.818	0.012	1.73E+00	8.30E-01	-99	-99	-7.13	-99	-99
28.99224	-0.0126	-0.25	-0.25	5.089	0.012	1.74E+00	8.35E-01	-99	-99	-7.13	-99	-99
29.18325	-0.0118	-0.25	-0.25	4.74	0.012	1.75E+00	8.41E-01	-99	-99	-7.13	-99	-99
29.37565	-0.0118	-0.25	-0.25	4.74	0.012	1.76E+00	8.46E-01	-99	-99	-7.13	-99	-99
29.65938	-0.0118	-0.25	-0.25	4.74	0.012	1.78E+00	8.54E-01	-99	-99	-7.13	-99	-99
29.69493	-0.0118	-0.25	-0.25	4.74	0.012	1.78E+00	8.55E-01	-99	-99	-7.13	-99	-99
29.73049	0.009	-0.25	-0.25	-3.628	0.012	1.78E+00	8.56E-01	-99	-99	-7.13	-99	-99
29.76743	0.0418	-0.25	-0.25	-16.867	0.012	1.79E+00	8.57E-01	-99	-99	-7.13	-99	-99

29.80438	0.0747	-0.25	-0.25	-30.109	0.012	1.79E+00	8.58E-01	-99	-99	-7.13	-99	-99
29.84342	0.1093	-0.25	-0.25	-44.099	0.012	1.79E+00	8.60E-01	-99	-99	-7.13	-99	-99
29.88245	0.144	-0.25	-0.25	-58.087	0.012	1.79E+00	8.61E-01	-99	-99	-7.13	-99	-99
29.92219	0.2183	-0.25	-0.25	-87.811	0.009	1.80E+00	8.62E-01	-99	-99	-7.13	-99	-99
29.96193	0.3523	-0.25	-0.25	-142.093	0.012	1.80E+00	8.63E-01	-99	-99	-7.13	-99	-99
30.00097	0.484	-0.25	-0.25	-195.202	0.012	1.80E+00	8.64E-01	-99	-99	-7.13	-99	-99
30.20034	1.2719	23.31	23.33	5.452	0.077	1.81E+00	8.70E-01	25	-99	1.43	-99	54.04
30.29654	1.4522	29.08	29.1	4.991	0.099	1.82E+00	8.73E-01	31	-99	1.82	-99	48.4
30.39623	1.575	31.33	31.37	5.021	0.18	1.82E+00	8.75E-01	33	-99	1.97	-99	47.21
30.4994	1.6707	28.45	28.52	5.858	0.352	1.83E+00	8.78E-01	30	-99	1.77	-99	51.65
30.5977	1.7852	26.7	26.77	6.669	0.352	1.84E+00	8.81E-01	28	-99	1.66	-99	55.3
30.69808	1.7874	24.44	24.5	7.295	0.31	1.84E+00	8.84E-01	26	-99	1.51	-99	58.8
30.76919	1.7309	22.81	22.87	7.569	0.281	1.85E+00	8.86E-01	24	-99	1.4	-99	60.94
30.82775	1.7046	21.68	21.73	7.843	0.251	1.85E+00	8.88E-01	23	-99	1.32	-99	62.74
30.88909	1.6872	20.93	20.98	8.041	0.251	1.85E+00	8.90E-01	-99	-99	1.27	-99	64.01
30.94835	1.6651	20.68	20.73	8.031	0.255	1.86E+00	8.91E-01	-99	-99	1.25	-99	64.24
31.009	1.6189	20.68	20.73	7.809	0.248	1.86E+00	8.93E-01	22	-99	1.25	-99	63.63
31.07243	1.5626	20.18	20.23	7.725	0.238	1.86E+00	8.95E-01	21	-99	1.22	-99	63.92
31.13865	1.5105	19.43	19.48	7.756	0.238	1.87E+00	8.97E-01	20	-99	1.17	-99	64.81
31.22789	1.4233	18.3	18.34	7.759	0.226	1.87E+00	8.99E-01	19	-99	1.1	-99	66.11
31.31363	1.3037	17.17	17.22	7.573	0.219	1.88E+00	9.02E-01	18	-99	1.02	-99	66.98
31.39729	1.2147	16.29	16.34	7.436	0.206	1.88E+00	9.04E-01	17	-99	0.96	-99	67.75
31.48303	1.2509	16.29	16.34	7.658	0.206	1.89E+00	9.07E-01	17	-99	0.96	-99	68.4
31.56459	1.3774	18.05	18.1	7.612	0.235	1.89E+00	9.09E-01	19	-99	1.08	-99	65.99
31.64476	1.5231	24.94	25	6.093	0.264	1.90E+00	9.11E-01	26	-99	1.54	-99	54.84
31.72144	1.6388	27.32	27.38	5.985	0.284	1.90E+00	9.14E-01	28	-99	1.69	-99	52.79
31.79743	1.727	26.07	26.13	6.609	0.293	1.91E+00	9.16E-01	27	-99	1.61	-99	55.58
31.87272	1.7439	24.32	24.37	7.156	0.277	1.91E+00	9.18E-01	25	-99	1.49	-99	58.51
31.9487	1.562	22.31	22.36	6.986	0.245	1.92E+00	9.20E-01	23	-99	1.36	-99	59.73
32.02539	1.3197	20.18	20.22	6.525	0.222	1.92E+00	9.22E-01	21	-99	1.22	-99	60.38
32.10067	1.1435	17.55	17.59	6.5	0.226	1.93E+00	9.25E-01	18	-99	1.04	-99	63.24
32.17666	0.9946	16.42	16.46	6.041	0.226	1.93E+00	9.27E-01	17	-99	0.97	-99	63.18
32.24986	0.8958	16.42	16.47	5.44	0.238	1.94E+00	9.29E-01	17	-99	0.97	-99	61.07
32.32445	0.8554	16.17	16.22	5.274	0.255	1.94E+00	9.31E-01	17	-99	0.95	-99	60.79
32.40392	0.8459	15.54	15.6	5.424	0.274	1.94E+00	9.33E-01	16	-99	0.91	-99	62.19
32.48478	0.8884	16.17	16.22	5.476	0.271	1.95E+00	9.36E-01	17	-99	0.95	-99	61.52
32.56774	0.9689	16.79	16.85	5.75	0.271	1.95E+00	9.38E-01	17	-99	0.99	-99	61.68
32.65209	1.0546	19.43	19.49	5.412	0.287	1.96E+00	9.40E-01	20	-99	1.16	-99	57.45
32.73714	1.1865	24.94	25.01	4.745	0.319	1.96E+00	9.43E-01	26	-99	1.53	-99	50.22
32.82288	1.3569	25.07	25.14	5.397	0.368	1.97E+00	9.45E-01	26	-99	1.54	-99	52.44
32.90723	1.4927	21.68	21.76	6.861	0.368	1.97E+00	9.48E-01	22	-99	1.31	-99	59.91
32.99298	1.5445	19.93	19.99	7.725	0.313	1.98E+00	9.50E-01	20	-99	1.2	-99	64.16
33.0829	1.5566	17.92	17.98	8.658	0.268	1.99E+00	9.53E-01	-99	-99	1.06	-99	69
33.17701	1.4188	15.67	15.72	9.027	0.248	1.99E+00	9.56E-01	-99	-99	0.91	-99	73.04
33.27322	1.1434	13.79	13.83	8.265	0.229	2.00E+00	9.58E-01	-99	-99	0.79	-99	74.02
33.37291	0.9956	13.41	13.46	7.398	0.232	2.00E+00	9.61E-01	14	-99	0.76	-99	72.15
33.47607	0.891	12.78	12.83	6.943	0.245	2.01E+00	9.64E-01	13	-99	0.72	-99	71.87
33.56182	0.7875	11.66	11.71	6.726	0.255	2.01E+00	9.67E-01	12	-99	0.64	-99	73.41
33.62735	0.7233	10.65	10.7	6.758	0.245	2.02E+00	9.69E-01	11	-99	0.58	-99	75.78
33.69915	0.6847	10.28	10.33	6.627	0.268	2.02E+00	9.71E-01	10	-99	0.55	-99	76.24
33.77654	0.6502	10.15	10.21	6.369	0.277	2.03E+00	9.73E-01	10	-99	0.54	-99	75.66
33.8581	0.6265	10.28	10.34	6.061	0.287	2.03E+00	9.75E-01	10	-99	0.55	-99	74.25
33.93687	0.6345	10.9	10.96	5.787	0.293	2.04E+00	9.77E-01	11	-99	0.59	-99	71.76
34.02192	0.6704	11.78	11.84	5.661	0.3	2.04E+00	9.80E-01	12	-99	0.65	-99	69.41
34.10627	0.7174	12.16	12.22	5.871	0.303	2.05E+00	9.82E-01	12	-99	0.67	-99	69.42
34.19131	0.824	13.16	13.22	6.232	0.31	2.05E+00	9.85E-01	13	-99	0.74	-99	68.81
34.27497	1.0655	14.79	14.86	7.172	0.329	2.06E+00	9.87E-01	15	-99	0.85	-99	69.13
34.35793	1.452	20.18	20.25	7.17	0.361	2.06E+00	9.90E-01	20	-99	1.21	-99	62.3
34.44228	1.881	33.59	33.68	5.585	0.442	2.07E+00	9.92E-01	34	-99	2.1	-99	47.89
34.52175	2.262	44.74	44.85	5.044	0.51	2.07E+00	9.94E-01	45	36.06	2.84	-99	41.6
34.59843	2.5733	45.12	45.25	5.687	0.627	2.08E+00	9.96E-01	45	-99	2.87	-99	43.49
34.6772	2.6864	39.86	39.98	6.719	0.633	2.08E+00	9.99E-01	40	-99	2.52	-99	48.41
34.75946	2.5696	36.47	36.58	7.024	0.549	2.09E+00	1.00E+00	36	-99	2.29	-99	50.73
34.83893	1.6902	35.72	35.83	4.718	0.523	2.09E+00	1.00E+00	24	-99	2.24	-99	43.96
34.91631	2.0545	38.73	38.84	5.289	0.565	2.10E+00	1.01E+00	39	-99	2.44	-99	44.61
34.99021	1.8221	44.87	44.99	4.051	0.568	2.10E+00	1.01E+00	22	36	2.85	-99	38.09

35.06201	1.5166	44.49	44.59	3.401	0.484	2.10E+00	1.01E+00	22	35.93	2.83	-99	35.66
35.11848	1.3027	25.94	26.02	5.007	0.352	2.11E+00	1.01E+00	26	-99	1.59	-99	50.45
35.161	1.2036	39.48	39.55	3.043	0.329	2.11E+00	1.01E+00	16	35.17	2.49	-99	35.8
35.24675	1.02	28.45	28.51	3.577	0.3	2.12E+00	1.02E+00	14	33.03	1.76	-99	43.24
35.33249	0.853	19.05	19.11	4.465	0.271	2.12E+00	1.02E+00	19	-99	1.13	-99	54.27
35.41963	0.732	14.16	14.22	5.149	0.268	2.13E+00	1.02E+00	14	-99	0.8	-99	63.21
35.50608	0.7321	11.16	11.21	6.53	0.281	2.13E+00	1.02E+00	11	-99	0.6	-99	73.83
35.58276	0.7412	15.04	15.1	4.91	0.277	2.14E+00	1.03E+00	15	-99	0.86	-99	60.95
35.65874	0.6751	16.17	16.23	4.161	0.284	2.14E+00	1.03E+00	16	-99	0.94	-99	56.32
35.73682	0.7441	16.54	16.6	4.481	0.29	2.14E+00	1.03E+00	16	-99	0.96	-99	57.2
35.81629	0.8916	14.04	14.1	6.322	0.319	2.15E+00	1.03E+00	14	-99	0.79	-99	67.61
35.89437	1.0468	19.55	19.63	5.333	0.374	2.15E+00	1.03E+00	19	-99	1.16	-99	57.02
35.97105	1.2165	22.44	22.51	5.403	0.387	2.16E+00	1.04E+00	22	-99	1.35	-99	54.55
36.04634	1.3389	27.45	27.53	4.863	0.407	2.16E+00	1.04E+00	27	-99	1.69	-99	48.92
36.11744	1.3728	28.83	28.91	4.748	0.413	2.17E+00	1.04E+00	28	-99	1.78	-99	47.65
36.18855	1.3988	26.57	26.65	5.249	0.384	2.17E+00	1.04E+00	26	-99	1.63	-99	50.86
36.25896	1.373	26.32	26.39	5.202	0.348	2.18E+00	1.04E+00	26	-99	1.61	-99	50.88
36.33146	1.249	20.93	21	5.948	0.329	2.18E+00	1.05E+00	20	-99	1.25	-99	57.77
36.40466	1.0814	18.93	18.99	5.694	0.326	2.18E+00	1.05E+00	19	-99	1.12	-99	58.96
36.47855	0.847	17.05	17.11	4.95	0.316	2.19E+00	1.05E+00	17	-99	0.99	-99	58.43
36.54896	0.7296	20.93	21	3.474	0.329	2.19E+00	1.05E+00	10	-99	1.25	-99	48.16
36.61797	1.0482	20.55	20.62	5.083	0.332	2.20E+00	1.06E+00	20	-99	1.22	-99	55.13
36.68629	1.4698	23.56	23.63	6.221	0.313	2.20E+00	1.06E+00	23	-99	1.42	-99	56.32
36.75182	1.6689	43.74	43.8	3.81	0.297	2.21E+00	1.06E+00	21	35.53	2.77	-99	37.56
36.81107	1.726	60.79	60.85	2.837	0.297	2.21E+00	1.06E+00	24	37.53	3.91	-99	29.24
36.86893	1.7457	59.03	59.09	2.954	0.303	2.21E+00	1.06E+00	23	37.35	3.79	-99	30.1
36.93934	1.761	45.12	45.2	3.896	0.41	2.22E+00	1.06E+00	22	35.7	2.86	-99	37.44
37.01393	1.6011	37.6	37.67	4.25	0.352	2.22E+00	1.07E+00	24	34.53	2.36	-99	41.48
37.08922	1.3471	33.84	33.9	3.974	0.297	2.23E+00	1.07E+00	16	33.83	2.11	-99	42.07
37.1659	1.2059	28.7	28.76	4.193	0.3	2.23E+00	1.07E+00	19	-99	1.76	-99	45.64
37.24537	1.1321	22.94	22.99	4.924	0.287	2.24E+00	1.07E+00	22	-99	1.38	-99	52.44
37.32415	1.0222	19.05	19.11	5.349	0.3	2.24E+00	1.08E+00	18	-99	1.12	-99	57.62
37.40989	0.9151	17.55	17.61	5.196	0.323	2.25E+00	1.08E+00	17	-99	1.02	-99	58.75
37.49703	0.9362	18.3	18.37	5.096	0.358	2.25E+00	1.08E+00	18	-99	1.07	-99	57.5
37.58487	0.9099	25.57	25.64	3.548	0.371	2.26E+00	1.08E+00	12	-99	1.55	-99	44.92
37.67619	0.8123	27.7	27.77	2.926	0.326	2.26E+00	1.09E+00	13	32.4	1.7	-99	40.66
37.7696	0.8456	25.94	26.01	3.251	0.348	2.27E+00	1.09E+00	12	31.94	1.58	-99	43.31
37.86232	0.8597	18.05	17.93	4.794	-0.561	2.27E+00	1.09E+00	17	-99	1.05	-99	56.85
37.95573	0.8767	17.05	16.96	5.17	-0.444	2.28E+00	1.09E+00	16	-99	0.98	-99	59.45
38.05402	0.9633	16.17	16.09	5.987	-0.392	2.28E+00	1.10E+00	15	-99	0.93	-99	63.5
38.15232	1.1998	22.06	21.99	5.456	-0.325	2.29E+00	1.10E+00	21	-99	1.32	-99	55.19
38.24573	1.4247	33.34	33.3	4.279	-0.215	2.30E+00	1.10E+00	21	-99	2.07	-99	43.54
38.33636	1.6788	33.34	33.32	5.039	-0.108	2.30E+00	1.10E+00	32	-99	2.07	-99	46.26
38.55873	1.5421	23.44	23.48	6.567	0.222	2.31E+00	1.11E+00	22	-99	1.41	-99	57.51
38.64587	1.2982	19.18	19.21	6.757	0.177	2.32E+00	1.11E+00	18	-99	1.12	-99	62.17
38.74207	0.972	14.66	14.69	6.618	0.119	2.33E+00	1.12E+00	14	-99	0.82	-99	67.65
38.83967	0.7125	12.41	12.43	5.733	0.103	2.33E+00	1.12E+00	12	-99	0.67	-99	68.51
38.93378	0.5743	10.9	10.93	5.256	0.116	2.34E+00	1.12E+00	10	-99	0.57	-99	69.81
38.99094	0.5709	11.53	11.58	4.931	0.232	2.34E+00	1.12E+00	11	-99	0.61	-99	67.11
39.05996	0.5978	13.54	13.59	4.4	0.248	2.34E+00	1.13E+00	13	-99	0.75	-99	61.18
39.13106	0.644	13.66	13.71	4.696	0.264	2.35E+00	1.13E+00	13	-99	0.75	-99	62.22
39.20008	0.6855	14.54	14.59	4.7	0.229	2.35E+00	1.13E+00	14	-99	0.81	-99	60.87
39.27118	0.7327	12.53	12.63	5.802	0.465	2.36E+00	1.13E+00	12	-99	0.68	-99	68.39
39.34299	0.7688	11.78	11.88	6.471	0.488	2.36E+00	1.13E+00	11	-99	0.63	-99	72.2
39.41339	0.7551	11.41	11.51	6.559	0.526	2.37E+00	1.14E+00	11	-99	0.6	-99	73.27
39.48589	0.763	11.53	11.64	6.555	0.536	2.37E+00	1.14E+00	11	-99	0.61	-99	72.99
39.5556	0.8329	12.53	12.65	6.585	0.568	2.37E+00	1.14E+00	12	-99	0.68	-99	71.06
39.62601	1.0722	17.3	17.42	6.154	0.627	2.38E+00	1.14E+00	16	-99	0.99	-99	62.33
39.69433	1.3241	26.57	26.69	4.96	0.601	2.38E+00	1.14E+00	25	-99	1.61	-99	49.82
39.76125	1.4129	40.36	40.45	3.493	0.475	2.39E+00	1.15E+00	19	34.52	2.53	-99	37.43
39.82539	1.4574	40.86	40.93	3.56	0.371	2.39E+00	1.15E+00	19	34.59	2.56	-99	37.54
39.89022	1.5453	36.47	36.57	4.225	0.494	2.39E+00	1.15E+00	23	33.85	2.27	-99	41.84
39.95714	1.6604	31.46	31.61	5.252	0.763	2.40E+00	1.15E+00	29	-99	1.94	-99	47.87
40.02477	1.7919	31.33	31.52	5.685	0.911	2.40E+00	1.15E+00	29	-99	1.93	-99	49.34
40.09587	1.8624	32.46	32.67	5.7	1.051	2.41E+00	1.16E+00	30	-99	2	-99	48.76
40.16977	1.9234	32.59	32.8	5.863	1.067	2.41E+00	1.16E+00	30	-99	2.01	-99	49.21

40.24366	2.0331	32.09	32.3	6.294	1.07	2.42E+00	1.16E+00	30	-99	1.98	-99	50.79
40.31824	2.0953	31.33	31.56	6.639	1.115	2.42E+00	1.16E+00	29	-99	1.93	-99	52.21
40.39354	2.1129	30.96	31.19	6.775	1.122	2.42E+00	1.16E+00	29	-99	1.9	-99	52.81
40.46882	2.1038	31.46	31.68	6.64	1.112	2.43E+00	1.17E+00	29	-99	1.94	-99	52.14
40.54411	2.0502	31.96	32.19	6.37	1.112	2.43E+00	1.17E+00	30	-99	1.97	-99	51.08
40.61731	2.0585	33.21	33.43	6.158	1.057	2.44E+00	1.17E+00	31	-99	2.05	-99	49.79
40.69399	2.0828	32.34	32.55	6.398	1.067	2.44E+00	1.17E+00	30	-99	1.99	-99	50.96
40.76788	2.1262	32.84	33.05	6.433	1.06	2.45E+00	1.17E+00	30	-99	2.03	-99	50.8
40.83968	2.1838	33.09	33.3	6.558	1.044	2.45E+00	1.18E+00	31	-99	2.04	-99	51.03
40.9101	2.2403	33.21	33.42	6.703	1.031	2.46E+00	1.18E+00	31	-99	2.05	-99	51.38
40.98399	2.2692	33.59	33.79	6.716	0.983	2.46E+00	1.18E+00	31	-99	2.08	-99	51.23
41.06067	2.2838	33.59	33.78	6.761	0.937	2.46E+00	1.18E+00	31	-99	2.08	-99	51.36
41.13736	2.2934	33.34	33.52	6.841	0.915	2.47E+00	1.19E+00	31	-99	2.06	-99	51.72
41.21404	2.2808	33.21	33.4	6.828	0.924	2.47E+00	1.19E+00	31	-99	2.05	-99	51.75
41.28863	2.269	32.84	33.02	6.872	0.895	2.48E+00	1.19E+00	30	-99	2.02	-99	52.07
41.366	2.2825	32.21	32.38	7.05	0.818	2.48E+00	1.19E+00	30	-99	1.98	-99	52.91
41.44548	2.2754	31.83	32.01	7.109	0.847	2.49E+00	1.19E+00	29	-99	1.96	-99	53.28
41.52704	2.2387	31.71	31.88	7.023	0.814	2.49E+00	1.20E+00	29	-99	1.95	-99	53.12
41.61069	2.212	31.58	31.75	6.968	0.798	2.50E+00	1.20E+00	29	-99	1.94	-99	53.04
41.69574	2.2267	31.46	31.62	7.043	0.776	2.50E+00	1.20E+00	29	-99	1.93	-99	53.32
41.88606	2.2052	33.21	33.36	6.61	0.721	2.51E+00	1.21E+00	30	-99	2.05	-99	51.15
41.93764	2.2017	33.34	33.48	6.576	0.698	2.52E+00	1.21E+00	30	-99	2.05	-99	50.99
41.9962	2.1806	34.22	34.35	6.348	0.675	2.52E+00	1.21E+00	31	-99	2.11	-99	49.88
42.05267	2.1714	34.34	34.47	6.299	0.653	2.52E+00	1.21E+00	31	-99	2.12	-99	49.68
42.10983	2.1412	34.97	35.08	6.103	0.562	2.53E+00	1.21E+00	32	-99	2.16	-99	48.8
42.16769	2.111	33.09	33.19	6.36	0.504	2.53E+00	1.21E+00	30	-99	2.04	-99	50.51
42.22625	2.067	31.46	31.56	6.55	0.491	2.53E+00	1.22E+00	29	-99	1.93	-99	51.95
42.2855	2.0289	30.33	30.42	6.67	0.442	2.54E+00	1.22E+00	28	-99	1.85	-99	52.95
42.34546	1.9754	28.2	28.29	6.984	0.423	2.54E+00	1.22E+00	26	-99	1.71	-99	55.18
42.40192	1.9102	26.57	26.66	7.165	0.439	2.54E+00	1.22E+00	24	-99	1.6	-99	56.81
42.45978	1.8161	24.94	25.03	7.256	0.429	2.55E+00	1.22E+00	23	-99	1.49	-99	58.28
42.51625	1.7397	23.69	23.77	7.318	0.413	2.55E+00	1.22E+00	21	-99	1.41	-99	59.47
42.57341	1.6894	22.44	22.52	7.503	0.41	2.55E+00	1.23E+00	20	-99	1.33	-99	61.07
42.63197	1.6433	21.43	21.52	7.637	0.416	2.56E+00	1.23E+00	19	-99	1.26	-99	62.38
42.69192	1.6191	20.3	20.39	7.939	0.442	2.56E+00	1.23E+00	18	-99	1.18	-99	64.33
42.74978	1.5888	19.68	19.77	8.036	0.465	2.57E+00	1.23E+00	-99	-99	1.14	-99	65.26
42.80834	1.5603	19.55	19.65	7.941	0.471	2.57E+00	1.23E+00	18	-99	1.13	-99	65.13
42.8655	1.5316	19.68	19.78	7.745	0.481	2.57E+00	1.24E+00	18	-99	1.14	-99	64.45
42.92336	1.5286	19.8	19.9	7.681	0.488	2.58E+00	1.24E+00	18	-99	1.15	-99	64.14
42.98401	1.5373	20.3	20.41	7.534	0.501	2.58E+00	1.24E+00	18	-99	1.18	-99	63.19
43.04466	1.5379	20.93	21.03	7.312	0.504	2.58E+00	1.24E+00	19	-99	1.22	-99	61.93
43.10601	1.552	22.18	22.29	6.963	0.523	2.59E+00	1.24E+00	20	-99	1.31	-99	59.73
43.16526	1.5969	23.56	23.67	6.746	0.546	2.59E+00	1.24E+00	21	-99	1.4	-99	57.89
43.22312	1.6511	24.94	25.06	6.59	0.562	2.59E+00	1.25E+00	22	-99	1.49	-99	56.32
43.28168	1.7073	26.32	26.44	6.457	0.601	2.60E+00	1.25E+00	24	-99	1.58	-99	54.9
43.33884	1.7577	27.2	27.32	6.434	0.601	2.60E+00	1.25E+00	24	-99	1.64	-99	54.22
43.396	1.807	27.82	27.95	6.466	0.598	2.60E+00	1.25E+00	25	-99	1.68	-99	53.9
43.45387	1.8785	28.45	28.57	6.574	0.604	2.61E+00	1.25E+00	26	-99	1.72	-99	53.81
43.51173	1.9465	28.95	29.08	6.694	0.62	2.61E+00	1.25E+00	26	-99	1.76	-99	53.84
43.57168	2.0039	29.45	29.58	6.774	0.63	2.61E+00	1.26E+00	26	-99	1.79	-99	53.76
43.63302	2.075	30.46	30.59	6.784	0.643	2.62E+00	1.26E+00	27	-99	1.86	-99	53.18
43.69786	2.1844	32.21	32.35	6.753	0.662	2.62E+00	1.26E+00	29	-99	1.97	-99	52.1
43.76269	2.3273	35.09	35.24	6.605	0.698	2.63E+00	1.26E+00	31	-99	2.16	-99	50.2
43.82682	2.4671	37.48	37.61	6.56	0.656	2.63E+00	1.26E+00	33	-99	2.32	-99	48.97
43.88538	2.57	37.6	37.7	6.816	0.507	2.63E+00	1.26E+00	34	-99	2.33	-99	49.65
43.94115	2.6219	39.98	40.08	6.542	0.465	2.64E+00	1.27E+00	36	-99	2.49	-99	47.88
43.99622	2.6455	40.48	40.56	6.522	0.391	2.64E+00	1.27E+00	36	-99	2.52	-99	47.63
44.05129	2.6719	40.11	40.18	6.65	0.358	2.64E+00	1.27E+00	36	-99	2.5	-99	48.14
44.10636	2.6747	39.61	39.67	6.742	0.342	2.65E+00	1.27E+00	35	-99	2.46	-99	48.6
44.16074	2.6369	38.48	38.55	6.84	0.355	2.65E+00	1.27E+00	34	-99	2.39	-99	49.35
44.21581	2.5641	37.1	37.17	6.899	0.332	2.65E+00	1.27E+00	33	-99	2.3	-99	50.12
44.26879	2.4838	35.34	35.41	7.014	0.336	2.66E+00	1.28E+00	31	-99	2.18	-99	51.25
44.32108	2.4427	34.47	34.53	7.073	0.329	2.66E+00	1.28E+00	31	-99	2.12	-99	51.85
44.37405	2.4271	34.22	34.28	7.081	0.31	2.66E+00	1.28E+00	30	-99	2.1	-99	52
44.42773	2.4086	33.46	33.52	7.185	0.293	2.67E+00	1.28E+00	30	-99	2.05	-99	52.67
44.48071	2.3881	32.71	32.77	7.287	0.281	2.67E+00	1.28E+00	29	-99	2	-99	53.35

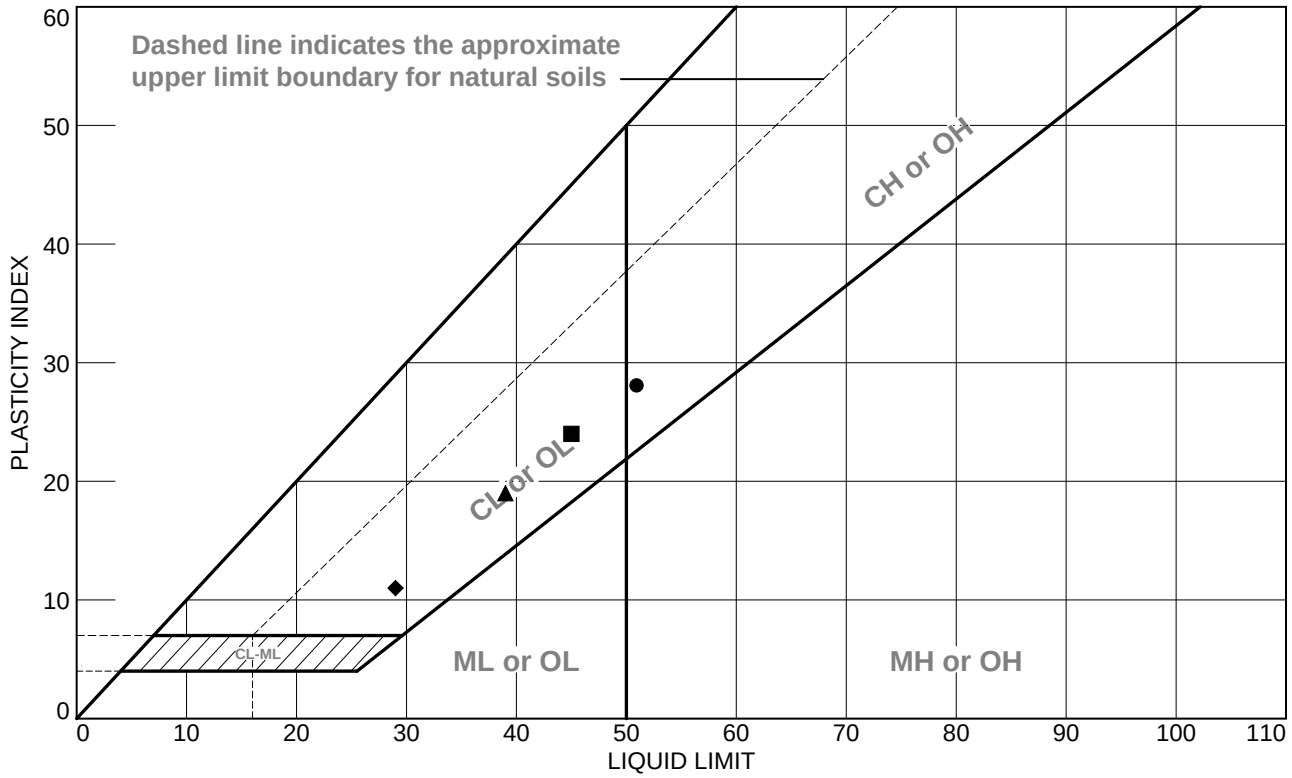
44.5316	2.3666	31.83	31.89	7.421	0.271	2.67E+00	1.28E+00	28	-99	1.94	-99	54.2
44.5797	2.3362	30.08	30.13	7.754	0.238	2.68E+00	1.28E+00	27	-99	1.83	-99	56.12
44.6292	2.2905	29.08	29.13	7.863	0.248	2.68E+00	1.29E+00	26	-99	1.76	-99	57.03
44.68148	2.2341	27.95	28	7.979	0.255	2.68E+00	1.29E+00	25	-99	1.68	-99	58.07
44.73586	2.1956	26.7	26.75	8.207	0.274	2.68E+00	1.29E+00	-99	-99	1.6	-99	59.54
44.79302	2.0967	25.69	25.75	8.141	0.3	2.69E+00	1.29E+00	-99	-99	1.53	-99	60.11
44.85227	1.9942	24.44	24.5	8.138	0.316	2.69E+00	1.29E+00	-99	-99	1.45	-99	61.09
44.91223	1.8905	23.69	23.76	7.958	0.339	2.70E+00	1.29E+00	21	-99	1.4	-99	61.23
44.97078	1.863	23.44	23.52	7.921	0.403	2.70E+00	1.30E+00	21	-99	1.38	-99	61.34
45.02934	1.8664	24.44	24.53	7.607	0.465	2.70E+00	1.30E+00	22	-99	1.45	-99	59.64
45.21477	1.9728	28.7	28.81	6.848	0.52	2.71E+00	1.30E+00	25	-99	1.73	-99	54.46
45.26706	1.98	28.83	28.92	6.847	0.452	2.72E+00	1.30E+00	25	-99	1.74	-99	54.38
45.32283	1.9704	27.45	27.52	7.159	0.374	2.72E+00	1.31E+00	24	-99	1.65	-99	56.18
45.38417	1.9583	25.94	26.01	7.528	0.336	2.72E+00	1.31E+00	23	-99	1.55	-99	58.29
45.44761	1.9327	24.19	24.25	7.969	0.306	2.73E+00	1.31E+00	21	-99	1.43	-99	60.85
45.51244	1.8826	22.81	22.88	8.23	0.316	2.73E+00	1.31E+00	-99	-99	1.34	-99	62.72
45.57588	1.831	22.31	22.38	8.182	0.342	2.74E+00	1.31E+00	-99	-99	1.31	-99	63.05
45.6428	1.7744	21.56	21.63	8.204	0.345	2.74E+00	1.32E+00	-99	-99	1.25	-99	63.81
45.71112	1.6975	21.06	21.13	8.033	0.368	2.74E+00	1.32E+00	-99	-99	1.22	-99	63.84
45.78083	1.6397	20.68	20.76	7.898	0.397	2.75E+00	1.32E+00	18	-99	1.2	-99	63.85
45.84775	1.6325	21.31	21.39	7.631	0.423	2.75E+00	1.32E+00	19	-99	1.24	-99	62.48
45.91467	1.6642	23.69	23.8	6.992	0.552	2.76E+00	1.32E+00	21	-99	1.4	-99	58.51
45.9795	1.674	26.7	26.82	6.242	0.598	2.76E+00	1.32E+00	23	-99	1.6	-99	53.98
46.04573	1.6468	27.32	27.45	6	0.601	2.76E+00	1.33E+00	24	-99	1.64	-99	52.8
46.11335	1.5363	25.57	25.65	5.99	0.4	2.77E+00	1.33E+00	22	-99	1.52	-99	54.02
46.18446	1.4452	21.68	21.75	6.644	0.336	2.77E+00	1.33E+00	19	-99	1.26	-99	59.27
46.25626	1.3968	17.8	17.86	7.821	0.306	2.78E+00	1.33E+00	15	-99	1	-99	66.87
46.33085	1.3455	16.04	16.12	8.347	0.381	2.78E+00	1.33E+00	-99	-99	0.88	-99	70.64
46.40962	1.3048	16.42	16.51	7.902	0.458	2.79E+00	1.34E+00	14	-99	0.91	-99	68.86
46.49189	1.2733	16.79	16.89	7.541	0.446	2.79E+00	1.34E+00	15	-99	0.93	-99	67.32
46.57205	1.2926	16.54	16.63	7.773	0.42	2.79E+00	1.34E+00	14	-99	0.92	-99	68.33
46.65152	1.3219	16.17	16.25	8.135	0.397	2.80E+00	1.34E+00	-99	-99	0.89	-99	69.88
46.73169	1.3302	15.92	16	8.312	0.423	2.80E+00	1.35E+00	-99	-99	0.87	-99	70.71
46.81604	1.3128	16.92	17.01	7.716	0.462	2.81E+00	1.35E+00	15	-99	0.94	-99	67.65
46.90388	1.2116	16.67	16.76	7.231	0.423	2.81E+00	1.35E+00	14	-99	0.92	-99	66.58
46.99659	1.1856	15.54	15.62	7.592	0.368	2.82E+00	1.35E+00	13	-99	0.85	-99	69.24
47.09349	1.1578	15.29	15.39	7.522	0.497	2.83E+00	1.36E+00	13	-99	0.83	-99	69.37
47.19109	1.1013	15.42	15.52	7.095	0.526	2.83E+00	1.36E+00	13	-99	0.84	-99	67.88
47.29078	1.1263	15.42	15.51	7.259	0.484	2.84E+00	1.36E+00	13	-99	0.84	-99	68.4
47.38837	1.1204	15.42	15.51	7.223	0.471	2.84E+00	1.37E+00	13	-99	0.84	-99	68.29
47.47969	1.1287	15.04	15.14	7.453	0.51	2.85E+00	1.37E+00	13	-99	0.81	-99	69.54
47.57101	1.1302	15.04	15.17	7.452	0.62	2.85E+00	1.37E+00	13	-99	0.81	-99	69.5
47.66094	1.1236	14.79	14.92	7.533	0.623	2.86E+00	1.37E+00	13	-99	0.8	-99	70.12
47.75575	1.1847	16.04	16.17	7.326	0.627	2.87E+00	1.38E+00	14	-99	0.88	-99	67.66
47.84986	1.2574	17.67	17.81	7.061	0.672	2.87E+00	1.38E+00	15	-99	0.99	-99	64.72
47.94049	1.349	18.42	18.54	7.278	0.552	2.88E+00	1.38E+00	16	-99	1.04	-99	64.5
48.03251	1.428	20.18	20.28	7.043	0.484	2.88E+00	1.38E+00	17	-99	1.15	-99	61.9
48.12592	1.4003	21.18	21.28	6.582	0.462	2.89E+00	1.39E+00	18	-99	1.22	-99	59.52
48.21864	1.3729	20.68	20.76	6.614	0.384	2.89E+00	1.39E+00	18	-99	1.19	-99	60.12
48.31414	1.413	19.05	19.13	7.388	0.378	2.90E+00	1.39E+00	16	-99	1.08	-99	64.15
48.55952	1.3592	22.06	22.15	6.137	0.446	2.91E+00	1.40E+00	19	-99	1.28	-99	57.32
48.62296	1.4059	25.19	25.28	5.561	0.436	2.92E+00	1.40E+00	21	-99	1.49	-99	52.89
48.6857	1.4741	27.57	27.67	5.328	0.465	2.92E+00	1.40E+00	23	-99	1.64	-99	50.46
48.75402	1.5243	30.58	30.66	4.971	0.394	2.93E+00	1.40E+00	26	-99	1.84	-99	47.43
48.82303	1.5112	32.21	32.28	4.681	0.355	2.93E+00	1.41E+00	18	-99	1.95	-99	45.53
48.89344	1.5812	32.96	33.03	4.787	0.352	2.93E+00	1.41E+00	28	-99	2	-99	45.53
48.96733	1.6877	34.09	34.16	4.941	0.342	2.94E+00	1.41E+00	29	-99	2.08	-99	45.51
49.03913	1.7533	34.09	34.16	5.133	0.332	2.94E+00	1.41E+00	29	-99	2.08	-99	46.17
49.11164	1.8153	33.46	33.52	5.415	0.284	2.95E+00	1.41E+00	28	-99	2.03	-99	47.42
49.18204	1.9189	33.21	33.27	5.767	0.284	2.95E+00	1.42E+00	28	-99	2.02	-99	48.67
49.25036	2.0278	32.96	33.02	6.141	0.281	2.96E+00	1.42E+00	28	-99	2	-99	49.95
49.30334	2.0769	32.96	33.02	6.29	0.277	2.96E+00	1.42E+00	28	-99	2	-99	50.39
49.35702	2.0659	34.34	34.4	6.006	0.274	2.96E+00	1.42E+00	29	-99	2.09	-99	48.84
49.41976	1.9869	36.22	36.28	5.477	0.277	2.97E+00	1.42E+00	30	-99	2.22	-99	46.31
49.47901	1.8878	39.98	40.05	4.714	0.313	2.97E+00	1.43E+00	22	-99	2.47	-99	42.2
49.53479	1.8343	43.24	43.3	4.236	0.3	2.97E+00	1.43E+00	24	-99	2.68	-99	39.33

49.58776	1.7953	43.62	43.67	4.111	0.274	2.98E+00	1.43E+00	18	33.59	2.71	-99	38.75
49.64005	1.8097	42.74	42.79	4.229	0.258	2.98E+00	1.43E+00	24	-99	2.65	-99	39.48
49.69721	1.7821	41.36	41.4	4.304	0.216	2.98E+00	1.43E+00	23	-99	2.56	-99	40.24
49.75507	1.8206	38.85	38.9	4.68	0.216	2.99E+00	1.43E+00	22	-99	2.39	-99	42.54
49.81363	1.8859	35.47	35.52	5.31	0.235	2.99E+00	1.44E+00	30	-99	2.17	-99	46.11
49.87498	1.9395	35.22	35.27	5.499	0.264	2.99E+00	1.44E+00	29	-99	2.15	-99	46.84
49.93562	1.9552	37.73	37.79	5.174	0.326	3.00E+00	1.44E+00	31	-99	2.32	-99	44.66
49.98791	1.9148	40.86	40.92	4.679	0.297	3.00E+00	1.44E+00	23	-99	2.52	-99	41.75
50.03741	1.8718	41.61	41.67	4.492	0.29	3.00E+00	1.44E+00	23	-99	2.57	-99	40.82
50.08133	1.8107	43.49	43.55	4.158	0.274	3.01E+00	1.44E+00	18	33.51	2.7	-99	38.96
50.12384	1.7933	46	46.05	3.894	0.261	3.01E+00	1.44E+00	19	33.87	2.87	-99	37.17
50.16776	1.7799	48.88	48.93	3.638	0.248	3.01E+00	1.45E+00	20	34.26	3.06	-99	35.34
50.2075	1.7637	51.01	51.06	3.454	0.245	3.01E+00	1.45E+00	21	34.53	3.2	-99	34.04
50.24863	0	53.52	53.57	0	0.242	3.02E+00	1.45E+00	11	-99	-7.13	-99	-99
50.29115	0	55.15	55.19	0	0.229	3.02E+00	1.45E+00	11	-99	-7.13	-99	-99
50.33577	0	56.02	56.08	0	0.268	3.02E+00	1.45E+00	12	-99	-7.13	-99	-99
50.3755	0	56.78	56.83	0	0.248	3.02E+00	1.45E+00	12	-99	-7.13	-99	-99
50.41106	0	56.9	56.95	0	0.222	3.03E+00	1.45E+00	12	-99	-7.13	-99	-99
50.4724	0	56.9	56.95	0	0.242	3.03E+00	1.45E+00	12	-99	-7.13	-99	-99
50.50586	0	56.9	56.95	0	0.242	3.03E+00	1.46E+00	12	-99	-7.13	-99	-99

CLASSIFICATION TESTS

Suelos, PSC
Calle Chile 258, San Juan, P.R. 00917-2103
Tel. (787) 753-0147. Email: suelosinc@gmail.com

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	B-1	S-3	4-5.5'		23	51	28		CH
■	B-1	S-5	9-10.5'		21	45	24		SC
▲	B-1	S-7	19-20.5'		20	39	19		CL
◆	B-1	S-9	29-30.5'		18	29	11		SC

SUELOS, INC.

San Juan, Puerto Rico

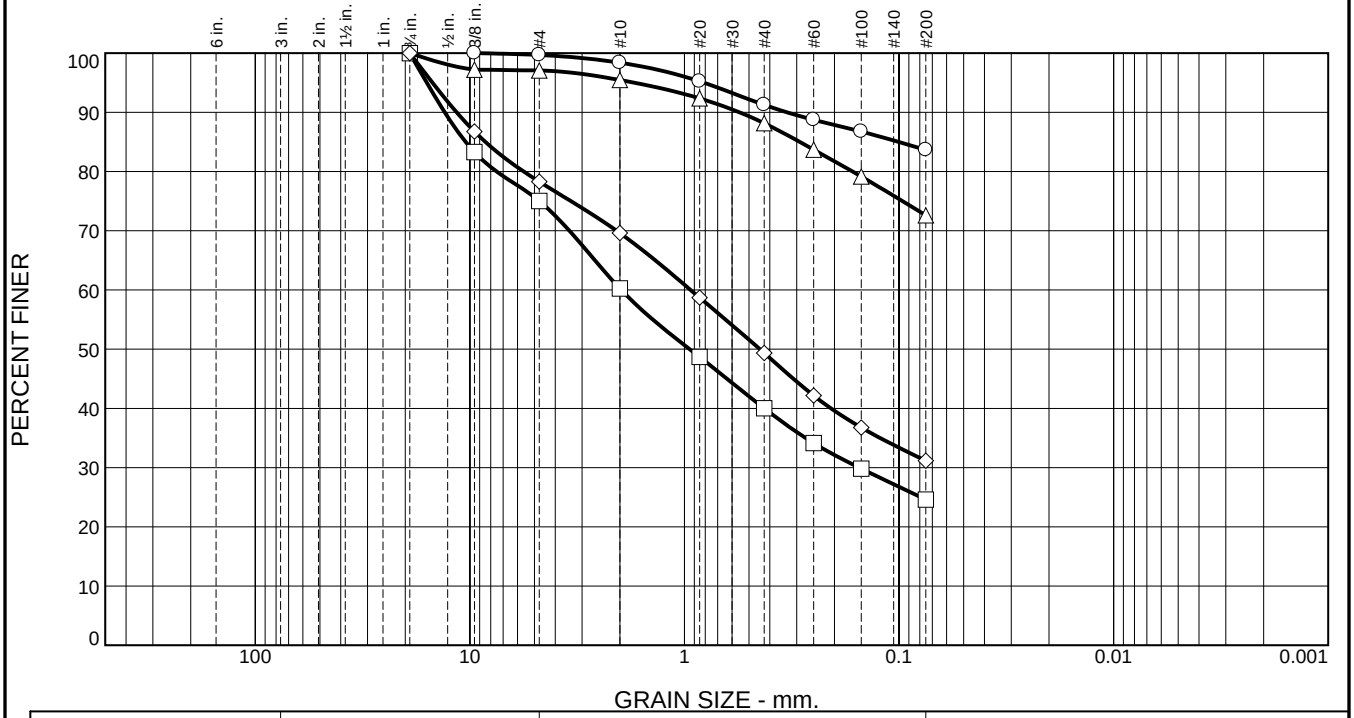
Client:

Project: Dike B, Gurabo, PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.3	1.3	7.1	7.7	83.6	
□	0.0	0.0	25.0	14.7	20.3	15.4	24.6	
△	0.0	0.0	2.9	1.6	7.3	15.6	72.6	
◇	0.0	0.0	21.7	8.7	20.2	18.2	31.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	51	23	0.1002							
□	45	21	10.4584	1.9690	0.9460	0.1534				
△	39	20	0.2899							
◇	29	18	8.4673	0.9358	0.4452					

Material Description	USCS	AASHTO
○ fat clay with sand	CH	A-7-6(25)
□ clayey sand with gravel	SC	A-2-7(1)
△ lean clay with sand	CL	A-6(13)
◇ clayey sand with gravel	SC	A-2-6(0)

Project No. 5068 **Client:**

Project: Dike B, Gurabo, PR

○ **Source of Sample:** B-1 **Depth:** 4-5.5' **Sample Number:** S-3

□ **Source of Sample:** B-1 **Depth:** 9-10.5' **Sample Number:** S-5

△ **Source of Sample:** B-1 **Depth:** 19-20.5' **Sample Number:** S-7

◇ **Source of Sample:** B-1 **Depth:** 29-30.5' **Sample Number:** S-9

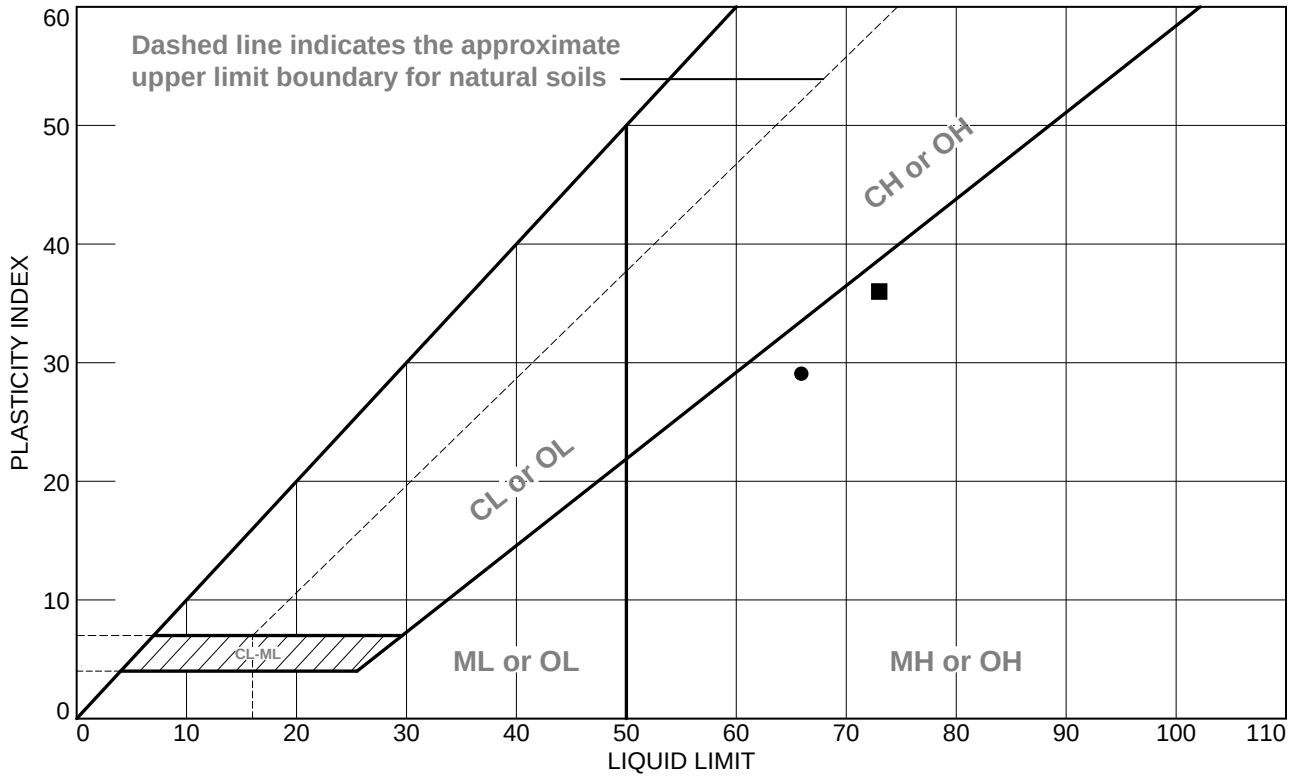
SUELOS, INC.

San Juan, Puerto Rico

Remarks:

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	B-3	S-3	4-5.5'		37	66	29		SM
■	B-3	S-5	9-10.5'		37	73	36		MH

SUELOS, INC.

San Juan, Puerto Rico

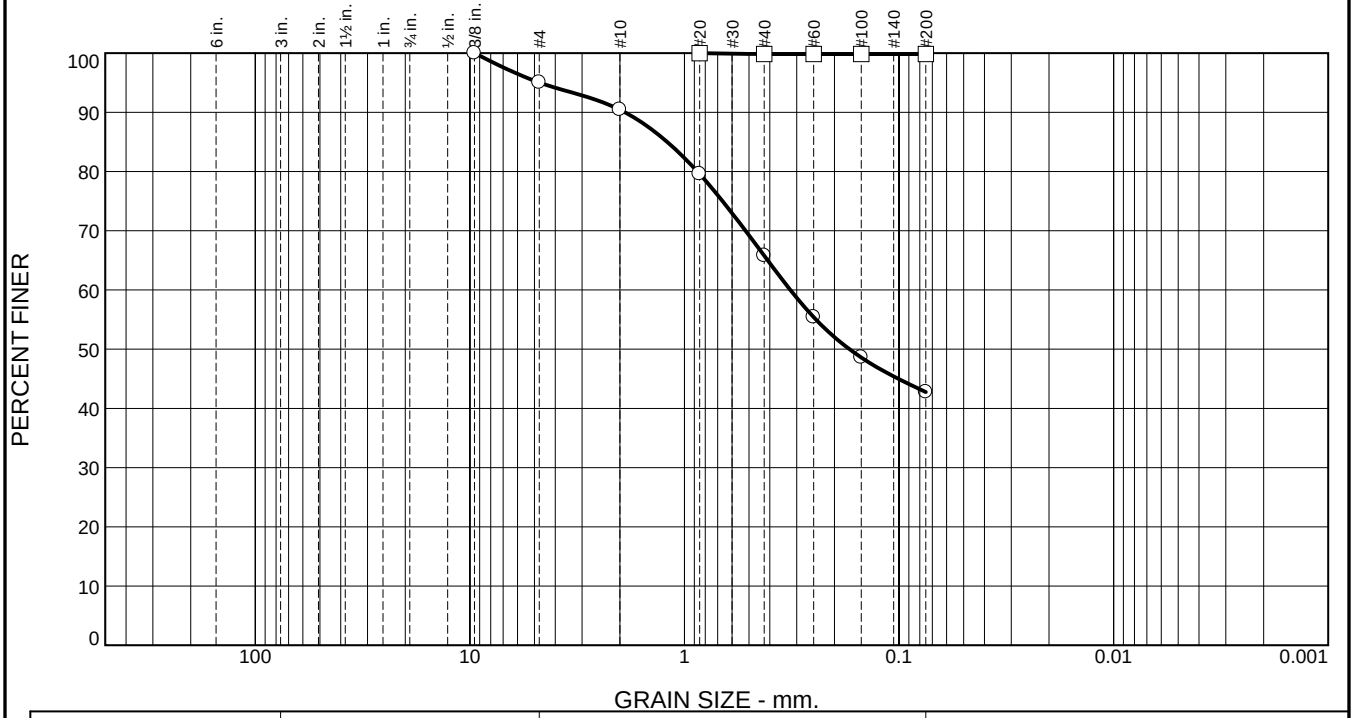
Client:

Project: Dike B, Gurabo, PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	5.0	4.6	24.6	23.0	42.8	
□	0.0	0.0	0.0	0.0	0.2	0.0	99.8	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	66	37	1.2032	0.3208	0.1702					
□	73	37								

Material Description	USCS	AASHTO
○ silty sand	SM	A-7-5(8)
□ elastic silt	MH	A-7-5(46)

Project No. 5068 **Client:**

Project: Dike B, Gurabo, PR

○ **Source of Sample:** B-3 **Depth:** 4-5.5' **Sample Number:** S-3

□ **Source of Sample:** B-3 **Depth:** 9-10.5' **Sample Number:** S-5

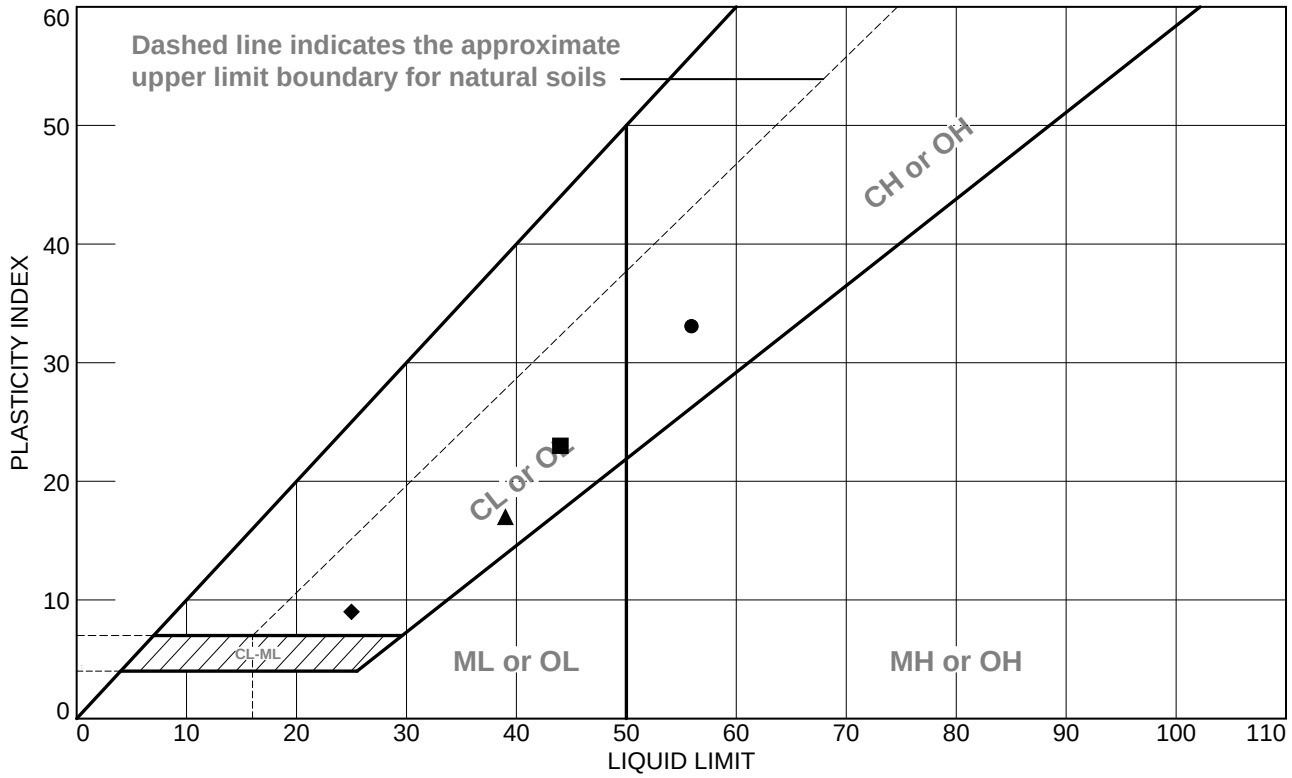
Remarks:

SUELOS, INC.

San Juan, Puerto Rico

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	B-6	S-3	4-5.5'		23	56	33		CH
■	B-6	S-5	9-10.5'		21	44	23		CL
▲	B-6	S-7	19-20.5'		22	39	17		SC
◆	B-6	S-9	29-30.5'		16	25	9		SC

SUELOS, INC.

San Juan, Puerto Rico

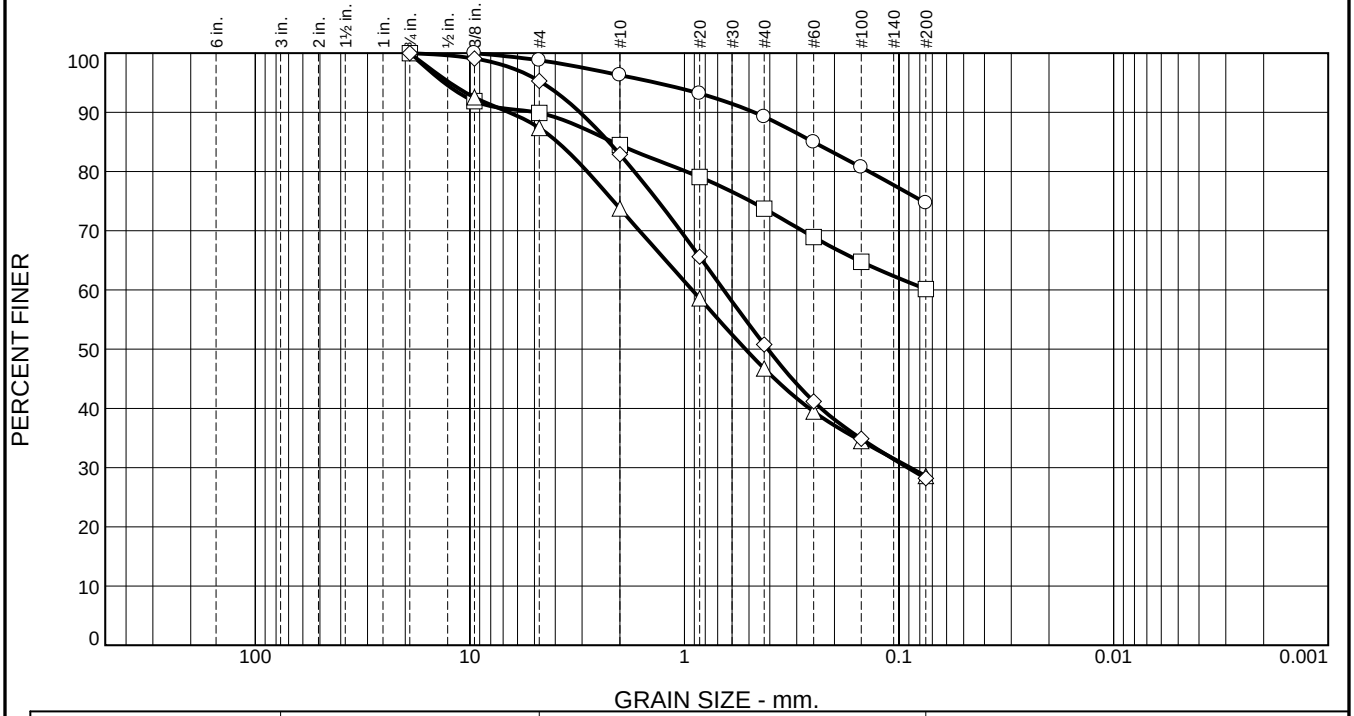
Client:

Project: Dike B, Gurabo, PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.2	2.5	7.0	14.6	74.7	
□	0.0	0.0	10.1	5.4	10.8	13.6	60.1	
△	0.0	0.0	12.6	13.6	27.1	18.1	28.6	
◇	0.0	0.0	4.7	12.4	32.1	22.6	28.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	56	23	0.2508							
□	44	21	2.1542							
△	39	22	3.9085	0.9204	0.5195	0.0888				
◇	25	16	2.2495	0.6563	0.4088	0.0912				

Material Description	USCS	AASHTO
○ fat clay with sand	CH	A-7-6(25)
□ sandy lean clay	CL	A-7-6(11)
△ clayey sand	SC	A-2-6(1)
◇ clayey sand	SC	A-2-4(0)

Project No. 5068 **Client:**

Project: Dike B, Gurabo, PR

○ **Source of Sample:** B-6 **Depth:** 4-5.5' **Sample Number:** S-3

□ **Source of Sample:** B-6 **Depth:** 9-10.5' **Sample Number:** S-5

△ **Source of Sample:** B-6 **Depth:** 19-20.5' **Sample Number:** S-7

◇ **Source of Sample:** B-6 **Depth:** 29-30.5' **Sample Number:** S-9

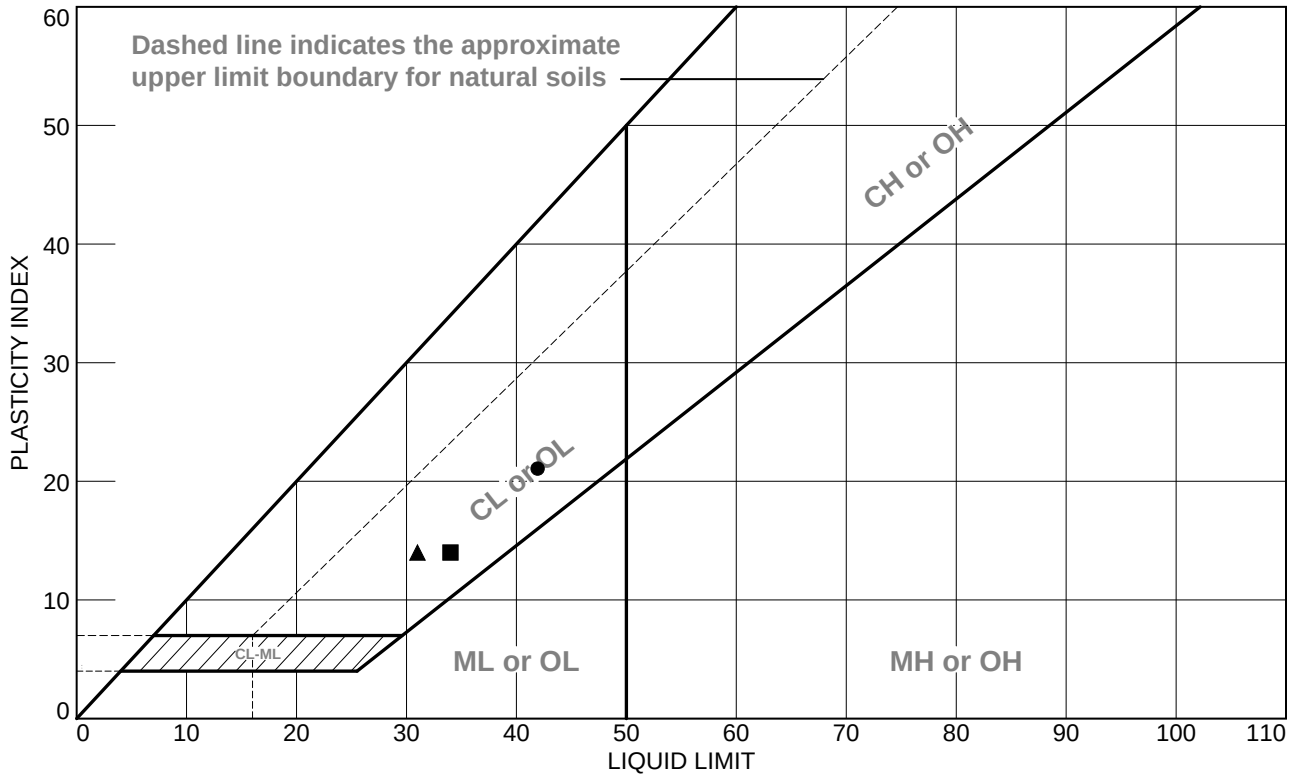
SUELOS, INC.

San Juan, Puerto Rico

Remarks:

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	B-7	S-3	4-5.5'		21	42	21		CL
■	B-7	S-5	9-10.5'		20	34	14		CL
▲	B-7	S-6	19-20.5'		17	31	14		GC

SUELOS, INC.

San Juan, Puerto Rico

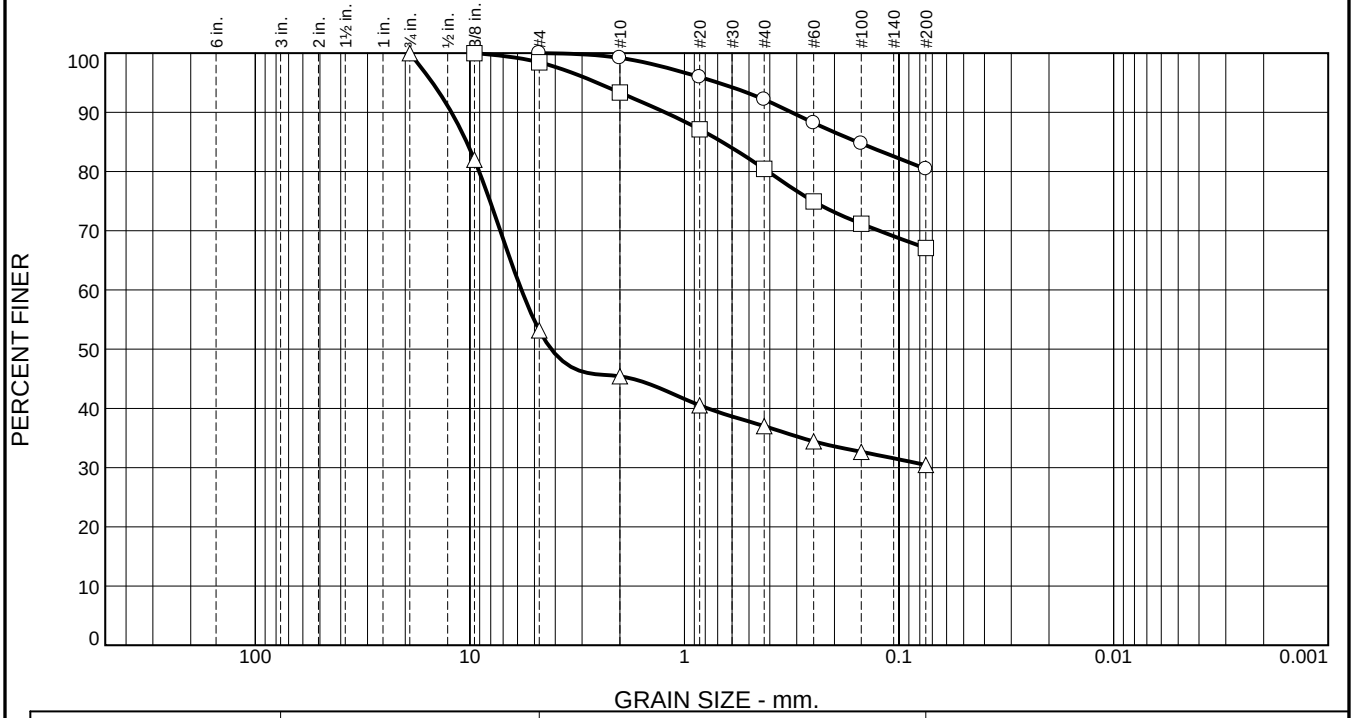
Client:

Project: Dike B, Gurabo, PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.8	7.0	11.8	80.4	
□	0.0	0.0	1.5	5.2	12.8	13.4	67.1	
△	0.0	0.0	46.8	7.8	8.4	6.6	30.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	42	21	0.1561							
□	34	20	0.6676							
△	31	17	10.3470	5.7499	4.1750					

	Material Description	USCS	AASHTO
○	lean clay with sand	CL	A-7-6(17)
□	sandy lean clay	CL	A-6(8)
△	clayey gravel with sand	GC	A-2-6(1)

Project No. 5068 **Client:**

Project: Dike B, Gurabo, PR

○ **Source of Sample:** B-7 **Depth:** 4-5.5' **Sample Number:** S-3

□ **Source of Sample:** B-7 **Depth:** 9-10.5' **Sample Number:** S-5

△ **Source of Sample:** B-7 **Depth:** 19-20.5' **Sample Number:** S-6

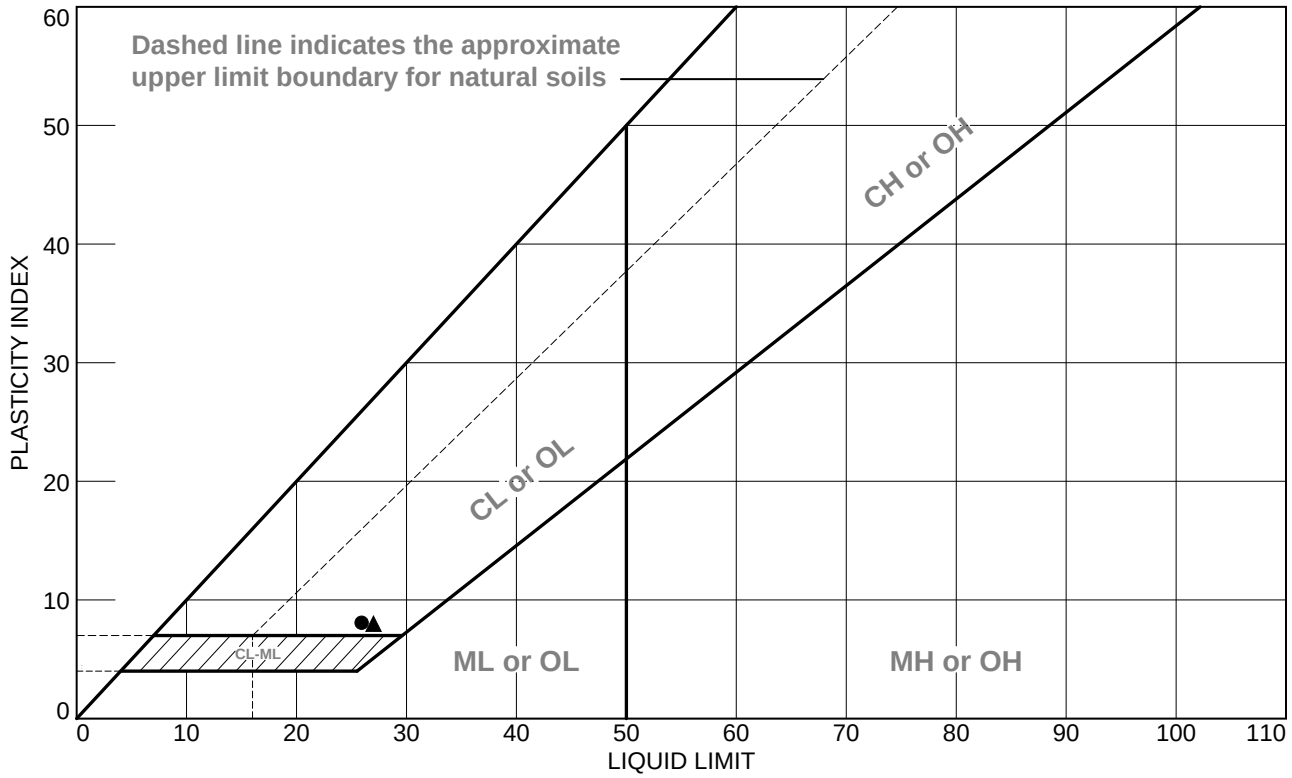
Remarks:

SUELOS, INC.

San Juan, Puerto Rico

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	B-8	S-3	4-5.5'		18	26	8		CL
■	B-8	S-5	9-10.5'		NP	NV	NP		SM
▲	B-8	S-6	14-15.5'		19	27	8		GC

SUELOS, INC.

San Juan, Puerto Rico

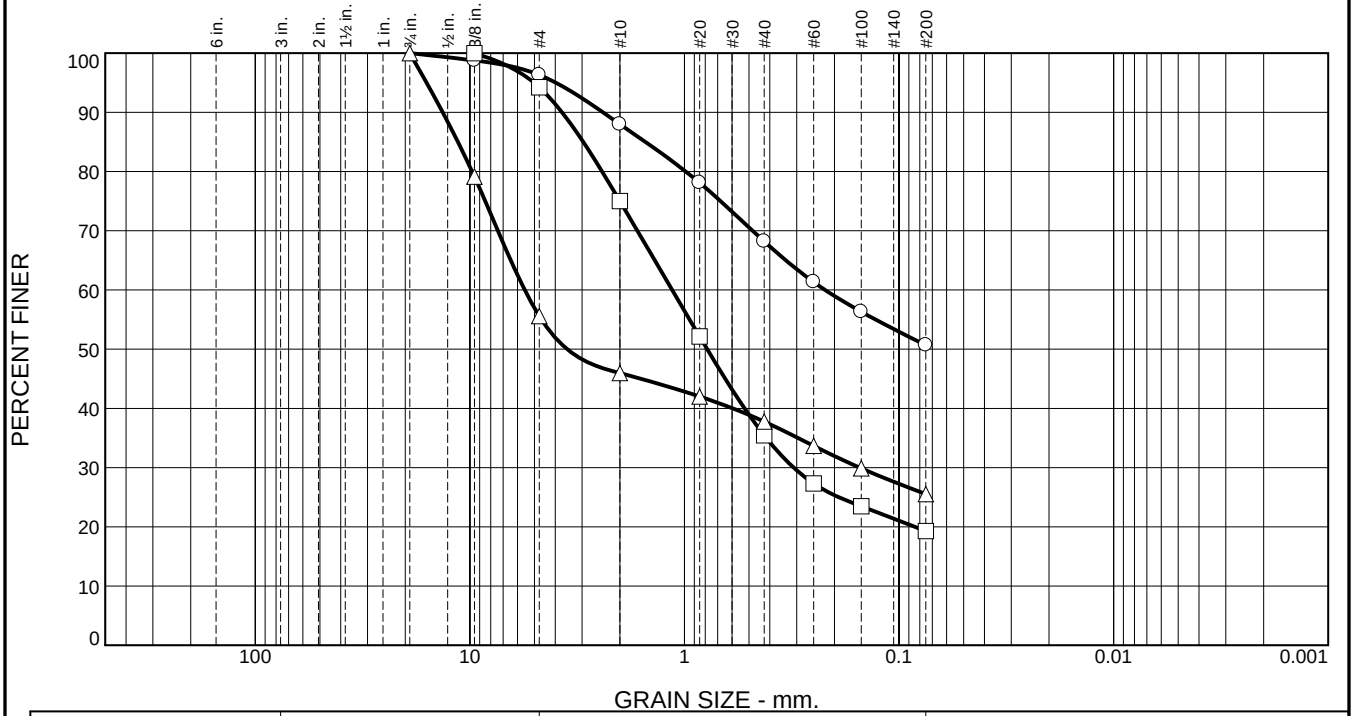
Client:

Project: Dike B, Gurabo, PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	3.7	8.3	19.8	17.5	50.7	
□	0.0	0.0	5.8	19.2	39.6	16.1	19.3	
△	0.0	0.0	44.4	9.6	8.2	12.3	25.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	26	18	1.5204	0.2210						
□	NV	NP	2.9618	1.1410	0.7834	0.3098				
△	27	19	11.3635	5.5507	3.5195	0.1527				

Material Description	USCS	AASHTO
○ sandy lean clay	CL	A-4(1)
□ silty sand silty sand	SM	A-1-b
△ clayey gravel with sand	GC	A-2-4(0)

Project No. 5068 **Client:**

Project: Dike B, Gurabo, PR

○ **Source of Sample:** B-8 **Depth:** 4-5.5' **Sample Number:** S-3

□ **Source of Sample:** B-8 **Depth:** 9-10.5' **Sample Number:** S-5

△ **Source of Sample:** B-8 **Depth:** 14-15.5' **Sample Number:** S-6

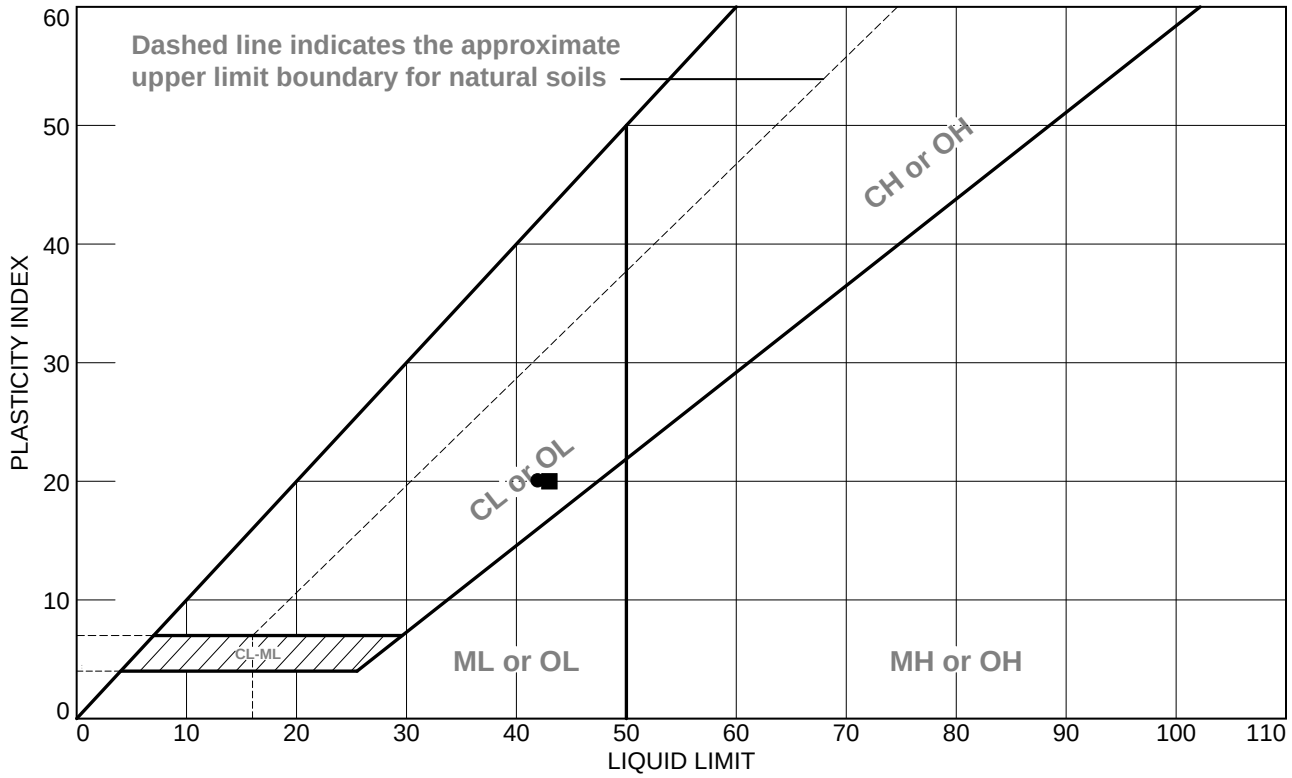
Remarks:

SUELOS, INC.

San Juan, Puerto Rico

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	B-9	S-3	3.5-5.0'		22	42	20		CL
■	B-9	S-5	8.5-10.0'		23	43	20		CL
▲	B-9	S-6	13.5-15.0'		NP	NV	NP		SM

SUELOS, INC.

San Juan, Puerto Rico

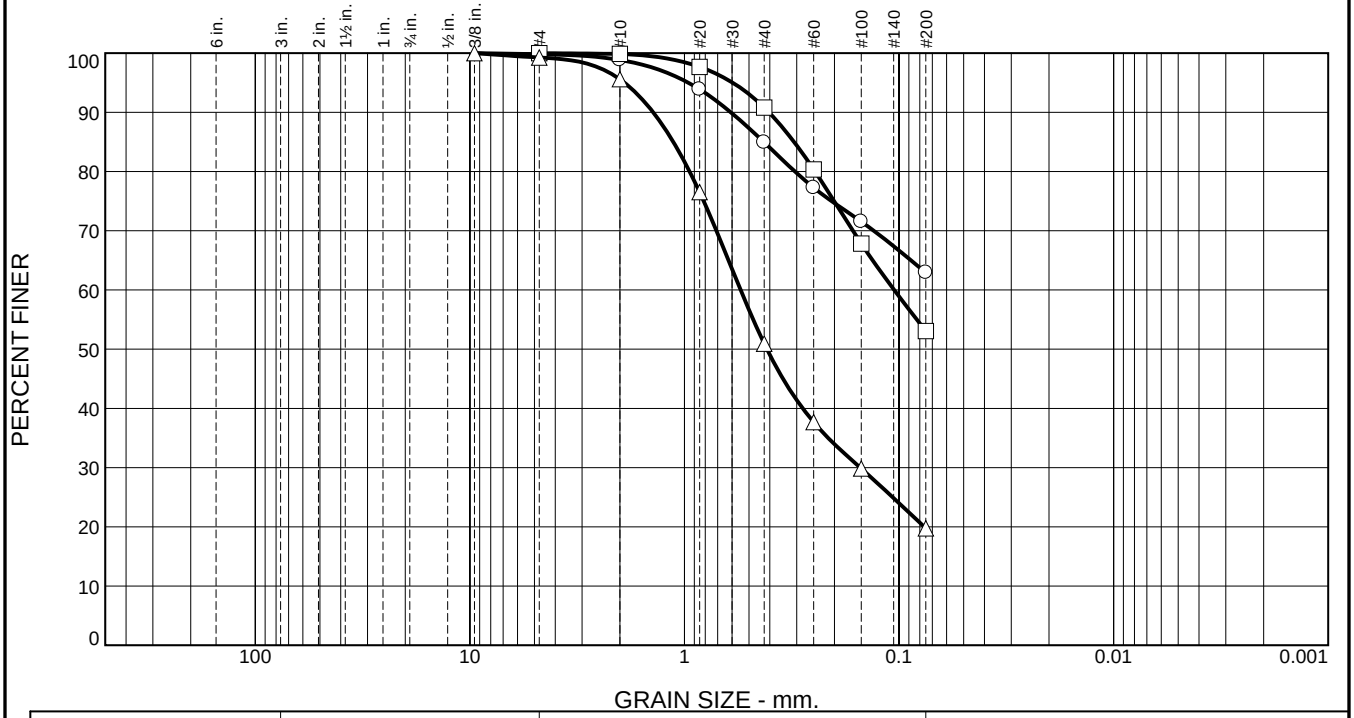
Client:

Project: Dike B, Gurabo, PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.2	0.9	14.0	22.0	62.9	
□	0.0	0.0	0.0	0.1	9.1	37.7	53.1	
△	0.0	0.0	0.7	3.7	44.7	31.2	19.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	42	22	0.4269							
□	43	23	0.3084	0.1054						
△	NV	NP	1.1268	0.5473	0.4128	0.1518				

Material Description	USCS	AASHTO
○ sandy lean clay	CL	A-7-6(11)
□ sandy lean clay	CL	A-7-6(8)
△ silty sand	SM	A-2-4(0)

Project No. 5068 **Client:**

Project: Dike B, Gurabo, PR

○ **Source of Sample:** B-9 **Depth:** 3.5-5.0' **Sample Number:** S-3

□ **Source of Sample:** B-9 **Depth:** 8.5-10.0' **Sample Number:** S-5

△ **Source of Sample:** B-9 **Depth:** 13.5-15.0' **Sample Number:** S-6

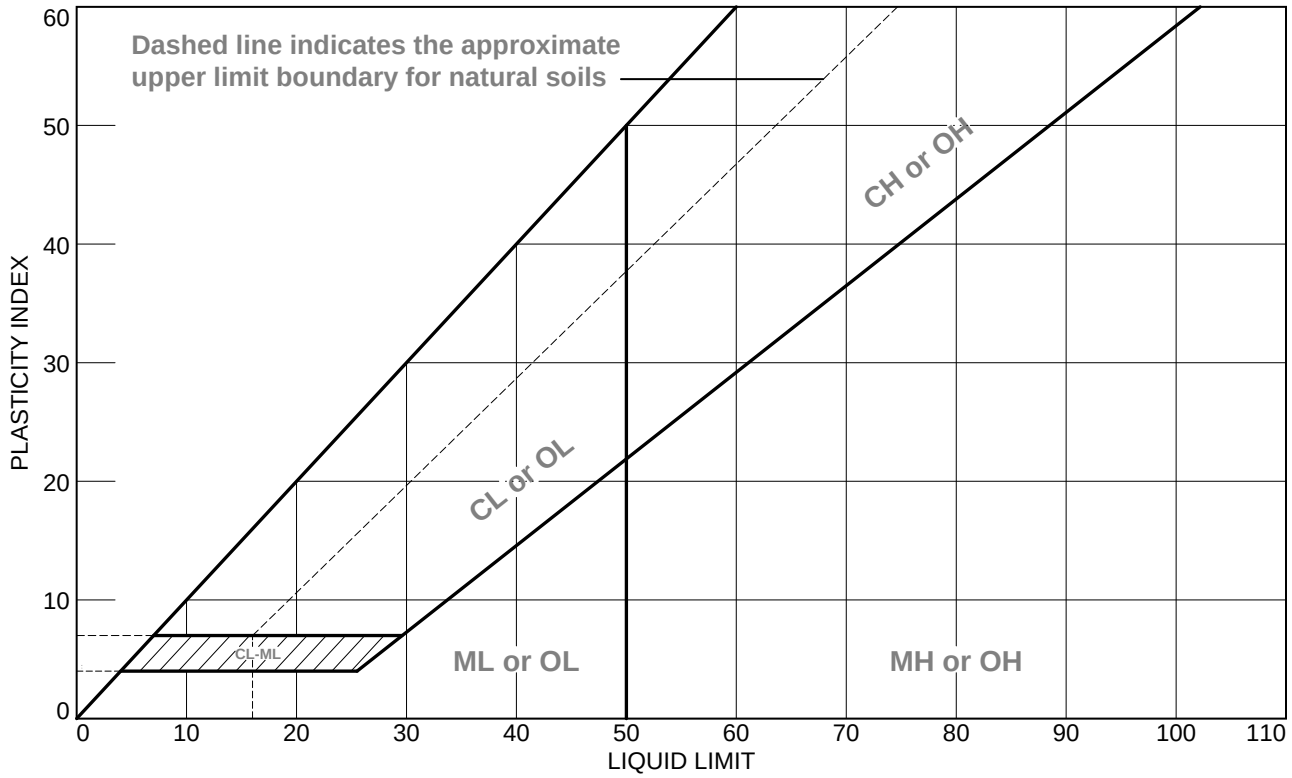
Remarks:

SUELOS, INC.

San Juan, Puerto Rico

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	B-10	S-3	3.5-5.0'		NP	NV	NP		SM
■	B-10	S-5	8.5-10.0'		NP	NV	NP		SP-SM
▲	B-10	S-6	13.5-15.0'		NP	NV	NP		SP-SM

SUELOS, INC.

San Juan, Puerto Rico

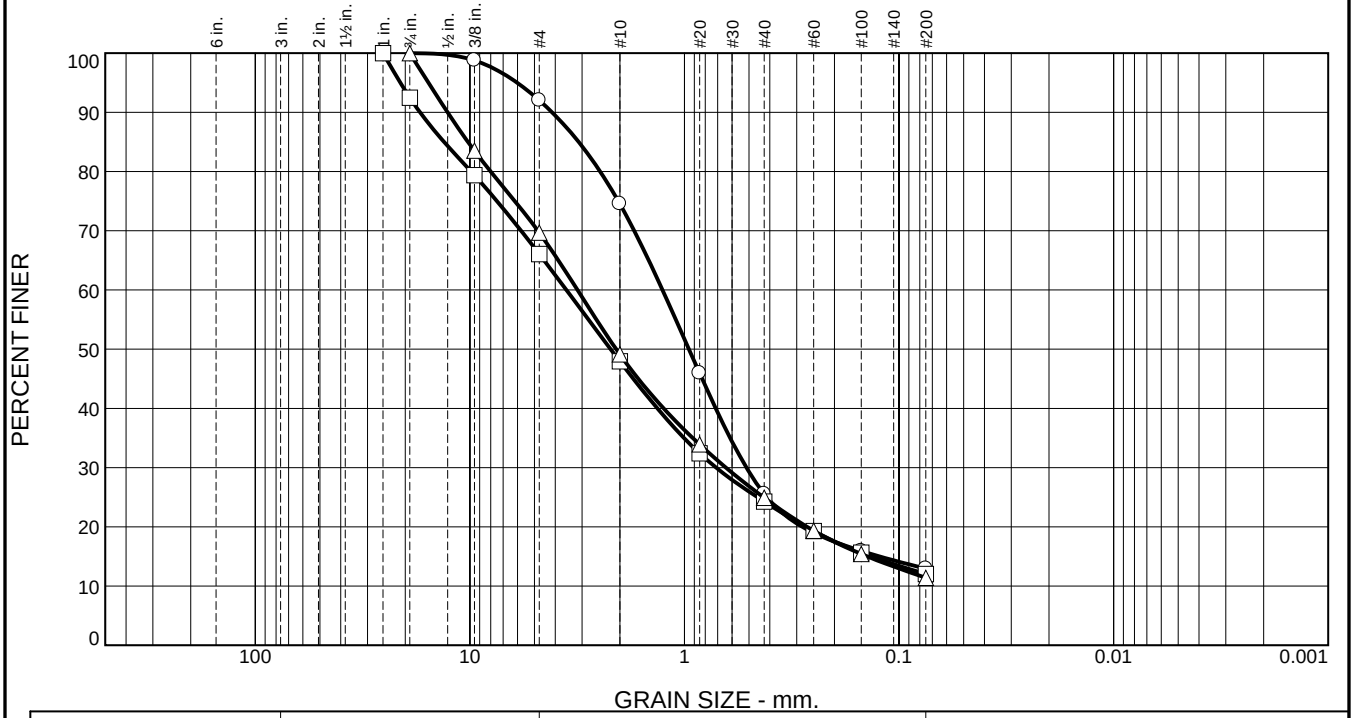
Client:

Project: Dike B, Gurabo, PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	8.0	17.5	49.0	12.6	12.9	
□	0.0	7.5	26.4	18.1	23.7	12.3	12.0	
△	0.0	0.0	30.3	20.6	24.2	13.5	11.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	NV	NP	3.1121	1.2661	0.9530	0.5145	0.1235			
□	NV	NP	13.1888	3.5503	2.2082	0.7120	0.1348			
△	NV	NP	10.2021	3.1523	2.0802	0.6407	0.1407			

	Material Description	USCS	AASHTO
○	silty sand	SM	A-1-b
□	poorly graded sand with silt and gravel	SP-SM	A-1-a
△	poorly graded sand with silt and gravel	SP-SM	A-1-a

Project No. 5068 **Client:**

Project: Dike B, Gurabo, PR

○ **Source of Sample:** B-10 **Depth:** 3.5-5.0' **Sample Number:** S-3

□ **Source of Sample:** B-10 **Depth:** 8.5-10.0' **Sample Number:** S-5

△ **Source of Sample:** B-10 **Depth:** 13.5-15.0' **Sample Number:** S-6

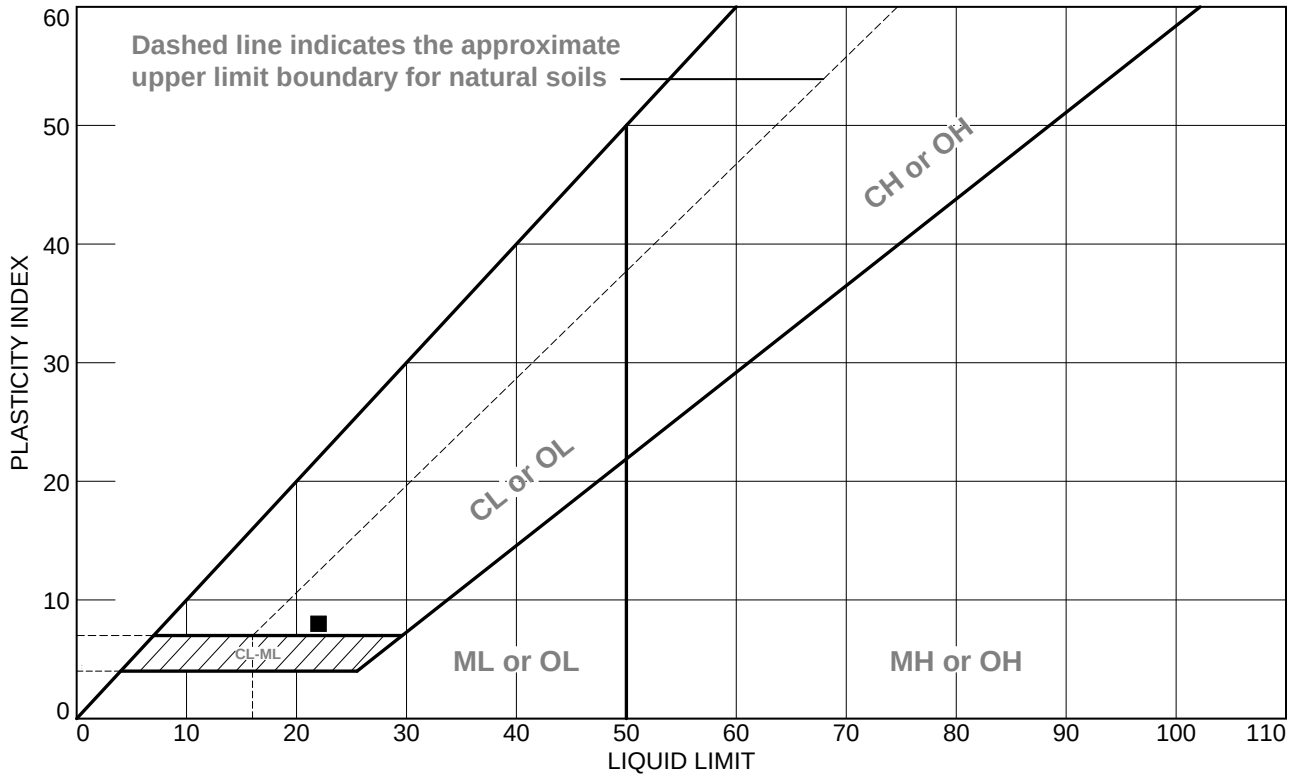
Remarks:

SUELOS, INC.

San Juan, Puerto Rico

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	B-11	S-3	3.5-5.0'		NP	NV	NP		SM
■	B-11	S-5	8.5-10.0'		14	22	8		SC
▲	B-11	S-6	13.5-15.0'		NP	NV	NP		SM

SUELOS, INC.

San Juan, Puerto Rico

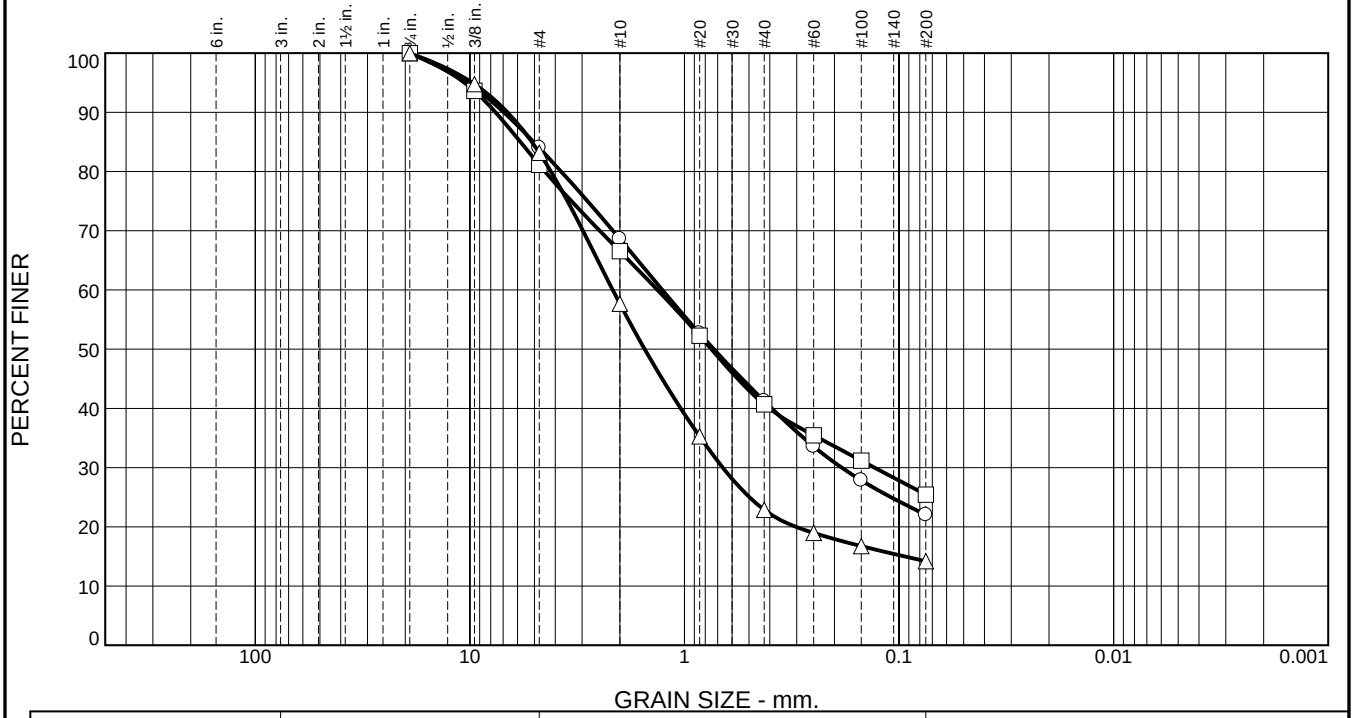
Client:

Project: Dike B, Gurabo, PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	16.0	15.4	27.4	19.2	22.0	
□	0.0	0.0	18.9	14.6	25.8	15.3	25.4	
△	0.0	0.0	16.8	25.5	34.8	8.7	14.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	NV	NP	5.0464	1.2677	0.7297	0.1851				
□	22	14	5.8094	1.3351	0.7494	0.1302				
△	NV	NP	5.1428	2.1580	1.5325	0.6628	0.0942			

Material Description	USCS	AASHTO
○ silty sand with gravel	SM	A-1-b
□ clayey sand with gravel	SC	A-2-4(0)
△ silty sand with gravel	SM	A-1-b

Project No. 5068 **Client:**

Project: Dike B, Gurabo, PR

○ **Source of Sample:** B-11 **Depth:** 3.5-5.0' **Sample Number:** S-3

□ **Source of Sample:** B-11 **Depth:** 8.5-10.0' **Sample Number:** S-5

△ **Source of Sample:** B-11 **Depth:** 13.5-15.0' **Sample Number:** S-6

Remarks:

SUELOS, INC.

San Juan, Puerto Rico

Figure

BORING LOGS

Suelos, PSC
Calle Chile 258, San Juan, P.R. 00917-2103
Tel. (787) 753-0147. Email: suelosinc@gmail.com

BORING LOGS

The description of subsurface profile and results of field and laboratory tests, as enclosed, pertain to conditions actually encountered at the borings location proper and at the depths indicated. Profile tracings between borings, when give, represent a reasonable interpolation of subsoil characteristics and should not be taken to indicate true intermediate conditions.

NOTES:

N	**-**	**Number of blows required to drive the sampling spoon a distance of 12" with a 140 lbs hammer falling 30".**
NW	**-**	**No water.**
WH	**-**	**Weight of hammer.**
WR	**-**	**Weight of Rods.**
W	**-**	**Natural moisture content in % of dry weight.**
qu	**-**	**Unconfined compressive strength in tons/sq ft.**
*****	**-**	**Penetrometer value.**

Suelos, PSC
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Tel. (787) 753-0147. Email: suelosinc@gmail.com

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-1

Job No. 5068

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 09/28/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 09/28/21	Date : 09/28/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 60.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	10-11-13		Topsoil: strong brown silt,s ome sand, roots, trace gravel	24		6
	2	100	15-16-8		Silty sand, some angular-subangular gravel, clay pockets, strong brown	24		21
5	3	100	5-7-8		Stiff, yellowish brown silty clay with few sand (A-7-6) LL-51, PL=23, CH	15	4.5+*	18
	4	100	6-6-9		-trace small subrounded gravel	15	4.5+*	23
10	5	100	9-7-14		Yellowish brown silty to clayey sand, some subangular gravel (Dike Fill) (A-2-7) LL=45, PL=21, SC	21		22
15	6	100	8-15-7		-few clay pockets	22	1.0*	8
20	7	100	4-4-5		Strong brown, olive gray clay with some sand, trace roots (Dike Fill) (A-6) LL=39, PL=20, CL	9	1.0*	26
25	8	100	5-6-7		Yellowish brown, strong brown sandy clay, few small-weathered subangular gravel (Dike Fill)	13	2.0*	16
30	9	100	5-15-9		Sandy clay and clayey sand (A-2-6) LL=29, PL=18, SC	24	2.5*	12
35	10	100	10-15-13		Silty sand, yellowish brown some subangular weathered gravel	28		13
					DIKE BASE			
40	11	100	7-11-15		Silty clay, some sand, few subangular-subrounded gravel (Native)	26	2.0*	13

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-1

Job No. 5068

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	8-12-19		Hard clay, few fine sand, olive, yellowish brown, brown colored (Native)		31	4.5+*	27
50	13	100	8-11-16		-same as above;		27	4.5	24
55	14	100	6-7-9		-same as above;		16	4.5+*	25
60	15	100	6-8-10		-same as above;		18	4.0*	31
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-2

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 09/24/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 09/24/21	Date : 09/24/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 60.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	6-8-10		Very stiff, strong brown, yellowish brown silty clay, few sand, roots	18		20
	2	100	9-10-11		Sandy silt, very stiff, yellowish brown, trace weathered gravel, dry	21		14
5	3	100	14-12-11		-same as above;	23		11
	4	100	10-11-13		-same as above; (Levee Fill)	24		14
10	5	100	12-14-16		-same as above;	30		17
15	6	100	7-10-11		-same as above;	21		14
20	7	100	9-8-8		Strong brown, silty clay with some fine sand, trace weathered gravel	16	2.5*	19
25	8	100	4-6-8		(Leeve Fill) -same as above;	14	3.5*	13
30	9	100	13-11-10		MEdium density, yellowish brown, sandy silt, some severely weathered rock fragments	21		9
35	10	100	12-11-13		-same as above; (Levee Fill)	24		15
40	11	100	9-10-11		-same as above;	21		9

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-2

Job No. 5068

Sheet 2 of 2

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	11-14-17		Clayey silt, yellowish brown, some small-coarse subangular gravel, weathered		31		13
50	13	100	13-14-12		silty sand, yellowish brown some weathered, subrounded gravel (Levee Base)		26		12
55	14	100	6-9-11		Dark gray silty clay with fine sand, trace roots, moist (Native Soil)		20	2.5*	22
60	15	100	6-8-10		Strong brown sandy clay, some silt, few weathered subangular gravel		18	1.25*	19
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-3

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 09/27/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 09/27/21	Date : 09/27/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 60.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	2-2-2		Strong brown, gray, grayish brown clay, trace roots (Dredge Material)	4	1.0*	59
	2	100	2-1-2			3	1.25*	61
5	3	100	1-1-1		Gray silty sand; (A-7-5) LL=66, PL=37, SM	2	1.0*	80
	4	100	2-1-1		Olive gray elastic silt, soft (Dredge Material)	2	0.5	74
10	5	100	1-2-1		-same as above; (A-7-5) LL=73, PL=37, MH	3	0.5*	73
15	6	100	3-3-2		-trace sand, trace weathered gravel	5	0.5*	30
20	7	100	4-5-5		Stiff, strong brown clay, some sand	10		21
25	8	100	5-4-7		Stiff, strong brown, dark gray, olive, clay, little sand (Native Soil)	11	1.25*	26
30	9	100	5-6-7		-same as above;	13	1.5*	27
35	10	100	4-9-7		-same as above;	16	2.0*	26
40	11	100	7-10-14		Very stiff, gray, yellowish brown silty clay, some sand (Native Soil)	24	4.5+*	24

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-3

Job No. 5068

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	5-5-4		Medium yellowish brown, strong brown clayey silt, some sand		9	1.5*	29
50	13	100	4-5-6		-same as above;		11	1.0*	25
55	14	100	4-5-6		-same as above;		11	1.5*	26
60	15	100	4-6-9		Very stiff, strong brown, silty clay		15	2.5*	32
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-4

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 10/01/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 10/01/21	Date : 10/01/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 60.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	6-6-8		Topsoil: strong brown sandy silt, some roots	14		22
	2	100	8-9-7		Silty clay, some sand, trace small gravel, yellowish brown, strong brown, dry	16	4.5+*	18
5	3	100	11-13-14		-same as above;	27	4.5+*	15
	4	100	12-10-11		Sandy silt, strong brown, yellowish brown (Leeve Fill)	21		10
10	5	100	8-10-9		Silty clay, some sand, strong brown, yellowish brown	19	4.5+*	15
15	6	22	7-11-14		Grayish brown, sandy silt, very stiff, dry (Levee Fill) DIKE BASE	25		6
20	7	100	6-7-8		Strong brown, silty clay, some sand, few weathered gravel, roots	15	2.5*	14
25	8	100	6-8-6		Stiff-very stiff, strong brown olive clay, some sand, moist (Native Soil)	14	4.0*	26
30	9	100	4-6-8		-same as above;	14	3.25*	23
35	10	100	6-7-10		-same as above;	17	3.75*	27
40	11	100	7-9-11		-same as above;	20	3.75*	24

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-4

Job No. 5068

Sheet 2 of 2

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	7-12-14		-trace sand		26	3.5*	23
50	13	100	7-6-5		Strong brown, grayish brown, clay, very stiff		11	1.25*	17
55	14	100	7-7-7		-same as above;		14	3.0*	23
60	15	100	7-8-9		-same as above;		17	3.5*	24
					END OF TEST HOLE - 60.5 FT				

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-5

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 09/29/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 09/29/21	Date : 09/29/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 60.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	2-1-1		Soft, grayish brown silty clay	2	2.0*	39
	2	100	1-1-1		(Dredged Material)	2	1.0*	45
	3	100	0-1-1		Soft elastic silt, grayish brown	2	1.5*	75
5					(Dredged Material)			
	4	100	1-1-1		-same as above;	2	0.5*	72
	5	100	1-1-1		-same as above;	2	0.5*	76
10								
	6	100	3-4-6		Grayish brown, yellowish brown clay, sand traces	10	2.5*	23
15					(Native Soil)			
	7	100	4-6-9		Olive brown, yellowish brown sandy clay, some weathered angular-subrounded gravel	15		27
20					(Native Soil)			
	8	100	5-6-8		Olive, grayish brown clay, sand traces, stiff	14	3.0*	29
25					(Native Soil)			
	9	100	5-6-6		-same as above;	12	2.5*	31
30								
	10	100	6-7-8		-same as above;	15	3.0*	27
35								
	11	100	7-8-10		Very stiff, grayish brown clay, few silt	18	3.0*	23
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-5

Job No. 5068

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	7-9-9		-same as above;		18	4.5*	25
50	13	100	8-10-12		-same as above;		22	4.5*	25
55	14	100	9-11-13		-same as above;		24	4.5+*	26
60	15	100	6-11-14		-same as above;		25	4.5*	24
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-6

Job No. 5068

Sheet 1 of 1

Spoon : 1.375"I.D. Hammer: 140# Drop : 30"	Driller : M. GALVEZ Method : AUGER Drill Type: AD-II	Date Started : 10/01/21 Date Completed: 10/01/21 Total Depth : 40	WATER LEVEL: Date : 10/01/21 Depth: N/O	N < 100 = 40 N > 100 = CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	3-5-4		Topsoil: strong brown silty sand, roots, clay pockets	9		27
	2	89	6-9-13		Very stiff, dry sandy silt, some weathered subangular gravel	22		11
5	3	67	5-7-9		-same as above; (A-7-6) LL=56, PL=23, CH	16		15
	4	100	7-11-13		-with some clay pockets	24		19
10	5	100	5-10-15		-low plasticity clay with some clay pockets (A-7-6) LL=44, PL=21, CL	25		15
					DIKE BASE			
15	6	100	5-6-6		-silty clay (Native Soil)	12	3.0*	19
20	7	100	6-7-10		-clayey sand with some clay pockets (A-2) LL=39, PL=22, SC	17	2.5	18
25	8	44	43-50/3"---		Yellowish brown silty to clayey sand, some severely weathered friable rock fragments, dry (Native Soil)	50/3"		6
30	9	39	34-50/3"---		-same as above; (A-2)LL=25, PL=16, SC	50/3"		6
35	10	17	50/4"------		-same as above;	50/4"		7
40	11	17	50/3"------		-some clay pockets	50/3"		7
					END OF TEST HOLE - 40 FT			

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-7

Job No. 5068

Sheet 1 of 1

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 09/29/21	WATER LEVEL:	N < 100 = 25.5
Hammer: 140#	Method : AUGER	Date Completed: 09/29/21	Date : 09/29/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 25.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	3-6-7		Topsoil: strong brown clayey silt, few angular gravel, sand traces	13		42
	2	100	4-3-3		Silt with some fine sand trace clay pockets, grayish brown, dark brown (Native Soil)	6		13
5	3	100	6-7-11		Very stiff grayish brown, yellowish brown silt, some sand, trace fine roots (A-7-6) LL=42, PL=21, CL	18		15
	4	100	16-15-13		Very stiff, yellow, sandy silt, few clay pockets, dry (Native Soil)	28		12
10	5	17	10-50/4"---		-same as above; (A-6) ll=34, PL=20, CL	50/4"		12
15	6	17	50/4"------		Strong brown severely weathered rock fragments, friable, some silt and sand, trace roots (A-2-6) LL=31, PL=17, GC	50/4"		6
20	7	22	50/5"------		-same as above;	50/5"		7
25	8	17	50/3"------		-same as above;	50/3"		6
					END OF TEST HOLE - 25.5 FT			
30								
35								
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-8

Job No. 5068

Sheet 1 of 1

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 09/30/21	WATER LEVEL:	N < 100 = 25.5
Hammer: 140#	Method : AUGER	Date Completed: 09/30/21	Date : 09/30/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 25.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	6-7-10		Topsoil: strong brown sandy silt, few clay, roots	17		19
	2	100	4-6-6		Hard yellowish brown, sandy silt with some weathered, friable rock fragments (residual soil)	12		10
5	3	78	18-21-30		-same as above; (A-4)	51		12
	4	44	31-50/3"----		-same as above;	50/3"		7
10	5	22	50/4"------		-same as above; (A-1-b)	50/4"		6
15	6	17	50/3"------		-same as above; (A-2-4)	50/3"		5
20	7	44	25-50/3"----		-same as above;	50/3"		9
25	8	17	50/3"------		-same as above;	50/3"		8
					END OF TEST HOLE - 25.5 FT			
					Obstruction Solid Rock @ 28 feet			
30								
35								
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-9

Job No. 5068

Sheet 1 of 1

Spoon : 1.375"I.D.	Driller : N. ANDINO	Date Started : 08/10/21	WATER LEVEL:	N < 100 = 30.5
Hammer: 140#	Method : AUGER	Date Completed: 08/10/21	Date : 08/10/21	N > 100 =
Drop : 30"	Drill Type: CME-55	Total Depth : 30.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	118	11			Strong brown, fine grained silty sand, few roots	2		21
	2	100	5-5-7		-same as above; (Desiccated Dredge)	12		13
	3	100	1-1-WH		Soft gray, dark brown elastic silt with fine sand, trace, wet (Soft Dredge)	1		36
5	4	100	1-WH-WH		-same as above;	WH		46
	5	100	1-1-1		-same as above;	2		37
10	6	100	5-5-6		Grayish brown, coarse-medium, fine-medium, grained sand (sandy fill: maybe old entrance ramp?)	11		12
15	7	100	5-7-7		-trace subrounded small gravel	14		14
20	8	44	7-10-11		Dark olive gray, fine-medium sand, some silt (Native Soil)	21		23
25	9	0	10-20-34		-no recovery	54		--
30					**END OF TEST HOLE - 30.5 FT**			
35								
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-10

Job No. 5068

Sheet 1 of 1

Spoon : 1.375"I.D.	Driller : N. ANDINO	Date Started : 11/10/21	WATER LEVEL:	N < 100 = 20.5
Hammer: 140#	Method : AUGER	Date Completed: 11/10/21	Date : 11/10/21	N > 100 =
Drop : 30"	Drill Type: CME-55	Total Depth : 20.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	2-4-5		Strong brown clayey silt some sand, roots	9	3.5*	19
	2	100	6-7-6		-same as above; (Native Material)	13	3.25*	19
5	3	33	25-50/2"---		Residual soil: very dense fine-coarse sand, few weathered rock fragments, light yellowish brown, dry	50/2"		10
	4	22	50/6"------		-same as above; (Native Material)	50/6"		7
10	5	17	50/4"------		-same as above;	50/4"		3
15	6	11	50/2"------		-same as above;	50/2"		4
20	7	11	50/2"------		-same as above;	50/2"		8
					END OF TEST HOLE - 20.5 FT			
25								
30								
35								
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE B, GURABO, P.R.

BORING NO.: B-11

Job No. 5068

Sheet 1 of 1

Spoon : 1.375"I.D.	Driller : N. ANDINO	Date Started : 11/10/21	WATER LEVEL:	N < 100 = 20.5
Hammer: 140#	Method : AUGER	Date Completed: 11/10/21	Date : 11/10/21	N > 100 =
Drop : 30"	Drill Type: CME-55	Total Depth : 20.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	67	17-34-46		Very dense, yellowish brown, sand, some silt, some severely weathered rock fragments	80		8
	2	39	39-50/2"----		Residual soil: fine-coarse sand, some silt, some weathered friable rock fragments, light yellowish brown, dry (Native Material)	50/2"		8
5	3	22	50/5"------		-same as above;	50/5"		8
	4	17	50/3"------		-same as above;	50/3"		5
10	5	39	29-50/2"----		-same as above; (Native Material)	50/2"		8
15	6	67	27-39-50/2"		-same as above;	50/2"		7
20	7	44	37-50/4"----		-same as above;	50/4"		5
					END OF TEST HOLE - 20.5 FT			
25								
30								
35								
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

DRILLING APPENDIX

Suelos, PSC
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APPENDIX NO. 1

General

Comprised in this report is a description of the project as made know to **SUELOS, PSC**. and details of the project with pertinent recommendations for the design of foundations and other earth related structures. It should be considered that the design recommendations are relative to the project aspects discussed and subject to the limitations imposed by all practical considerations in the determination of subsoil conditions.

The field and laboratory data shown in boring logs represent subsoil conditions encountered at the borehole proper. The analysis and conclusions herein presented and discussed are based on such results and on a reasonable interpolation of subsoil characteristics. Whenever cross-sections with a schematic representation of the interpreted subsoil stratification between borings are included, the same should not be taken to represent true intermediate conditions but are rather given for general comparison purposes only.

Copy of this report should be made available to the Project Designers for their information and guidance, as well as to the Contractor and Resident Engineer, in order to secure maximum protection in the case of possible unexpected variations. Any such variations as well as any changes or modifications to the scope of project described after submittance of this report shall be notified by writing to these Consultants in order to evaluate same and decide upon the need to alter or modify the recommendations given.

APPENDIX NO. 2

Field and Laboratory Work

Field exploration was made by **SUELOS, PSC.**, a private laboratory to the services of these Consultants. The field work consisted of a visual observation of the area and existing structures at the site, if any, and of performance of test borings as indicated.

Test borings were made in accordance to the "Standard Penetration Test and Split-Spoon Sampling of Soils Method", as proposed by the Standards of the American Society for testing and Materials Designation ASTM D-1586, Latest Revision.

The testing hole is bored either by manual and mechanical augers or by driving a 2.5 inch inside diameter casing into the ground which is washed clean internally each time a soil sample is to be secured below its reach. While sampling, the Standard Penetration Test is performed and the "N" values recorded. This is the number of blows required to drive the split-spoon sampler 12 inches into the ground using a 140 lbs. hammer with a free fall of 30 inches.

The value gives an indication of the consistency of cohesive soils and the relative density of granular soils as shown in the following table:

COHESIVE SOILS

"N" Values	Consistency	Unconfined Comp. Strength (TSF)
less than 2	very soft	less than 0.25
2 - 4	soft	0.25 - 0.50
4 - 8	medium	0.50 - 1.00
8 - 15	stiff	1.00 - 2.00
15 - 30	very stiff	2.00 - 4.00
over 30	hard	over 4.00

GRANULAR SOILS

"N" Values	Relative Density
0 - 5	very loose
5 - 10	loose
10 - 30	medium
30 - 50	dense
over 50	very dense

Depth of water surface shown on logs indicate the phreatic level found either prior to use of any casing and water or taken 24 hours after the test borings was completed and the casing, if any, is pulled out. The information given, unless otherwise indicated, is not a adequate for study of deep excavations and is only to be used as an approximate level in the study of a normal foundation of the project. Phreatic or underground water levels may vary with seasonal rainshower variations thus water may appear where none is shown and the reader of this report should be aware of this fact. For excavations where ground water levels are of utmost importance special studies consisting of long range observations on installed wellpoint-type devices should be performed. Where deep excavations are contemplated, as in pumping stations, study of artesian or sub-artesian aquifers should be made by means of deep test borings and pumping tests.

DIAMOND CORE DRILLING

Whenever drilling through rock is necessary the same is made following the "Diamond Core Drilling for Site Investigation" method as proposed by the standards of the American Society for Testing and Materials Designation ASTM D-2113-L.R. In general a double tube core barrel with diamond bit is rotated under pressure into the rock. The drilled rock enters into the barrel using circulating water as cooling agent. At intervals of 2 to 5 feet the barrel is lifted and the core is removed. The length of each core run as well as the length of the core recovered is noted.

LABORATORY WORK

➢Water Contents

The natural moisture content was determined for all samples, except for those with high percentage of gravel or coarse sand.

The tests follow standards of the American Society for Testing and Materials ASTM Designation D-2216, Latest Revision. The water or moisture content of a given soil mass is by definition the ratio of the weight of water to the oven dry weight of the soil, expressed as a percentage.

➢Unconfined Compression Tests

All suitable samples of cohesive soil recovered from the split-spoon sampler were tested in unconfined compression. The ratio of the maximum load required for failure to the corrected cross sectional area of the sample expressed in tons per square foot is defined as the unconfined compressive strength.

➢**Examination and Description**

Soil samples are classified according to their constituents, the following terminology used to denote the approximate percentage by weight of each component.

Description Term	Percent by Weight
Trace	1 - 10
Little to some	10 - 20
Sandy, silty clayey	20 - 35
and	35 - 50

The examined samples are related into one of the following main groups; boulders, gravel, sand, clay, and silt. On peat, the presence of the decomposed and partly decomposed vegetable matter, is used for identification. The differentiation between a clay and a silt is based on the presence or lack of plasticity, dilatancy and dry strength rather than on grain size. The description of the soil includes: color, odor, minerals, presence of foreign matter, geological history, etc. These descriptions as well as the results of the laboratory testing are used in grouping similar samples into a stratigraphic unit as shown on the final boring logs. Therefore, the data on subsurface exploration logs represent subsoil conditions at the precise locations of the boreholes only.

GEOTECHNICAL REPORT ON
DREDGE DISPOSAL AREA C
CARRAIZO RESERVOIR
DREDGING PROJECT
GURABO, PUERTO RICO



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Suelos, PSC

Soil & Construction Materials Laboratory and Environmental Drilling Services

GEOTECHNICAL REPORT ON
DREDGE DISPOSAL AREA C
CARRAIZO RESERVOIR DREDGING PROJECT
GURABO, PUERTO RICO

CSA GROUP & GLM ENGINEERING GROUP
Requested for

Boring Logs Performed & Supervised By
***SUELOS, PSC.**

Submitted on December 15, 2021
Job No. 5068-Dike C.rep

258 Chile St., San Juan, PR 00917-2103. Phone (787) 753-0147
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GEOTECHNICAL REPORT ON
DREDGE DISPOSAL AREA C
CARRAIZO RESERVOIR DREDGING PROJECT
GURABO, PUERTO RICO
December 15, 2021

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SLOPE STABILITY ANALYSIS

CPT TABULATED RESULTS

CLASSIFICATION TESTS

BORING LOGS

DRILLING APPENDIXES

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GEOTECHNICAL REPORT ON
DREDGE DISPOSAL AREA C
CARRAIZO RESERVOIR DREDGING PROJECT
GURABO, PUERTO RICO

1.0 INTRODUCTION

This report presents the results of the geotechnical investigation performed at the dredge disposal area **"C"** (hereafter named **Dike C**) which has been used as disposal sites for dredged material from the Carraizo reservoir. **Dike C** is located at the town of Gurabo, at the site presented in **Figure 1**.

The subsoil exploration and geotechnical consulting services were commissioned by **CSA Group and GLM Engineering Group**, following the terms and conditions stated in our approved proposals.

The original objective of the exploration was to determine the capacity of Dike C to receive sediment in connection with the new dredging plan of the Carraizo reservoir, with the possibility of increasing the height of the present levees. In recent conversations with **Eng. Gregory Morris**, from **GLM**, we were informed that the plan considers new dredge deposition up to top-of-levee elevation, minus a marginal free board.

In view of this approach, our field investigation and geotechnical analyses were geared to provide information regarding soil type and strength parameters (cohesion and internal friction angle) of the existing sediments and levee material. Using this information, global stability analyses were conducted to determine the factor of safety of the levees under the increased dredge height.

2.0 GENERAL PROJECT DESCRIPTION AND BACKGROUND INFORMATION

About 2 decades ago, dredging contractor Weeks Marine was contracted by the Puerto Rico Aqueduct and Sewer Authority to dredge six million cubic meters of sediment from the Carraízo reservoir. The disposal of the dredged sediment required Weeks Marine to design and build 3 confined disposal areas which had combined capacity of seven million cubic meters. The construction of the disposal areas included excavating and compacting two million cubic meters of soil into levees as high as 17 meters.



Figure 1. **Location of Dike C.**

3.0 WORK PERFORMED

The combined work requested by CSA and GLM consisted of eleven SPT borings at the top of the perimeter levees, 2 SPT borings from the top of the interior (divider) levee, 3 SPT borings and 4 CPT's inside the containment area and 34 soil classification tests.



Figure 2. **Boring and CPT locations.**

The SPT borings were performed using the Power Auger Method. Borings were located at the field using hand-held GSP and their elevation were inferred from the topographic plan provided to us by CSA. Table #1 shows this information.

Soil samples were secured at vertical intervals not exceeding five (5) feet by means of a 1.375" I.D. Split Spoon Sampler according to ASTM Designation D-586 and/or D-1452. As part of the work, Unconfined Compressive Strength Tests were performed on clayey samples while Natural Moisture Contents were performed on all collected samples. Results of the comprehensive laboratory program are included in Appendix **"Laboratory Results"** enclosed at the back of this report.

A Vertek Model digital CPT probe equipped with tip, sleeve, pore pressure sensors and modules for dual axis inclination was used for the Cone Penetration Tests. The system is able to store unlimited data points for each test, which are then saved to a disk to ensure data integrity. Measurements are also plotted in real time on the computer screen during the push, providing immediate geotechnical data.

TABLE 1; Boring Coordinates and Inferred Elevations

Boring I.D.	Latitude	Longitude	Elevation(m)*
C-1	18.261944°	-65.950304°	71.75
C-2	18.260700°	-65.950913°	71.72
C-3	18.260868°	-65.952346°	71.74
C-4	18.262884°	-65.953461°	65.50
C-5	18.262498°	-65.955065°	71.69
C-6	18.263170°	-65.957627°	72.46
C-7	18.264746°	-65.958501°	71.70
C-8	18.266444°	-65.957538°	71.73
C-9	18.266516°	-65.955676°	71.80
C-10	18.266009°	-65.953214°	72.30
C-11	18.264584°	-65.952658°	65.00
C-12	18.263406°	-65.951356°	72.00
C-13	18.261795°	-65.952096°	62.75
C-14	18.264585°	-65.954506°	63.20
C-17	18.263845°	-65.953186°	64.50
C-18	18.263947°	-65.958137°	69.50
CPT-CA	18.265373°	-65.956637°	63.31
CPT-CB	18.264476°	-65.957465°	64.70
CPT-CC	18.264731°	-65.954450°	63.15
CPT-CD	18.261910°	-65.952300°	62.70

***Elevations inferred from the topographic information provided to us.**

Boring designations C-15 and C-16 were intentionally not used.

4.0 GENERAL SITE GEOLOGY

Based on the U.S.G.S. Geological Maps of the Aguas Buenas and Gurabo Quadrangles, Dike C appears to be entirely located over **Qa** and **Qt** deposits. These consist of alluvial sand, gravel, silt and clay in flood plains. **Figure 3** presents portion of the aforementioned Geologic Quadrangle that shows the boundaries of the above listed geologic unit.

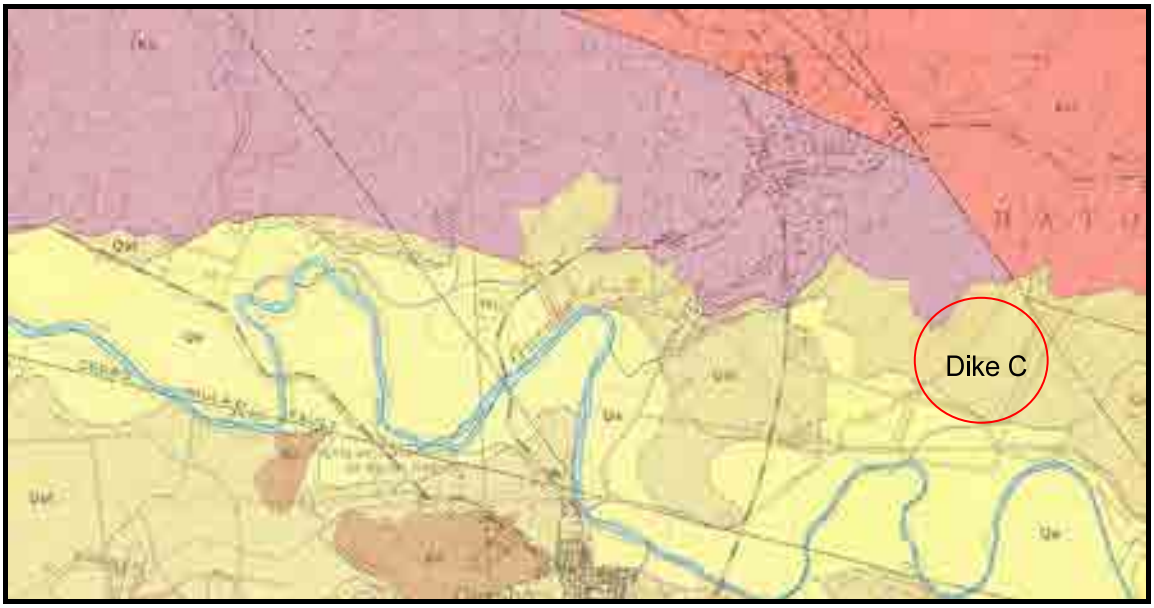

Figure 3. **Geologic setting.**

5.0 GEOTECHNICAL SUBSOIL CONDITIONS

5.1 Soil Composition of Levees

Borings C-1 to C-12 and C-17 were drilled from the top of the perimeter and interior levees in order to characterize their soil composition. The levees that make up the containment site C are made of stiff consistency, relatively well compacted yellowish-brown and brown silty to sandy clay, sandy silt and silty sand in variable proportions. The fill material comprising the levees extends to depths between 40 and 50 ft, depending on the boring location. The fill material shows AASHTO Soil Classification A-6 and A-7-6.

Standard Penetration Tests (SPT) resulted with N-values between 17 and 45 blows per foot, 23 bpf on average. The natural moisture content of this material varies mostly from 8 to 36 percent, while the unconfined compressive strength is in the order of 2 to 4.5 tons per square foot.

The native soils appear at depth between 40 and 50 ft measures from the top of the levees (boring dependent). Yellowish-brown, brown and gray are the most common hues in the medium to hard silty/sandy clay (AASHTO A-7-6). The N-values recorded by the SPT vary from 19 to 39 blows per foot, but most N-values fall in the 25 bpf range. Natural moisture contents range from 10 to 26 percent and unconfined compressive strengths from 2.0 to 4.0 tsf.

5.2 Dredge Material

Borings C-13, C-14 and C-18 where located inside the containment area with the intent of sampling the dredged material. These borings show the presence of 23 ft of dredged fill made mostly of soft, normally consolidated, fat to lean clay and plastic silt with variable sand content (AASTHO A-7-5, A-7-6 and A-6). At boring locations, the soft/loose sediments are capped by firm, desiccated material that shows medium consistency and a higher over-consolidation ratio ($2<OCR<3$). The thickness of this cap varies from 3 to 5 feet.

Standard Penetration Tests in the soft dredged material resulted with N-values between 1 (weight of hammer) to 5 blows per foot. Most unconfined compressive strength obtained qu values of 0.5 tsf, consistent with the soft consistency noted from the samples. Natural moisture contents in the dredge material range from 35% to 71% in the soft elastic silt and clay.

Atterberg Limits in the dredge material reveal LL between 39% and 69%, 60% on average. Values of PL average 27%. Grain Size Analyses disclosed fine contents in the range of 76% and 96%. The USCS for this material corresponds to CL and CH.

5.3 CPT Results

The implementation of the CPT allowed the refinement of the stratigraphy and strength parameters of the dredge material and the underlaying native soils. Detailed tabulated data is included as an Appendix to this report.

The CPT data was used to classify the soil, using the friction ratio between the cone sleeve and point. Using the guidelines presented by Robertson (1986), it was found that the dredge material should behave like low to high plasticity clay. This agrees with the visual descriptions of SPT samples and AASTHO soil classifications previously discussed in this report.

Making reference to CPT CC data between 7 and 17 feet deep, it can be seen that the average uncorrected tip stress value (**qc**) in the normally consolidated dredge corresponds to 0.9 tsf. The resulting undrained shear strength (**su**) vary mostly between 0.08 and 0.15 tsf. In terms of strength parameters, CPT data shows effective stress friction angles of 23° and 32°, 27° on average.

A distinctive change in su values occurs at 23 ft deep, where the uncorrected tip stress increases to 34 tsf and above. This sharp change marks the bottom of the dredge column and the beginning of more competent native soils. Complete tabulated data for this and other CPT's is included at the end of this report.

5.4 Groundwater

Observations on the groundwater table level were performed after drilling completion. The following table shows the groundwater table level as recorded from the borings.

TABLE 2; Summary of Water Levels

Boring I.D.	Depth to Groundwater (ft)
C-1	Not observed
C-2	Not observed
C-3	Not observed
C-4	Not observed
C-5	Not observed
C-6	Not observed
C-7	Not observed
C-8	Not observed
C-9	Not observed

Boring I.D.	Depth to Groundwater (ft)
C-10	Not observed
C-11	Not observed
C-12	Not observed
C-13	1.0 ft
C-14	1.5 ft
C-17	Not observed
C-18	Not observed

6.0 SHEAR STRENGTH PARAMETERS AND LAB TESTS

The main input for slope stability analysis are slope geometry, possible or potential location of the failure surface, magnitude of pore-water pressures, unit weight of materials involved, and shear strength of the materials that intersect the failure surface. For the latter, a drained or undrained shear strength may be applicable for the materials that intersect the failure surface depending on the hydraulic conductivity of the materials and rate of loading involved. For instance, if the loading (or failure rate) is slow enough that pore-water pressures do not develop, drained or effective shear strength parameters shall be employed.

For the case of drained (effective) shear strength parameters, two conditions can be considered; Residual and Fully Softened. The residual shear strength of cohesive soils is applicable to new and existing slopes that contain a pre-existing shear surface. Typical cases are old landslides, bedding shears in folded strata, in sheared joints of faults, and after an embankment failure (Skempton, 1985). An effective stress analysis is usually applicable in these cases and thus drained shear strength parameters should be used (**φr, C=0**).

On the other hand, the fully softened condition corresponds to the condition after which the over-consolidated clay has absorbed as much water as it desires and has reached equilibrium at a particular site. The softening of an oveconsolidated clay reduces the effective stress cohesion component of the Mohr-Coulomb shear stress parameters but does not cause orientation of clay particles or a reduction in the friction angle (Skempton 1970). This condition is numerically equal to the drained peak strength of a normally consolidated specimen (**φp, C=0**). Skempton (1977), concludes that slopes that have not undergone previous sliding can be analyzed using a fully softened shear strength.

Figure 4 presents empirical relationships between the drained, fully softened, peak friction angle (**φp**) and liquid limit, clay-size fraction and effective normal stresses of 1, 2 and 8.3 ksf (50, 100 and 400 kPa). These relationships, presented by Stark, Choi and McCone (2005), have the benefit of considering the effect of clay-size fraction and effective stresses, contrary to previous correlations presented by Bjerrum and Simons (1960), NAVFAC (1982), and Mesri and Abdel-Ghaffar (1993).

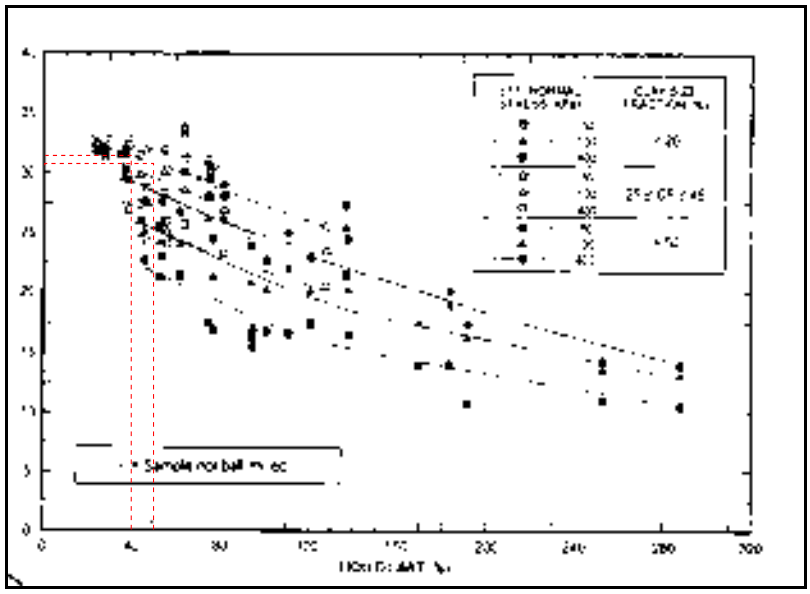

Figure 4. Secant fully softened friction angle relationship between LL, clay fraction and σ' (after Stark, Choi and McCone, 2005).

As part of the exploration several soil samples were subjected to laboratories that included Atterberg Limits and Grain Size Distribution analyses. Appendix **"Laboratory Test Results"** contains all laboratory results.

For evaluating the scenario of increased dredge height in Dike C, the fully softened shear strength should be considered (**φp, C=0**). It is known that most of the material comprising the levees classify as A-6 and A-7-6. Most liquid limits and plastic limits for these materials resulted in 40% and 20%, respectively. Accordingly, an empirical friction angle in the order of 32 degrees can be assigned to the levee material. Levee composition is far from homogeneous, and there are sporadic lenses of sandier materials showing higher strength parameters. Most of the soil matrix, however, consists of silt and clay in different proportions. That considered, a friction angle of 32 degrees and a nominal cohesion intercept of 100 psf can be assigned to the levee soil matrix for slope stability analyses.

7.0 SLOPE STABILITY ANALYSIS

The stability analyses were performed by using Morgenstern-Price slope stability methods of slices for circular, non-circular and combined sliding surfaces. Topographic cross sections provided by CSA were used to prepare slope stability models.

Generally speaking and under a limit equilibrium slope stability evaluation a safety factor can be defined as the ratio of the **"forces trying to prevent failure (F.P.)"** divided by the **"forces trying to induce failure (F.I.)"**.

The following conditions may occur:

F.P./F.I. > 1.0	**The slope is considered stable (usually 1.5 minimum for long term static stability and 1.1 under seismic loads).**
F.P./F.I. = 1	**Failure is forthcoming.**
F.P./F.I. < 1	**Failure has occurred, non-equilibrium conditions exist (mass is undergoing movement).**

For the assessment of potential consequences of slope instability under seismic loads, it is customary to use 50% of the peak ground acceleration adjusted for site class effects. The site-modified peak ground acceleration $\mathbf{PGA_M}$, is calculated as follows:

$$\mathbf{PGA_M = F_{PGA} \cdot PGA}$$

$\mathbf{PGA_M}$ = MCE_G peak ground acceleration adjusted for site class effects.

PGA = Mapped MCE_G peak ground acceleration.

FPG = Site coefficient.

For this site the following values should be used:

TABLE 3

Seismic Parameters for Soil Class D		
PGA	F_{PGA}	PGA_M
0.384	1.216	0.467

7.1 Static and Pseudo-Static Analyses

Static and Pseudo-static stability analyses were performed using horizontal accelerations of zero (0) and 50% of PGA_m, respectively. For the later, the seismic response of the levee is performed by adding a permanent body force representing the earthquake shaking to the static limit-equilibrium analysis.

Figures 5 and **6** correspond to the limit equilibrium model on Cross Section AA for static and pseudo-static conditions (**a=0.23g**). Graphic results for other cross sections are included at the end of report. The location of these cross sections are presented in **Figure 7**.

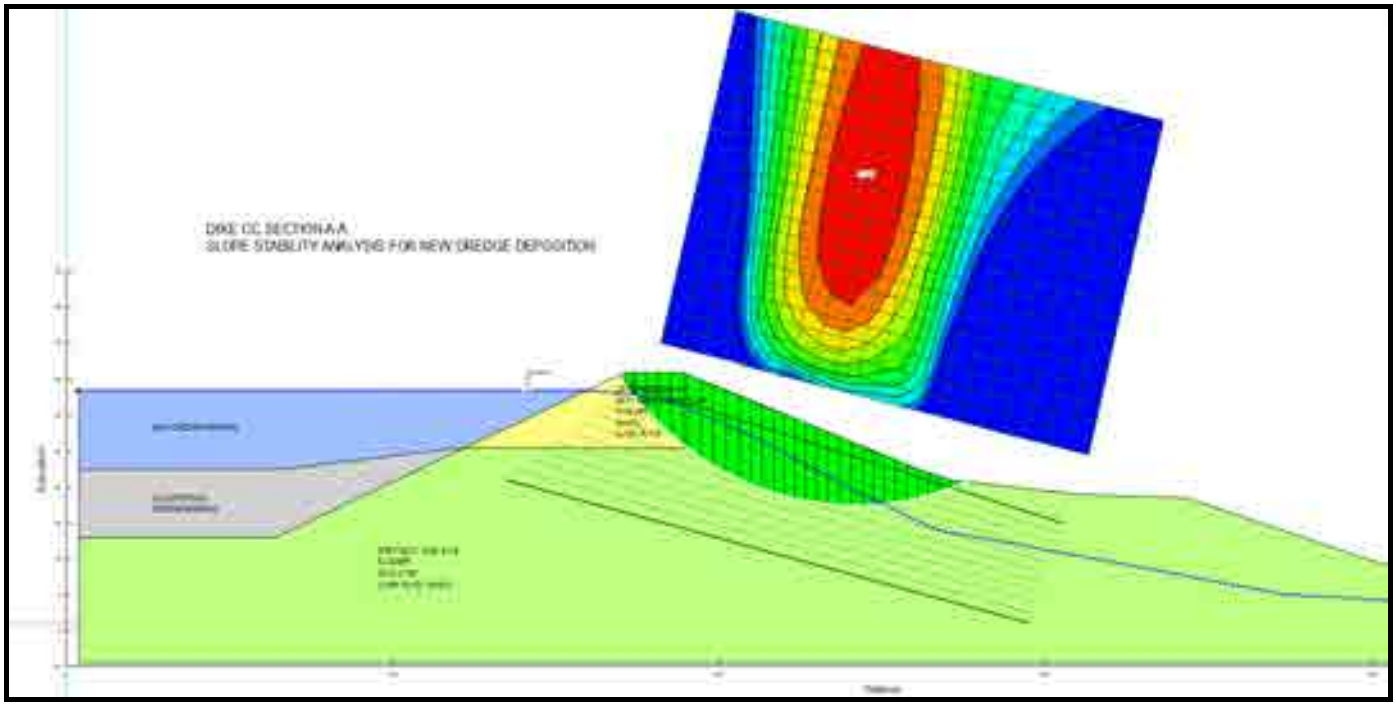

Figure 5. Global stability results for additional dredge material up to 5 ft below existing top of levee (FS=1.7 static).

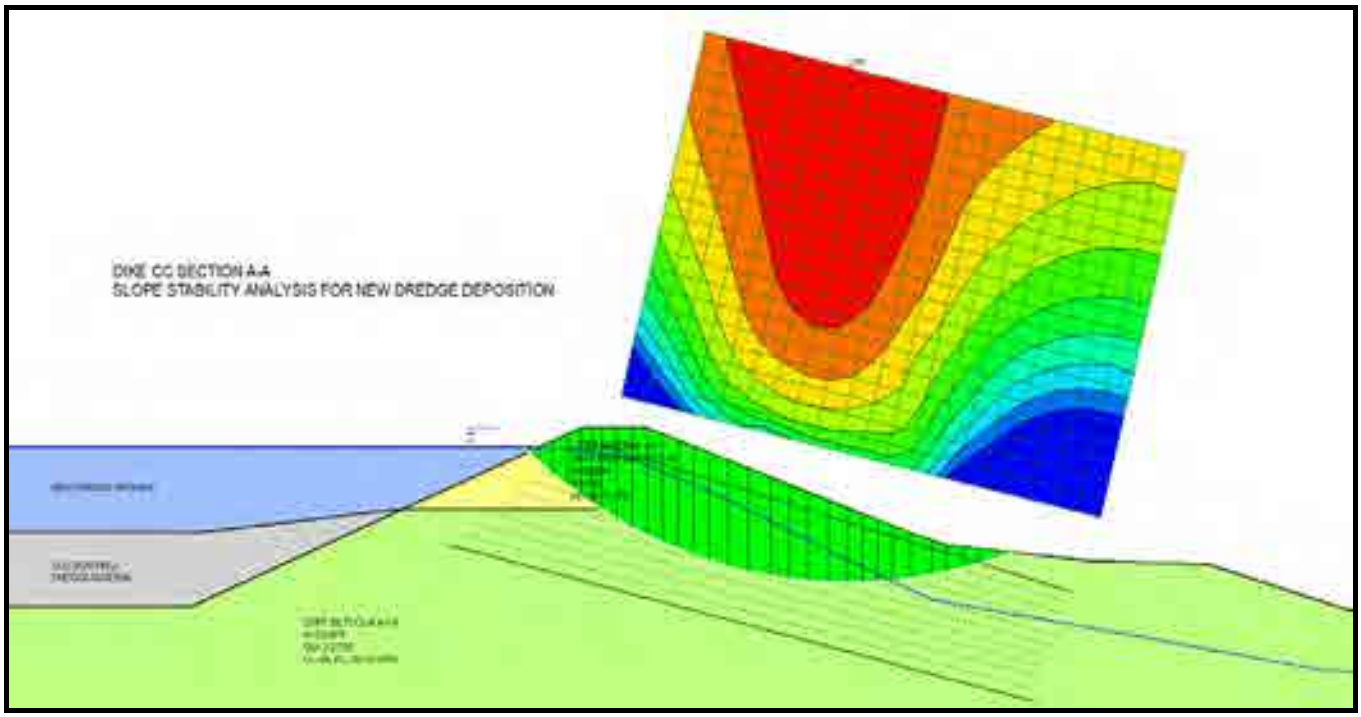

Figure 6. Global stability results for additional dredge material with 5 ft of freeboard to top of levee (FS=0.96 pseudo-static)

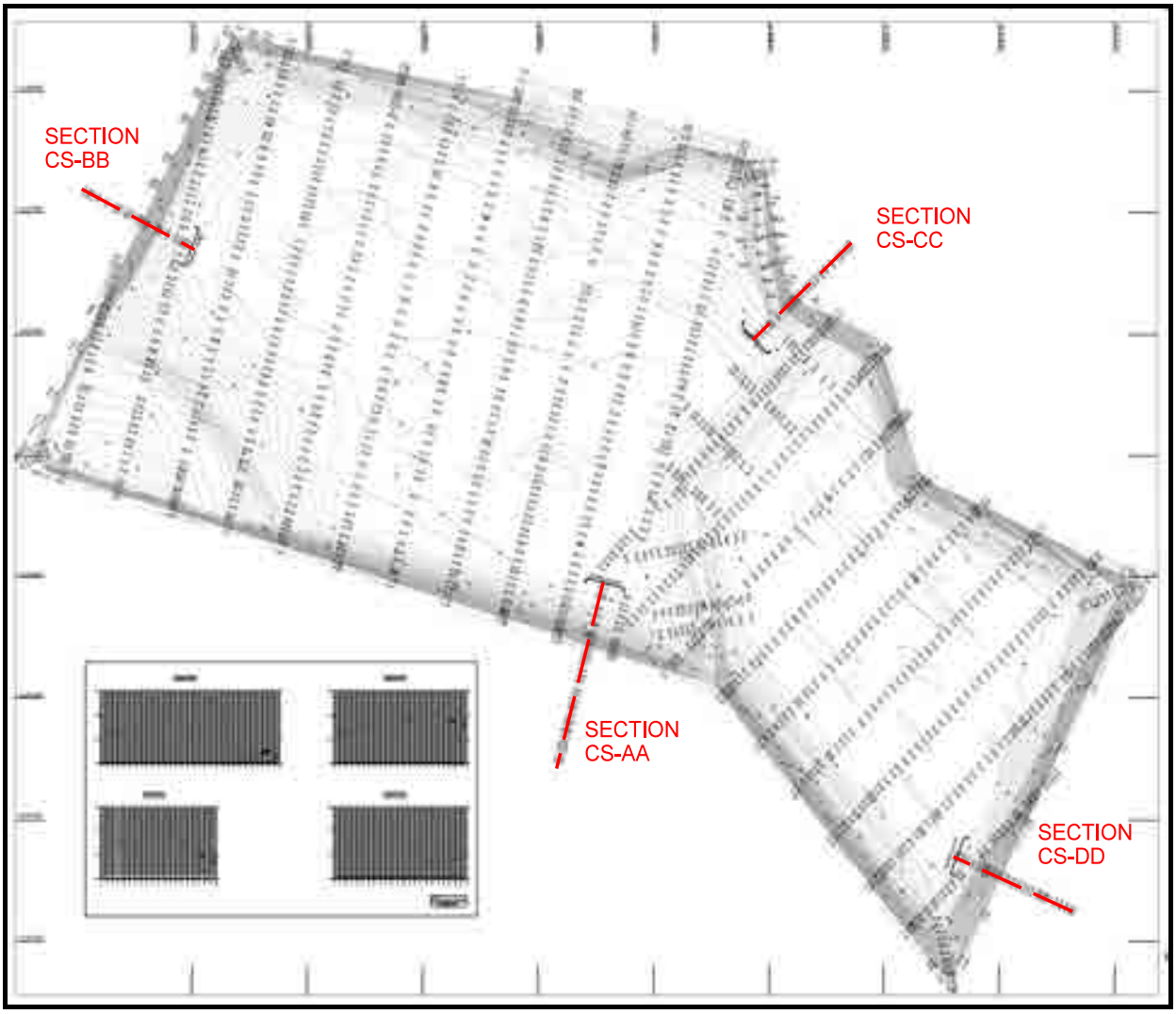

Figure 7. Location and identification of cross sections for slope stability analyses.

Figure 5 shows the results of static analysis in cross section A-A, for new dredge material with 5 feet of freeboard (i.e., new dredge surface located at 5 ft below top of levee). The analysis shows factor of safety equal to 1.7 meaning adequate conditions. **However, it can be observed from Figure 6 that pseudo-static analyses under seismic acceleration of 0.23g resulted with safety factors lower than 1.1.** Similar results were obtained from slope stability analyses in cross sections B-B and D-D as shown in the appendix **"Slope Stability Analysis"** at the end of this report.

In view of this finding, we proceeded to re-run the model allowing a freeboard of 10 ft, that is, dredge surface located 10 ft lower than top of levee. For this conditions the factor of safety for seismic conditions resulted adequate (FS=1.1). Refer to **Figure 8**. Similar conclusions were also drawn from slope stability analyses in cross sections B-B and D-D.

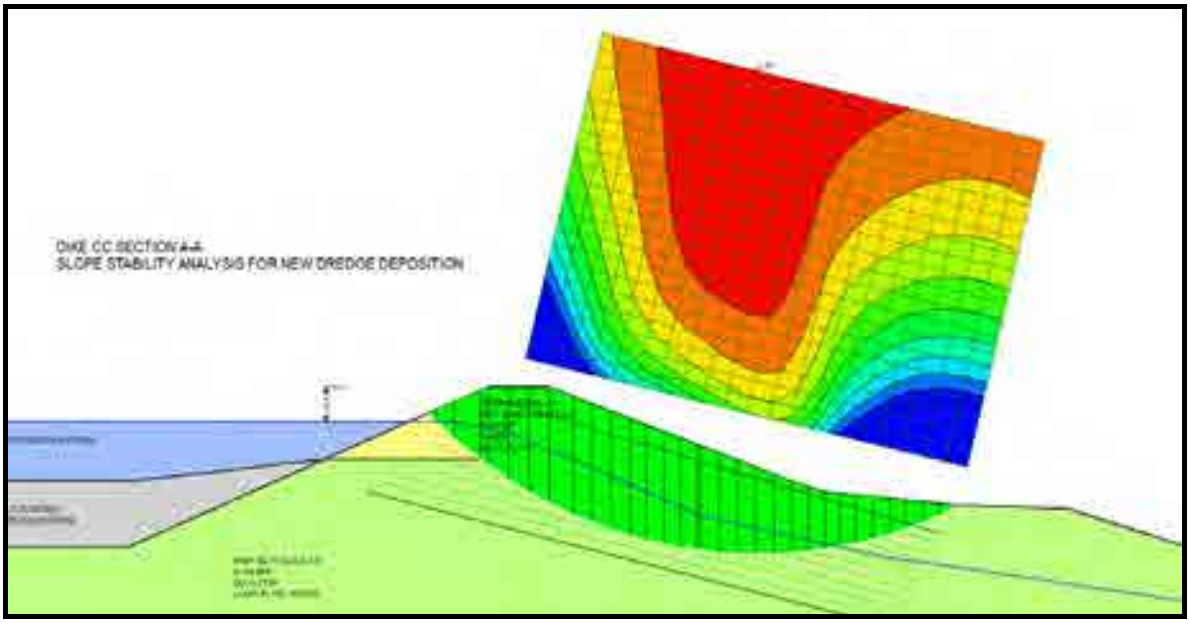

Figure 8. Global stability results for additional dredge material allowing 10 ft of freeboard to top of levee (FS=1.1 pseudo-static).

7.2 Rapid Drawdown Analysis

Stability analysis during rapid drawdown is an important consideration when assessing levee performance. The stabilizing effect of the water on the interior face of the levee is lost during rapid drawdown, but the pore-water pressures within the embankment may remain high. As a result, the stability of the interior face of the levee can be greatly reduced.

The dissipation of pore-water pressure in the levee is largely influenced by the permeability and storage characteristics of the fill material. Highly permeable materials drain quickly during rapid drawdown, but low permeability materials like those found in these levees take a long time to drain.

Figure 9 shows the results of static analysis in cross section A-A, for rapid drawdown conditions. For a freeboard of 10 ft, the analysis shows factor of safety equal to 2.7 meaning adequate conditions during rapid drawdown.

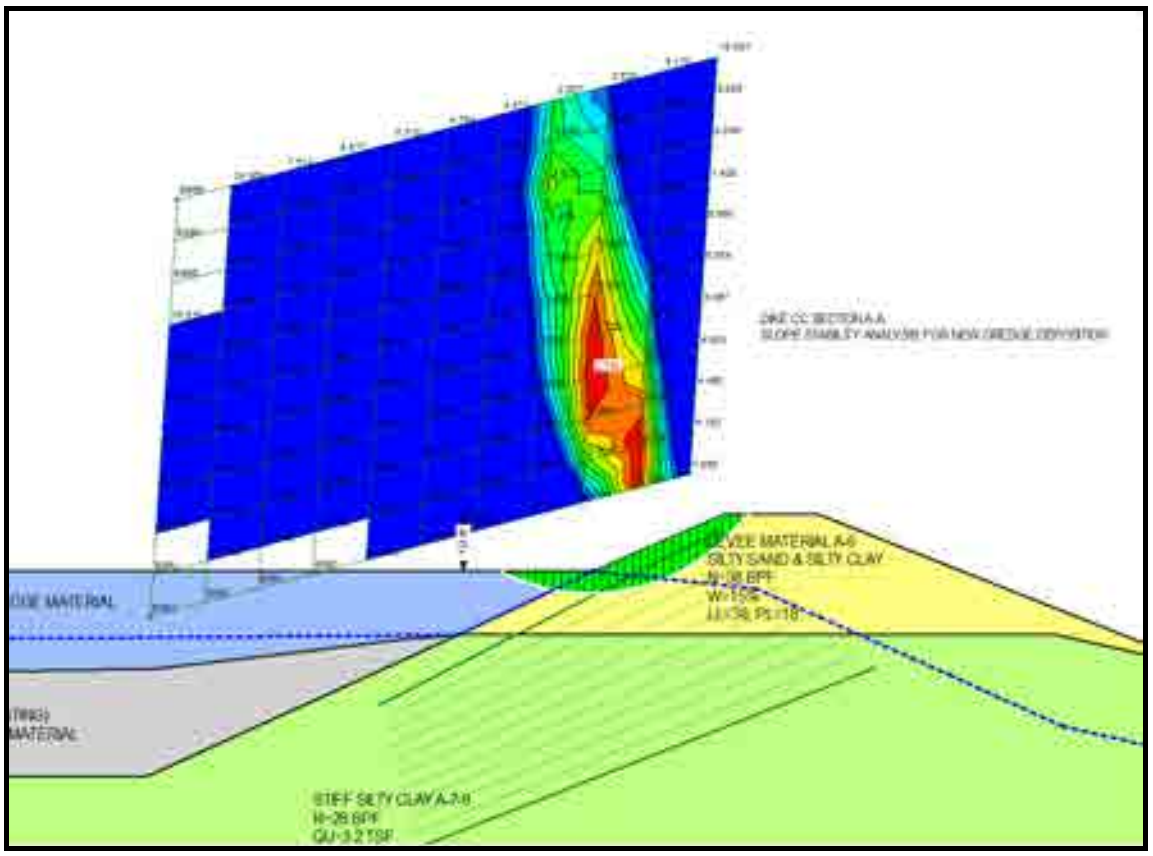

Figure 9. **Slope stability analysis results for rapid drawdown conditions (F.S.=2.7)**.

8.0 CONCLUSIONS

Thru slope stability analyses, we have assessed levee performance under static and pseudo-static conditions. In summary, the analysis show that the factor of safety for static, pseudostatic and rapid drawdown conditions should be adequate if a freeboard of 10 ft is allowed. The results also shown that the stability of the levees could be jeopardized during strong earthquake motions, if the freeboard is less than 10 feet.

Based on the topographic information provided to us, top of levee elevation varies from 71.7m to 72.4m, approximately. Considering the need for 10 feet of freeboard, we recommend to limit new dredge deposition to elevation 68.7m. Filling Dike C to an elevation higher than 68.7m could result in inadequate safety factors for seismic accelerations of 0.23g and greater.

9.0 RECOMMENDED MONITORING PROGRAM

Additional placement of dredge material inside Dike C must be accompanied by the monitoring of slope performance and groundwater fluctuations. This monitoring program must be implemented and observed during dredge deposition and up to 12 months after completion. Eleven monitoring stations are necessary to cover the approximately 1.7 miles (2,720m) of levee. The recommended location of these 11 monitoring stations are presented in **Figure 10**.



Figure 10. Slope inclinometers required during and after dredge deposition.

In each station, one inclinometer to a depth of 70 ft and one observation well to a depth of 50 ft are necessary. Instruments shall be read weekly during dredge deposition and monthly during one year after project completion. The data collected by inclinometers and observation wells shall be evaluated by the Geotechnical Engineer who shall provide, if necessary, additional recommendations.

10.0 LIMITATIONS OF REPORT

The final and comprehensive design for the new dredge deposition will undoubtedly require the participation of this office as Geotechnical Consultants. Suelos, PSC. shall be able to install and evaluate the monitoring program recommended herein. Therefore, the Geotechnical Engineer must be involved during dredge deposition works to monitor the field instrumentation and present additional recommendations as needed.

11.0 GENERAL COMMENTS

The observance or supervision of new dredge deposition over weak deposits is, in general, is a very delicate matter. In some cases this service is not rendered by the Soils Engineer who made the subsoil investigation. In a large number of projects fill and earthwork operations are successfully completed due to the prevalence of ideal and uniform conditions and to the fact that they are being performed by a competent and responsible contractor. But there are cases, where the lack of proper techniques and the lack of adequate supervision has given rise to the occurrence of geotechnical problems and failures.

Conscious of the above exposed problem, we wish to state that the validity of our recommendations is subordinated to the observance and monitoring of new dredge deposition by us. If the contract is awarded to another experienced Soils Engineer, he shall receive a copy of this report, evaluate the same and adopt it as his own, or request additional soil data to verify our recommendations or modify them in accordance to his personal knowledge and judgement, thus assuming full responsibility for his recommendations and the report itself.

The above conclusions and recommendations are being based on a number of representative tests which we consider appropriate to enable us to prepare recommendations for the project. But the testing of every square meter of land to be occupied by the proposed four sites would be economically unfeasible and variations might be encountered in the soil profile, especially, at intermediate areas between boreholes. These variations shall be evaluated by the project geotechnical engineer to provide the corresponding solution. The standard procedures followed during the drilling of the test borings are discussed in detail in the Appendix to this soil report.

This report has been prepared taking into consideration the design factors presently known to us. The project designers shall be alert of any item that might have been overlooked, that could require clarification or that may need additional recommendations to those discussed herein.

Respectfully submitted,



IVAN JACKSON MADURO, P.E., M.S.C.E., CWI
Partner

mgn
Reference No. 5068 Dike C.rep

APPENDIXES
DIKE C

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SLOPE STABILITY ANALYSIS

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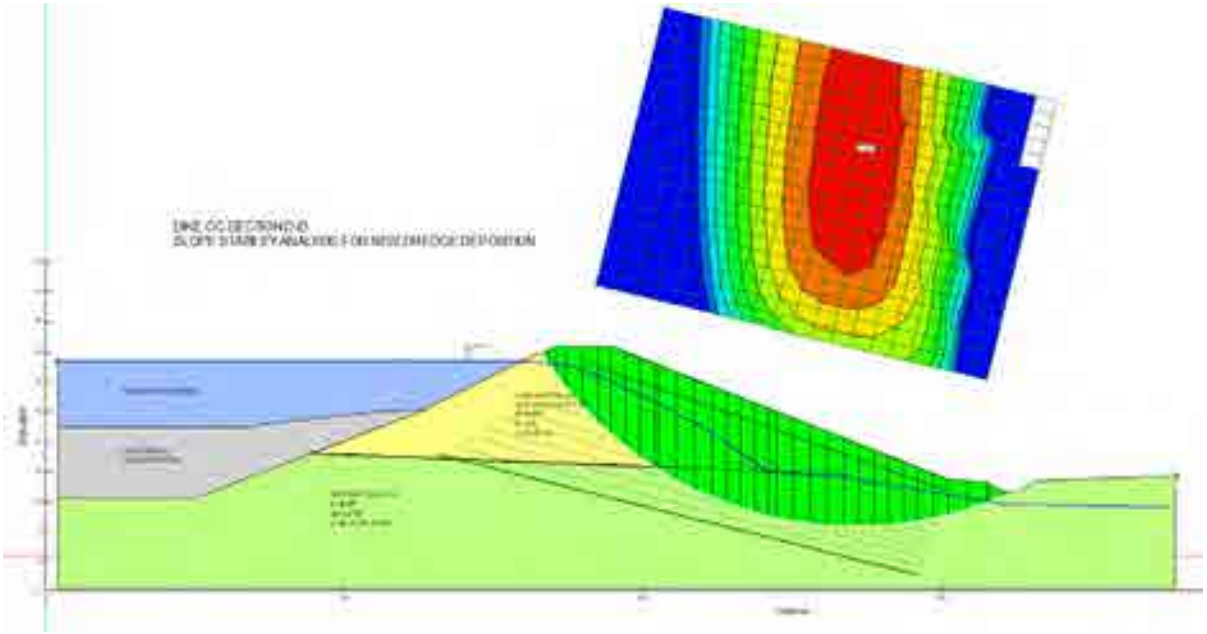
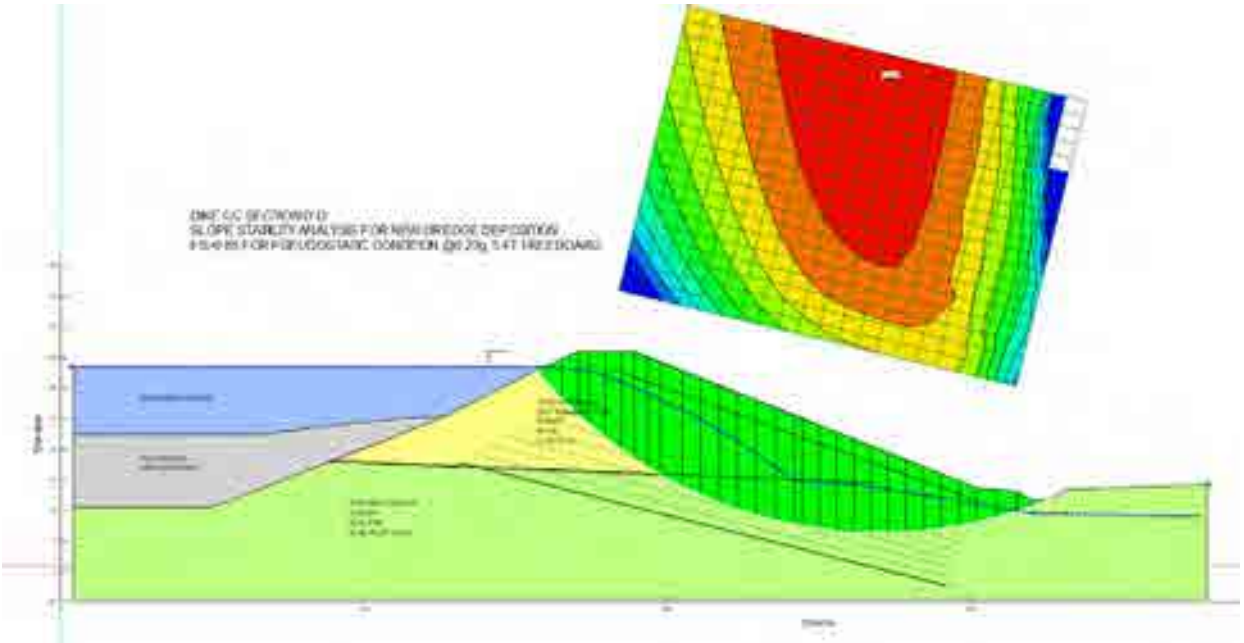


SECTION DD: STATIC, 5FT FREEBOARD, FS=1.5



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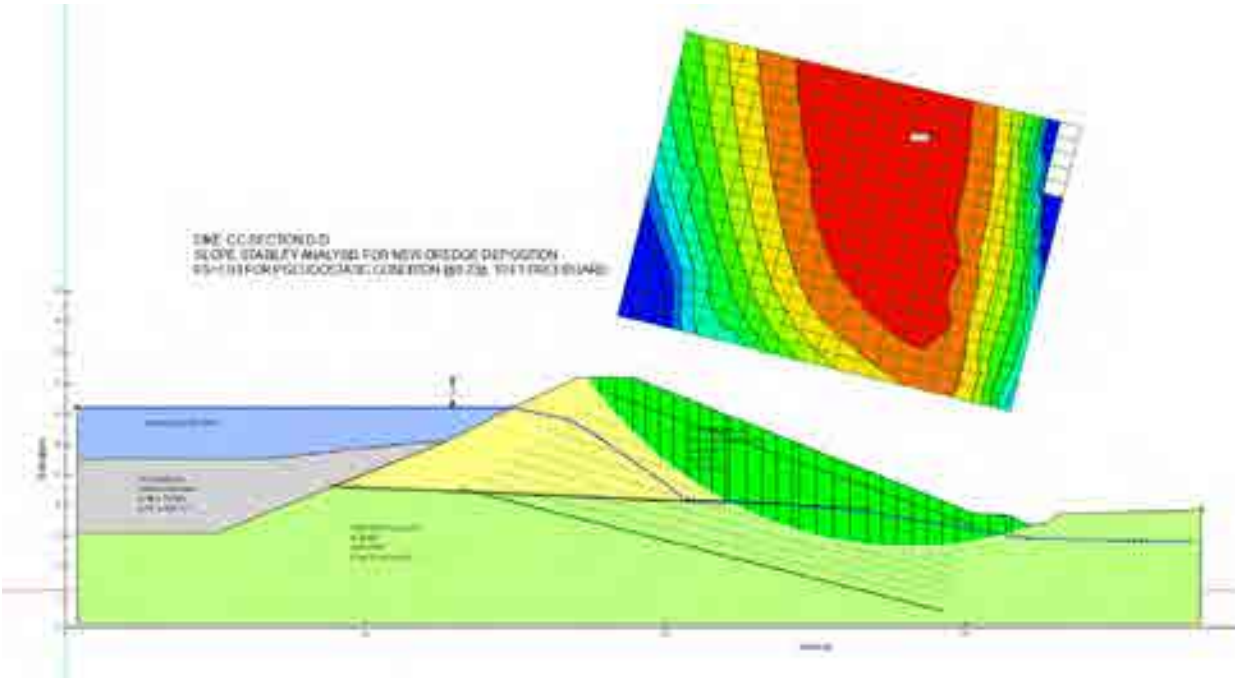
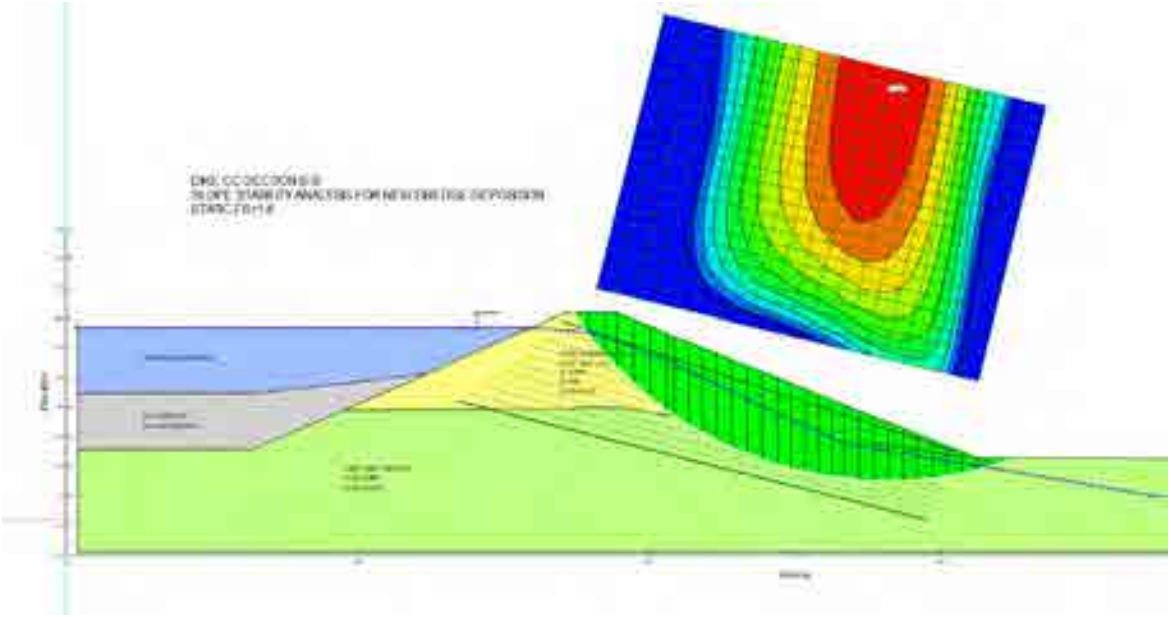
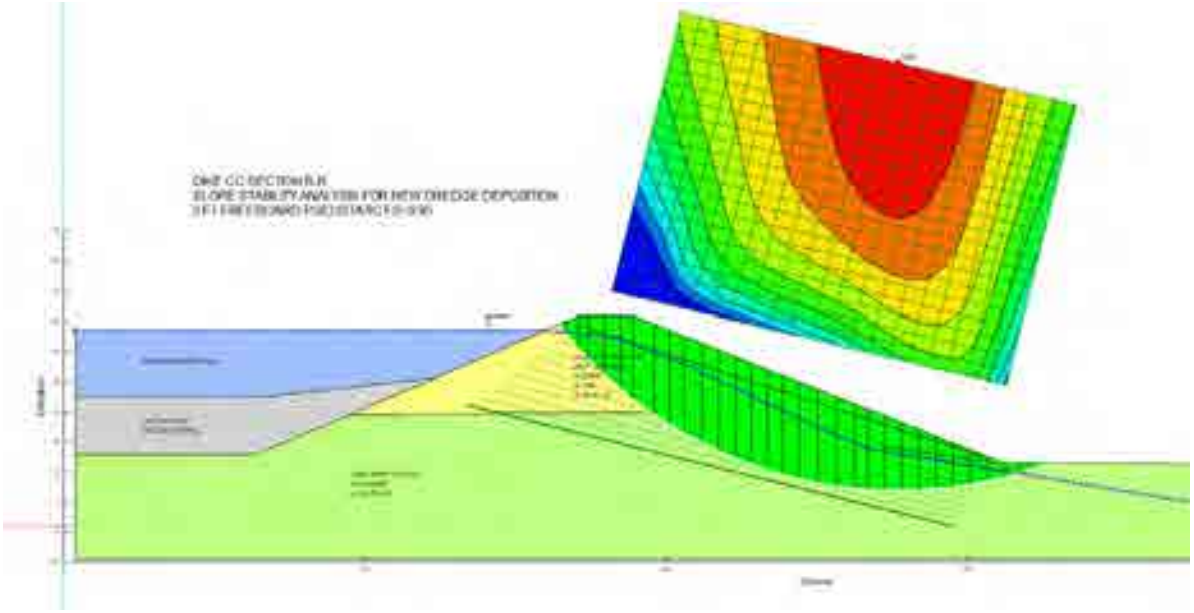


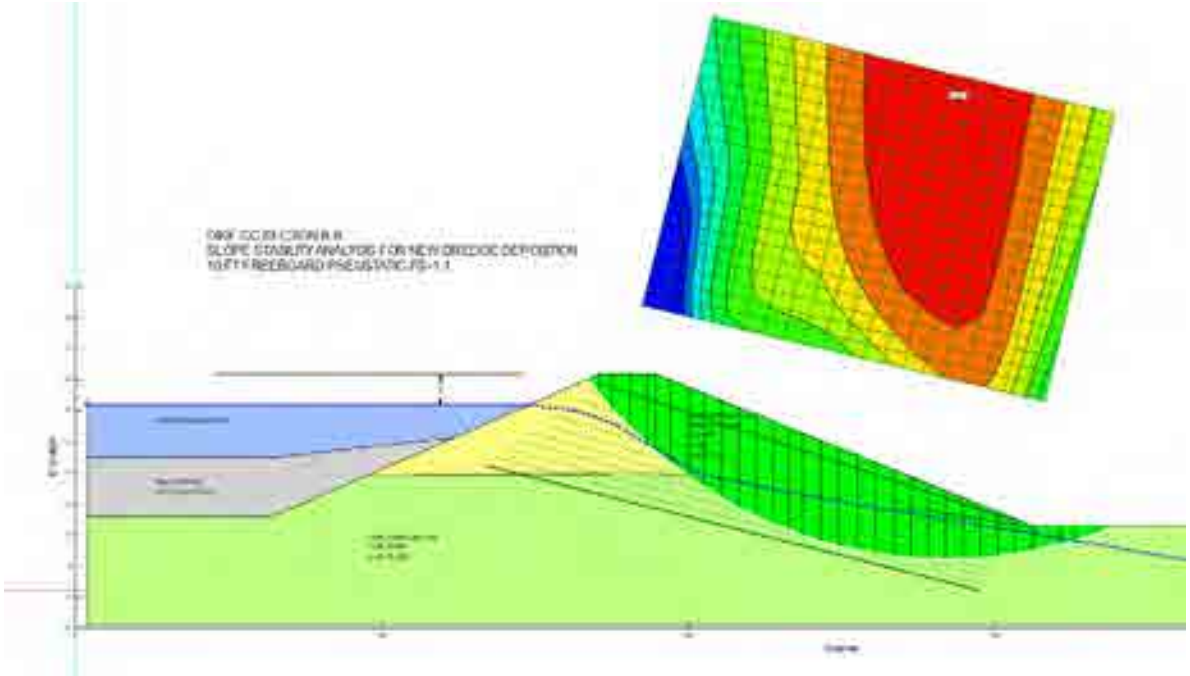
SECTION DD: PSEUDO-STATIC (0.23g), 10 FT FREEBOARD, FS=1.04



SECTION BB: STATIC, 5FT FREEBOARD, FS=1.6



SECTION BB: PSEUDO-STATIC (0.23g), 5 FT FREEBOARD, FS=0.95



SECTION BB: PSEUDO-STATIC (0.23g), 10 FT FREEBOARD, FS=1.1

CPT TABULATED RESULTS

Suelos, PSC
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Suelos, PSC.

Soil & Construction Materials Laboratory and Environmental Drilling Services

Test Id: CPT C A Date: 3-Nov-21
Site: DIKE C Cone Id: 3045.123xx
Location: Gurabo
Project: Diques Density 120 PCF
Operator | w: RTH | Nicolas

Depth (ft)	Sleeve Stress (tsf)	TIPStresUNC (tsf)	TIPStresCOR (tsf)	Ratio COR (%)	Pore Pressure (tsf)	Overburden (tsf)	Eff. Overburden (tsf)	SPT N60c (blows/ft)	Friction Angle (deg)	Su (tsf)	OCR ()	FC (%)
0	0	0	0	0	0	0.00E+00	0.00E+00	-99	0	0	-99	-99
0.13942	0	8.53	8.55	0	0.11	8.37E-03	4.02E-03	7	-99	-7.13	34.46	-99
0.21332	0	8.65	8.68	0	0.13	1.28E-02	6.14E-03	7	-99	-7.13	23.3	-99
0.28791	0.4598	7.77	7.81	5.89	0.152	1.73E-02	8.29E-03	13	50.87	-7.13	18.91	81.06
0.35971	0.4574	7.15	7.18	6.373	0.149	2.16E-02	1.04E-02	12	49.69	-7.13	13.04	85.24
0.43152	0.4483	6.52	6.55	6.848	0.127	2.59E-02	1.24E-02	11	48.58	-7.13	7.59	89.65
0.50262	0.4426	6.02	6.04	7.325	0.117	3.02E-02	1.45E-02	10	47.6	-7.13	5.22	93.74
0.57582	0.434	5.64	5.66	7.663	0.097	3.46E-02	1.66E-02	10	46.73	-7.13	3.05	96.91
0.64901	0.4158	5.02	5.03	8.261	0.088	3.89E-02	1.87E-02	-99	45.65	-7.13	2.04	-99
0.72012	0.4035	4.51	4.53	8.906	0.078	4.32E-02	2.07E-02	-99	44.66	-7.13	1.34	-99
0.79192	0.3837	3.89	3.9	9.841	0.059	4.75E-02	2.28E-02	-99	43.47	-7.13	0.58	-99
0.86303	0.3607	3.26	3.27	11.031	0.049	5.18E-02	2.49E-02	-99	42.14	-7.13	0.28	-99
0.93553	0.3342	3.01	3.02	11.078	0.036	5.61E-02	2.69E-02	-99	41.29	-7.13	0.05	-99
1.00524	0.3113	2.76	2.77	11.255	0.036	6.03E-02	2.90E-02	-99	40.43	-7.13	0.02	-99
1.07495	0.2942	2.26	2.26	12.996	0.033	6.45E-02	3.10E-02	-99	38.93	-7.13	-99	-99
1.14606	0.2857	2.13	2.14	13.366	0.026	6.88E-02	3.30E-02	-99	38.23	-7.13	-99	-99
1.21646	0.2808	2.13	2.14	13.143	0.023	7.30E-02	3.50E-02	-99	-99	0.14	-99	-99
1.28757	0.2725	2.26	2.26	12.049	0.02	7.73E-02	3.71E-02	-99	-99	0.15	-99	-99
1.35798	0.2696	2.13	2.14	12.618	0.023	8.15E-02	3.91E-02	-99	-99	0.14	-99	-99
1.42629	0.2683	2.13	2.14	12.562	0.02	8.56E-02	4.11E-02	-99	-99	0.14	-99	-99
1.4967	0.264	2.01	2.01	13.127	0.023	8.98E-02	4.31E-02	-99	-99	0.13	-99	-99
1.56572	0.2635	2.01	2.01	13.106	0.02	9.39E-02	4.51E-02	-99	-99	0.13	-99	-99
1.63543	0.2626	1.76	1.76	14.937	0.013	9.81E-02	4.71E-02	-99	-99	0.11	-99	-99
1.70444	0.264	1.63	1.63	16.175	0.01	1.02E-01	4.91E-02	-99	-99	0.1	-99	-99
1.77415	0.2626	1.51	1.51	17.442	0	1.06E-01	5.11E-02	-99	-99	0.09	-99	-99
1.84108	0.2541	1.38	1.38	18.426	-0.003	1.11E-01	5.30E-02	-99	-99	-7.13	-99	-99
1.91079	0.2456	1.13	1.13	21.791	-0.009	1.15E-01	5.50E-02	-99	-99	-7.13	-99	-99
1.9812	0.2343	1	1	23.418	-0.013	1.19E-01	5.71E-02	-99	-99	-7.13	-99	-99
2.05649	0.2221	0.75	0.75	29.651	-0.016	1.23E-01	5.92E-02	-99	-99	-7.13	-99	-99
2.13038	0.2115	0.63	0.62	33.887	-0.016	1.28E-01	6.14E-02	-99	-99	-7.13	-99	-99
2.20636	0.2047	0.5	0.5	40.992	-0.013	1.32E-01	6.35E-02	-99	-99	-7.13	-99	-99
2.28793	0.2024	0.13	0.12	166.447	-0.019	1.37E-01	6.59E-02	-99	-99	-7.13	-99	-99
2.36809	0.198	-0.13	-0.13	-153.085	-0.019	1.42E-01	6.82E-02	-99	-99	-7.13	-99	-99
2.44966	0.1889	-0.5	-0.51	-37.39	-0.019	1.47E-01	7.06E-02	-99	-99	-7.13	-99	-99
2.5347	0.1805	-0.5	-0.51	-35.586	-0.029	1.52E-01	7.30E-02	-99	-99	-7.13	-99	-99
2.62463	0.1706	-0.63	-0.63	-26.969	-0.029	1.58E-01	7.56E-02	-99	-99	-7.13	-99	-99
2.71944	0.1622	-0.5	-0.51	-31.973	-0.029	1.63E-01	7.83E-02	-99	-99	-7.13	-99	-99
2.81564	0.1523	-0.63	-0.63	-24.117	-0.022	1.69E-01	8.11E-02	-99	-99	-7.13	-99	-99
2.91742	0.1419	-0.75	-0.76	-18.745	-0.022	1.75E-01	8.40E-02	-99	-99	-7.13	-99	-99
3.02199	0.1378	-0.75	-0.76	-18.203	-0.022	1.81E-01	8.70E-02	-99	-99	-7.13	-99	-99
3.12934	0.1371	-0.88	-0.88	-15.542	-0.022	1.88E-01	9.01E-02	-99	-99	-7.13	-99	-99
3.23949	0.1344	-1	-1.01	-13.335	-0.026	1.94E-01	9.33E-02	-99	-99	-7.13	-99	-99
3.35521	0.13	-1.13	-1.13	-11.467	-0.026	2.01E-01	9.66E-02	-99	-99	-7.13	-99	-99
3.47372	0.1245	-1.25	-1.26	-9.904	-0.019	2.08E-01	1.00E-01	-99	-99	-7.13	-99	-99
3.59571	0.1211	-1.38	-1.38	-8.759	-0.019	2.16E-01	1.04E-01	-99	-99	-7.13	-99	-99
3.72259	0.1217	-1.63	-1.63	-7.476	0.013	2.23E-01	1.07E-01	-99	-99	-7.13	-99	-99
3.85155	0.0975	-2.01	-2	-4.878	0.033	2.31E-01	1.11E-01	-99	-99	-7.13	-99	-99
3.9847	0.0758	-2.38	-2.37	-3.206	0.084	2.39E-01	1.15E-01	-99	-99	-7.13	-99	-99
4.11994	0.0564	-2.38	-2.36	-2.385	0.091	2.47E-01	1.19E-01	-99	-99	-7.13	-99	-99
4.25727	0.054	-2.26	-2.24	-2.413	0.104	2.55E-01	1.23E-01	-99	-99	-7.13	-99	-99

4.3946	0.0598	-2.13	-2.11	-2.84	0.12	2.64E-01	1.27E-01	-99	-99	-7.13	-99	-99
4.53124	0.0684	-2.01	-1.98	-3.453	0.127	2.72E-01	1.31E-01	-99	-99	-7.13	-99	-99
4.67206	0.0696	-1.88	-1.85	-3.754	0.133	2.80E-01	1.35E-01	-99	-99	-7.13	-99	-99
4.81496	0.0618	-1.88	-1.85	-3.344	0.152	2.89E-01	1.39E-01	-99	-99	-7.13	0	-99
4.94532	0.055	-2.01	-1.97	-2.789	0.169	2.97E-01	1.42E-01	-99	-99	-7.13	0.01	-99
5.0478	0.0454	-2.26	-2.22	-2.045	0.175	3.03E-01	1.45E-01	-99	-99	-7.13	0.02	-99
5.14191	0.0387	-2.38	-2.34	-1.652	0.188	3.09E-01	1.48E-01	-99	-99	-7.13	0.03	-99
5.23881	0.0145	-2.38	-2.34	-0.619	0.195	3.14E-01	1.51E-01	-99	-99	-7.13	0.04	-99
5.3378	0.0214	-2.51	-2.47	-0.869	0.204	3.20E-01	1.54E-01	-99	-99	-7.13	0.04	-99
5.44237	0.0221	-2.63	-2.59	-0.852	0.208	3.27E-01	1.57E-01	-99	-99	-7.13	0.04	-99
5.5072	0.0193	-3.26	-3.22	-0.6	0.211	3.30E-01	1.59E-01	-99	-99	-7.13	0.04	-99
5.58737	0.0139	-2.63	-2.57	-0.541	0.292	3.35E-01	1.61E-01	-99	-99	-7.13	0.21	-99
5.6766	0.0066	-2.63	-2.57	-0.256	0.305	3.41E-01	1.64E-01	-99	-99	-7.13	0.23	-99
5.76583	0	-2.76	-2.69	-0.002	0.314	3.46E-01	1.66E-01	-99	-99	-7.13	0.24	-99
5.85785	-0.0039	-2.88	-2.82	0.138	0.324	3.52E-01	1.69E-01	-99	-99	-7.13	0.26	-99
5.94847	-0.0065	-3.01	-2.94	0.222	0.334	3.57E-01	1.71E-01	-99	-99	-7.13	0.27	-99
6.0384	-0.0086	-3.01	-2.94	0.293	0.34	3.62E-01	1.74E-01	-99	-99	-7.13	0.27	-99
6.12763	-0.0116	-3.13	-3.06	0.378	0.347	3.68E-01	1.77E-01	-99	-99	-7.13	0.28	-99
6.21059	-0.0121	-3.13	-3.06	0.396	0.353	3.73E-01	1.79E-01	-99	-99	-7.13	0.28	-99
6.28936	-0.0121	-3.13	-3.06	0.396	0.363	3.77E-01	1.81E-01	-99	-99	-7.13	0.29	-99
6.36604	-0.0121	-3.26	-3.18	0.381	0.373	3.82E-01	1.83E-01	-99	-99	-7.13	0.31	-99
6.44412	-0.0121	-3.26	-3.18	0.381	0.382	3.87E-01	1.86E-01	-99	-99	-7.13	0.32	-99
6.52359	-0.0109	-3.13	-3.06	0.357	0.392	3.91E-01	1.88E-01	-99	-99	-7.13	0.33	-99
6.60306	-0.0091	-3.13	-3.05	0.299	0.402	3.96E-01	1.90E-01	-99	-99	-7.13	0.34	-99
6.68462	-0.0095	-3.01	-2.93	0.325	0.411	4.01E-01	1.93E-01	-99	-99	-7.13	0.36	-99
6.76479	-0.0113	-2.88	-2.8	0.404	0.421	4.06E-01	1.95E-01	-99	-99	-7.13	0.37	-99
6.84635	-0.0121	-3.01	-2.92	0.415	0.424	4.11E-01	1.97E-01	-99	-99	-7.13	0.36	-99
6.92861	-0.0131	-3.01	-2.92	0.448	0.431	4.16E-01	2.00E-01	-99	-99	-7.13	0.37	-99
7.01227	-0.014	-3.13	-3.05	0.459	0.437	4.21E-01	2.02E-01	-99	-99	-7.13	0.37	-99
7.09453	-0.0148	-3.13	-3.04	0.488	0.45	4.26E-01	2.04E-01	-99	-99	-7.13	0.39	-99
7.17818	-0.0159	-3.13	-3.04	0.521	0.46	4.31E-01	2.07E-01	-99	-99	-7.13	0.4	-99
7.26393	-0.015	-3.13	-3.04	0.495	0.47	4.36E-01	2.09E-01	-99	-99	-7.13	0.41	-99
7.35037	-0.014	-3.13	-3.04	0.461	0.476	4.41E-01	2.12E-01	-99	-99	-7.13	0.41	-99
7.43402	-0.014	-3.13	-3.04	0.461	0.483	4.46E-01	2.14E-01	-99	-99	-7.13	0.41	-99
7.51976	-0.0147	-3.13	-3.03	0.484	0.492	4.51E-01	2.17E-01	-99	-99	-7.13	0.42	-99
7.6069	-0.0159	-3.13	-3.03	0.523	0.499	4.56E-01	2.19E-01	-99	-99	-7.13	0.42	-99
7.69404	-0.0159	-3.13	-3.03	0.523	0.505	4.62E-01	2.22E-01	-99	-99	-7.13	0.43	-99
7.78049	-0.0159	-3.13	-3.03	0.523	0.512	4.67E-01	2.24E-01	-99	-99	-7.13	0.43	-99
7.87111	-0.0159	-3.13	-3.03	0.524	0.521	4.72E-01	2.27E-01	-99	-99	-7.13	0.44	-99
7.96383	-0.0159	-3.01	-2.9	0.547	0.528	4.78E-01	2.29E-01	-99	-99	-7.13	0.44	-99
8.05724	-0.0156	-3.13	-3.03	0.516	0.534	4.83E-01	2.32E-01	-99	-99	-7.13	0.44	-99
8.14926	-0.014	-3.01	-2.9	0.483	0.544	4.89E-01	2.35E-01	-99	-99	-7.13	0.45	-99
8.24407	-0.014	-3.01	-2.9	0.483	0.547	4.95E-01	2.37E-01	-99	-99	-7.13	0.44	-99
8.33887	-0.0141	-3.13	-3.02	0.465	0.557	5.00E-01	2.40E-01	-99	-99	-7.13	0.45	-99
8.43368	-0.0158	-3.13	-3.02	0.524	0.56	5.06E-01	2.43E-01	-99	-99	-7.13	0.44	-99
8.53058	-0.0165	-3.01	-2.89	0.571	0.567	5.12E-01	2.46E-01	-99	-99	-7.13	0.44	-99
8.62887	-0.0172	-3.01	-2.89	0.594	0.573	5.18E-01	2.49E-01	-99	-99	-7.13	0.44	-99
8.72926	-0.0173	-3.01	-2.89	0.598	0.58	5.24E-01	2.51E-01	-99	-99	-7.13	0.44	-99
9.00113	-0.0178	-2.88	-2.77	0.641	0.567	5.40E-01	2.59E-01	-99	-99	-7.13	0.38	-99
9.09733	-0.0196	-3.01	-2.89	0.677	0.58	5.46E-01	2.62E-01	-99	-99	-7.13	0.39	-99
9.19423	-0.0177	-3.01	-2.89	0.614	0.593	5.52E-01	2.65E-01	-99	-99	-7.13	0.4	-99
9.29322	-0.0177	-2.88	-2.76	0.642	0.606	5.58E-01	2.68E-01	-99	-99	-7.13	0.42	-99
9.39012	-0.0177	-2.88	-2.76	0.643	0.619	5.63E-01	2.70E-01	-99	-99	-7.13	0.43	-99
9.48075	-0.0177	-3.01	-2.88	0.615	0.628	5.69E-01	2.73E-01	-99	-99	-7.13	0.44	-99
9.5407	-0.0177	-3.13	-3.01	0.59	0.635	5.72E-01	2.75E-01	-99	-99	-7.13	0.44	-99
9.59019	-0.0177	-3.13	-3	0.59	0.641	5.75E-01	2.76E-01	-99	-99	-7.13	0.45	-99
9.63899	-0.0177	-3.13	-3	0.59	0.651	5.78E-01	2.78E-01	-99	-99	-7.13	0.46	-99
9.69197	-0.0177	-3.13	-3	0.591	0.654	5.82E-01	2.79E-01	-99	-99	-7.13	0.46	-99
9.76726	-0.0177	-3.01	-2.88	0.617	0.661	5.86E-01	2.81E-01	-99	-99	-7.13	0.46	-99
9.86485	-0.0177	-2.88	-2.75	0.645	0.67	5.92E-01	2.84E-01	-99	-99	-7.13	0.47	-99
9.96315	-0.0177	-3.01	-2.87	0.618	0.683	5.98E-01	2.87E-01	-99	-99	-7.13	0.48	-99
10.06005	-0.0177	-2.88	-2.74	0.647	0.7	6.04E-01	2.90E-01	-99	-99	-7.13	0.5	-99
10.15764	-0.0177	-2.88	-2.74	0.647	0.709	6.10E-01	2.93E-01	-99	-99	-7.13	0.5	-99
10.24966	-0.0177	-2.88	-2.74	0.648	0.722	6.15E-01	2.95E-01	-99	-99	-7.13	0.51	-99
10.33471	-0.0177	-2.88	-2.73	0.648	0.735	6.20E-01	2.98E-01	-99	-99	-7.13	0.52	-99
10.41976	-0.0177	-2.88	-2.73	0.649	0.745	6.25E-01	3.00E-01	-99	-99	-7.13	0.53	-99

10.5062	-0.0177	-2.88	-2.73	0.649	0.751	6.30E-01	3.03E-01	-99	-99	-7.13	0.53	-99
10.59404	-0.0177	-2.88	-2.73	0.649	0.758	6.36E-01	3.05E-01	-99	-99	-7.13	0.53	-99
10.68118	-0.0177	-2.88	-2.73	0.65	0.764	6.41E-01	3.08E-01	-99	-99	-7.13	0.53	-99
10.76971	-0.0183	-2.88	-2.73	0.669	0.768	6.46E-01	3.10E-01	-99	-99	-7.13	0.53	-99
10.85894	-0.02	-2.76	-2.6	0.77	0.777	6.52E-01	3.13E-01	-99	-99	-7.13	0.53	-99
10.94817	-0.0212	-2.88	-2.72	0.778	0.784	6.57E-01	3.15E-01	-99	-99	-7.13	0.53	-99
11.0374	-0.0195	-2.88	-2.72	0.716	0.79	6.62E-01	3.18E-01	-99	-99	-7.13	0.53	-99
11.13081	-0.0177	-2.88	-2.72	0.651	0.797	6.68E-01	3.21E-01	-99	-99	-7.13	0.53	-99
11.22771	-0.0177	-2.88	-2.72	0.652	0.806	6.74E-01	3.23E-01	-99	-99	-7.13	0.54	-99
11.326	-0.0195	-2.88	-2.72	0.717	0.816	6.80E-01	3.26E-01	-99	-99	-7.13	0.54	-99
11.4243	-0.0179	-2.76	-2.59	0.692	0.826	6.86E-01	3.29E-01	-99	-99	-7.13	0.55	-99
11.52538	-0.0177	-2.76	-2.59	0.685	0.832	6.92E-01	3.32E-01	-99	-99	-7.13	0.55	-99
11.62577	-0.0192	-2.63	-2.46	0.781	0.842	6.98E-01	3.35E-01	-99	-99	-7.13	0.55	-99
11.72894	-0.0201	-2.51	-2.33	0.861	0.858	7.04E-01	3.38E-01	-99	-99	-7.13	0.56	-99
11.8342	-0.0207	-2.51	-2.33	0.89	0.868	7.10E-01	3.41E-01	-99	-99	-7.13	0.57	-99
11.94016	-0.0214	-2.63	-2.45	0.872	0.891	7.16E-01	3.44E-01	-99	-99	-7.13	0.59	-99
12.2455	-0.0215	-2.51	-2.33	0.923	0.897	7.35E-01	3.53E-01	-99	-99	-7.13	0.56	-99
12.34728	-0.0215	-2.38	-2.2	0.977	0.92	7.41E-01	3.56E-01	-99	-99	-7.13	0.59	-99
12.44557	-0.0215	-2.38	-2.19	0.978	0.929	7.47E-01	3.58E-01	-99	-99	-7.13	0.59	-99
12.52434	-0.0215	-2.38	-2.2	0.978	0.923	7.52E-01	3.61E-01	-99	-99	-7.13	0.57	-99
12.60033	-0.0198	-2.38	-2.2	0.901	0.903	7.56E-01	3.63E-01	-99	-99	-7.13	0.54	-99
12.67492	-0.0196	-2.26	-2.07	0.947	0.926	7.61E-01	3.65E-01	-99	-99	-7.13	0.56	-99
12.75021	-0.0196	-2.38	-2.19	0.894	0.942	7.65E-01	3.67E-01	-99	-99	-7.13	0.58	-99
12.82829	-0.0196	-2.38	-2.19	0.895	0.955	7.70E-01	3.70E-01	-99	-99	-7.13	0.59	-99
12.90288	-0.0196	-2.26	-2.06	0.951	0.968	7.74E-01	3.72E-01	-99	-99	-7.13	0.6	-99
12.97747	-0.0213	-2.26	-2.06	1.033	0.981	7.79E-01	3.74E-01	-99	-99	-7.13	0.61	-99
13.05276	-0.0199	-2.26	-2.06	0.966	0.994	7.83E-01	3.76E-01	-99	-99	-7.13	0.62	-99
13.12735	-0.0211	-2.26	-2.05	1.028	1.01	7.88E-01	3.78E-01	-99	-99	-7.13	0.64	-99
13.20403	-0.0201	-2.26	-2.05	0.979	1.026	7.92E-01	3.80E-01	-99	-99	-7.13	0.65	-99
13.27932	-0.0209	-2.13	-1.92	1.087	1.043	7.97E-01	3.82E-01	-99	-99	-7.13	0.67	-99
13.3574	-0.0215	-2.13	-1.92	1.119	1.056	8.01E-01	3.85E-01	-99	-99	-7.13	0.68	-99
13.43687	-0.0226	-2.13	-1.92	1.18	1.049	8.06E-01	3.87E-01	-99	-99	-7.13	0.66	-99
13.51773	-0.0222	-2.13	-1.92	1.153	1.026	8.11E-01	3.89E-01	-99	-99	-7.13	0.62	-99
13.5986	-0.0226	-2.26	-2.05	1.103	1.046	8.16E-01	3.92E-01	-99	-99	-7.13	0.64	-99
13.67876	-0.0223	-2.13	-1.92	1.164	1.062	8.21E-01	3.94E-01	-99	-99	-7.13	0.65	-99
13.76033	-0.0224	-2.26	-2.04	1.102	1.085	8.26E-01	3.96E-01	-99	-99	-7.13	0.67	-99
13.84328	-0.0223	-2.26	-2.03	1.1	1.111	8.31E-01	3.99E-01	-99	-99	-7.13	0.7	-99
13.92694	-0.0215	-2.26	-2.03	1.059	1.137	8.36E-01	4.01E-01	-99	-99	-7.13	0.73	-99
14.00989	-0.0215	-2.13	-1.9	1.131	1.156	8.41E-01	4.04E-01	-99	-99	-7.13	0.75	-99
14.09355	-0.0204	-2.13	-1.89	1.079	1.175	8.46E-01	4.06E-01	-99	-99	-7.13	0.77	-99
14.1765	-0.0206	-2.13	-1.89	1.091	1.195	8.51E-01	4.08E-01	-99	-99	-7.13	0.79	-99
14.25876	-0.0205	-2.01	-1.76	1.164	1.214	8.56E-01	4.11E-01	-99	-99	-7.13	0.8	-99
14.34102	-0.0196	-2.13	-1.88	1.04	1.221	8.61E-01	4.13E-01	-99	-99	-7.13	0.8	-99
14.42468	-0.0205	-2.01	-1.76	1.166	1.234	8.66E-01	4.15E-01	-99	-99	-7.13	0.81	-99
14.50833	-0.0215	-2.01	-1.75	1.225	1.25	8.71E-01	4.18E-01	-99	-99	-7.13	0.83	-99
14.59268	-0.0206	-2.01	-1.75	1.18	1.263	8.76E-01	4.20E-01	-99	-99	-7.13	0.83	-99
14.67773	-0.0196	-2.01	-1.75	1.122	1.279	8.81E-01	4.23E-01	-99	-99	-7.13	0.85	-99
14.76347	-0.0188	-2.01	-1.74	1.075	1.289	8.86E-01	4.25E-01	-99	-99	-7.13	0.85	-99
14.84922	-0.0193	-1.88	-1.62	1.196	1.298	8.91E-01	4.28E-01	-99	-99	-7.13	0.85	-99
14.93427	-0.0215	-1.88	-1.61	1.329	1.311	8.96E-01	4.30E-01	-99	-99	-7.13	0.86	-99
15.01862	-0.0217	-1.88	-1.61	1.346	1.324	9.01E-01	4.33E-01	-99	-99	-7.13	0.87	-99
15.10506	-0.0223	-1.76	-1.49	1.503	1.334	9.06E-01	4.35E-01	-99	-99	-7.13	0.87	-99
15.1929	-0.023	-1.88	-1.61	1.425	1.331	9.12E-01	4.38E-01	-99	-99	-7.13	0.86	-99
15.28003	-0.0233	-1.76	-1.49	1.567	1.318	9.17E-01	4.40E-01	-99	-99	-7.13	0.83	-99
15.53657	-0.0204	-1.76	-1.51	1.346	1.188	9.32E-01	4.48E-01	-99	-99	-7.13	0.63	-99
15.61744	-0.0196	-1.88	-1.64	1.197	1.201	9.37E-01	4.50E-01	-99	-99	-7.13	0.64	-99
15.70179	-0.0208	-1.88	-1.63	1.274	1.234	9.42E-01	4.52E-01	-99	-99	-7.13	0.67	-99
15.78335	-0.0215	-1.76	-1.5	1.43	1.26	9.47E-01	4.55E-01	-99	-99	-7.13	0.69	-99
15.86491	-0.0202	-1.76	-1.5	1.351	1.279	9.52E-01	4.57E-01	-99	-99	-7.13	0.71	-99
15.94508	-0.0196	-1.63	-1.37	1.433	1.298	9.57E-01	4.59E-01	-99	-99	-7.13	0.73	-99
16.02525	-0.0209	-1.63	-1.37	1.528	1.302	9.62E-01	4.62E-01	-99	-99	-7.13	0.72	-99
16.10612	-0.0202	-1.63	-1.37	1.47	1.272	9.66E-01	4.64E-01	-99	-99	-7.13	0.68	-99
16.18489	-0.0183	-1.63	-1.37	1.336	1.266	9.71E-01	4.66E-01	-99	-99	-7.13	0.66	-99
16.26436	-0.0177	-1.63	-1.37	1.294	1.282	9.76E-01	4.68E-01	-99	-99	-7.13	0.67	-99
16.34383	-0.0177	-1.5	-1.25	1.423	1.279	9.81E-01	4.71E-01	-99	-99	-7.13	0.66	-99
16.42469	-0.0177	-1.5	-1.25	1.423	1.276	9.86E-01	4.73E-01	-99	-99	-7.13	0.65	-99

16.50556	-0.0165	-1.5	-1.25	1.322	1.269	9.90E-01	4.75E-01	-99	-99	-7.13	0.64	-99
16.58434	-0.0159	-1.38	-1.12	1.417	1.282	9.95E-01	4.78E-01	-99	-99	-7.13	0.64	-99
16.6652	-0.0159	-1.25	-0.99	1.598	1.289	1.00E+00	4.80E-01	-99	-99	-7.13	0.64	-99
16.74537	-0.0133	-1.25	-0.99	1.342	1.302	1.01E+00	4.82E-01	-99	-99	-7.13	0.65	-99
16.82693	-0.0121	-1.13	-0.86	1.405	1.308	1.01E+00	4.85E-01	-99	-99	-7.13	0.65	-99
16.9064	-0.0121	-1.13	-0.87	1.402	1.298	1.01E+00	4.87E-01	-99	-99	-7.13	0.63	-99
16.98378	-0.0121	-1.13	-0.87	1.393	1.272	1.02E+00	4.89E-01	-99	-99	-7.13	0.6	-99
17.06395	-0.0108	-1.25	-1	1.079	1.24	1.02E+00	4.91E-01	-99	-99	-7.13	0.55	-99
17.14412	-0.0116	-1.25	-1	1.157	1.253	1.03E+00	4.94E-01	-99	-99	-7.13	0.56	-99
17.22359	-0.0121	-1.25	-0.99	1.219	1.279	1.03E+00	4.96E-01	-99	-99	-7.13	0.58	-99
17.30166	-0.0135	-1.13	-0.87	1.55	1.285	1.04E+00	4.98E-01	-99	-99	-7.13	0.58	-99
17.38183	-0.0126	-1.25	-0.99	1.268	1.282	1.04E+00	5.01E-01	-99	-99	-7.13	0.57	-99
17.462	-0.0121	-1.38	-1.12	1.079	1.26	1.05E+00	5.03E-01	-99	-99	-7.13	0.54	-99
17.54008	-0.0121	-1.38	-1.12	1.078	1.256	1.05E+00	5.05E-01	-99	-99	-7.13	0.53	-99
17.61815	-0.0121	-1.38	-1.12	1.078	1.256	1.06E+00	5.07E-01	-99	-99	-7.13	0.53	-99
17.69553	-0.0121	-1.25	-1	1.215	1.26	1.06E+00	5.10E-01	-99	-99	-7.13	0.53	-99
17.775	-0.0121	-1.25	-1	1.216	1.266	1.07E+00	5.12E-01	-99	-99	-7.13	0.53	-99
17.85448	-0.0094	-1.25	-1	0.945	1.269	1.07E+00	5.14E-01	-99	-99	-7.13	0.52	-99
17.93255	-0.0084	-1.25	-0.99	0.846	1.285	1.08E+00	5.17E-01	-99	-99	-7.13	0.54	-99
18.01202	-0.0098	-1.25	-0.99	0.983	1.289	1.08E+00	5.19E-01	-99	-99	-7.13	0.53	-99
18.09149	-0.0089	-1.13	-0.87	1.03	1.298	1.09E+00	5.21E-01	-99	-99	-7.13	0.54	-99
18.16957	-0.0084	-1.13	-0.86	0.978	1.328	1.09E+00	5.23E-01	-99	-99	-7.13	0.56	-99
18.24834	-0.0059	-1	-0.73	0.81	1.357	1.10E+00	5.26E-01	-99	-99	-7.13	0.59	-99
18.32712	-0.0069	-1	-0.73	0.944	1.35	1.10E+00	5.28E-01	-99	-99	-7.13	0.57	-99
18.40728	-0.0103	-1	-0.73	1.413	1.366	1.10E+00	5.30E-01	-99	-99	-7.13	0.58	-99
18.48885	-0.0137	-1	-0.72	1.898	1.389	1.11E+00	5.33E-01	-99	-99	-7.13	0.6	-99
18.56832	-0.014	-1	-0.72	1.951	1.408	1.11E+00	5.35E-01	-99	-99	-7.13	0.62	-99
18.79	-0.0084	-0.75	-0.47	1.779	1.383	1.13E+00	5.41E-01	-99	-99	-7.13	0.57	-99
18.87156	-0.0077	-0.75	-0.47	1.649	1.405	1.13E+00	5.44E-01	-99	-99	-7.13	0.59	-99
18.9594	-0.0065	-0.75	-0.46	1.407	1.421	1.14E+00	5.46E-01	-99	-99	-7.13	0.6	-99
19.04654	-0.0058	-0.75	-0.46	1.274	1.454	1.14E+00	5.49E-01	-99	-99	-7.13	0.62	-99
19.13367	-0.004	-0.63	-0.33	1.224	1.489	1.15E+00	5.51E-01	-99	-99	-7.13	0.65	-99
19.21942	-0.0002	-0.63	-0.32	0.064	1.525	1.15E+00	5.54E-01	-99	-99	-7.13	0.68	-99
19.30726	0.0034	-0.5	-0.19	-1.747	1.519	1.16E+00	5.56E-01	-99	-99	-7.13	0.67	-99
19.39509	0.0004	-0.38	-0.07	-0.545	1.528	1.16E+00	5.59E-01	-99	-99	-7.13	0.67	-99
19.48293	-0.0009	-0.38	-0.07	1.295	1.499	1.17E+00	5.61E-01	-99	-99	-7.13	0.64	-99
19.57007	-0.0009	-0.5	-0.19	0.484	1.522	1.17E+00	5.64E-01	-99	-99	-7.13	0.65	-99
19.6607	-0.0019	-0.63	-0.31	0.608	1.551	1.18E+00	5.66E-01	-99	-99	-7.13	0.68	-99
19.75271	0.001	-0.63	-0.31	-0.331	1.57	1.19E+00	5.69E-01	-99	-99	-7.13	0.69	-99
19.83776	0.0057	-0.63	-0.3	-1.865	1.593	1.19E+00	5.71E-01	-99	-99	-7.13	0.7	-99
19.91444	0.008	-0.63	-0.3	-2.647	1.609	1.20E+00	5.74E-01	-99	-99	-7.13	0.71	-99
19.99182	0.0098	-0.5	-0.18	-5.601	1.609	1.20E+00	5.76E-01	-99	-99	-7.13	0.71	-99
20.07199	0.0103	-0.5	-0.17	-5.919	1.619	1.20E+00	5.78E-01	-99	-99	-7.13	0.71	-99
20.14937	0.0103	-0.38	-0.04	-23.022	1.635	1.21E+00	5.80E-01	-99	-99	-7.13	0.72	-99
20.22606	0.0061	-0.25	0.09	7.022	1.664	1.21E+00	5.83E-01	-99	-99	-7.13	0.74	-99
20.30413	0.0047	-0.25	0.09	5.134	1.684	1.22E+00	5.85E-01	-99	-99	-7.13	0.76	-99
20.38221	0.006	-0.13	0.21	2.808	1.671	1.22E+00	5.87E-01	-99	-99	-7.13	0.74	-99
20.46238	0.0065	-0.25	0.09	7.296	1.677	1.23E+00	5.89E-01	-99	-99	-7.13	0.74	-99
20.53975	0.0104	-0.25	0.09	11.139	1.697	1.23E+00	5.92E-01	-99	-99	-7.13	0.75	-99
20.61923	0.0121	-0.13	0.22	5.49	1.71	1.24E+00	5.94E-01	-99	-99	-7.13	0.76	-99
20.69939	0.0134	-0.13	0.22	5.965	1.729	1.24E+00	5.96E-01	-99	-99	-7.13	0.77	-99
20.77956	0.0152	-0.13	0.23	6.681	1.745	1.25E+00	5.99E-01	-99	-99	-7.13	0.78	-99
20.85764	0.017	-0.13	0.23	7.304	1.771	1.25E+00	6.01E-01	-99	-99	-7.13	0.8	-99
20.93711	0.0201	0	0.36	5.508	1.797	1.26E+00	6.03E-01	-99	-99	-7.13	0.82	-99
21.01867	0.0226	0	0.37	6.11	1.829	1.26E+00	6.05E-01	-99	-99	-7.13	0.84	-99
21.10023	0.0245	0	0.37	6.564	1.845	1.27E+00	6.08E-01	-99	-99	-7.13	0.85	-99
21.1804	0.0252	0	0.38	6.701	1.855	1.27E+00	6.10E-01	-99	-99	-7.13	0.86	-99
21.26127	0.0264	0.13	0.5	5.259	1.858	1.28E+00	6.12E-01	-99	-99	-7.13	0.85	-99
21.34143	0.0271	0.13	0.5	5.389	1.858	1.28E+00	6.15E-01	-99	-99	-7.13	0.85	-99
21.4216	0.0271	0	0.38	7.098	1.881	1.29E+00	6.17E-01	-99	-99	-7.13	0.86	-99
21.50247	0.0281	0	0.39	7.252	1.913	1.29E+00	6.19E-01	-99	-99	-7.13	0.89	-99
21.58333	0.0289	0.13	0.52	5.584	1.936	1.30E+00	6.22E-01	-99	-99	-7.13	0.9	-99
21.66629	0.0289	0.25	0.65	4.458	1.962	1.30E+00	6.24E-01	-99	-99	-7.13	0.92	-99
21.74925	0.0289	0.38	0.77	3.755	1.943	1.31E+00	6.26E-01	-99	-99	-7.13	0.89	-99
21.8315	0.0296	0.38	0.76	3.877	1.91	1.31E+00	6.29E-01	-99	-99	-7.13	0.85	-99
22.11175	0.0382	0.63	1.01	3.765	1.91	1.33E+00	6.37E-01	-99	-99	-7.13	0.83	-99

22.18564	0.0382	0.63	1.02	3.741	1.946	1.33E+00	6.39E-01	-99	-99	-7.13	0.86	-99
22.26023	0.0364	0.63	1.03	3.545	1.968	1.34E+00	6.41E-01	-99	-99	-7.13	0.87	-99
22.33413	0.0361	0.63	1.03	3.511	1.985	1.34E+00	6.43E-01	-99	-99	-7.13	0.88	-99
22.40663	0.0326	0.63	1.04	3.141	2.033	1.34E+00	6.45E-01	-99	-99	-7.13	0.93	-99
22.47843	0.0323	0.63	1.05	3.072	2.091	1.35E+00	6.47E-01	1	-99	-7.13	0.98	-99
22.55093	0.0286	0.63	1.06	2.705	2.13	1.35E+00	6.50E-01	1	-99	-7.13	1.01	-99
22.62343	0.0271	0.75	1.19	2.271	2.166	1.36E+00	6.52E-01	1	-99	-7.13	1.04	-99
22.69523	0.0271	0.75	1.2	2.255	2.208	1.36E+00	6.54E-01	1	-99	-7.13	1.07	-99
22.76564	0.0264	0.75	1.21	2.189	2.24	1.37E+00	6.56E-01	1	-99	-7.13	1.1	-99
22.83465	0.0236	0.75	1.21	1.947	2.27	1.37E+00	6.58E-01	0	-99	-7.13	1.12	-99
22.90576	0.0249	0.75	1.21	2.056	2.27	1.37E+00	6.60E-01	1	-99	-7.13	1.11	-99
22.97617	0.0231	0.75	1.21	1.909	2.26	1.38E+00	6.62E-01	0	-99	-7.13	1.1	-99
23.04727	0.0218	0.75	1.21	1.803	2.253	1.38E+00	6.64E-01	0	-99	-7.13	1.08	-99
23.11768	0.0252	0.75	1.21	2.082	2.257	1.39E+00	6.66E-01	1	-99	-7.13	1.08	-99
23.18949	0.025	0.88	1.34	1.87	2.266	1.39E+00	6.68E-01	1	-99	-7.13	1.08	-99
23.26129	0.0233	1	1.47	1.592	2.279	1.40E+00	6.70E-01	1	-99	-7.13	1.09	-99
23.33449	0.0233	1	1.47	1.59	2.286	1.40E+00	6.72E-01	1	-99	-7.13	1.09	-99
23.40629	0.0235	1	1.46	1.608	2.273	1.40E+00	6.74E-01	1	-99	-7.13	1.07	-99
23.476	0.0254	1	1.46	1.734	2.273	1.41E+00	6.76E-01	1	-99	-7.13	1.06	-99
23.5485	0.0273	1.13	1.59	1.716	2.276	1.41E+00	6.78E-01	1	-99	-7.13	1.06	-99
23.6196	0.0295	1.13	1.59	1.852	2.286	1.42E+00	6.80E-01	1	-99	-7.13	1.06	-99
23.6921	0.0347	1.25	1.72	2.016	2.312	1.42E+00	6.82E-01	1	-99	-7.13	1.08	-99
23.76251	0.0364	1.25	1.73	2.108	2.328	1.43E+00	6.84E-01	1	-99	-7.13	1.09	-99
23.83362	0.0364	1.25	1.74	2.096	2.376	1.43E+00	6.86E-01	1	-99	-7.13	1.13	-99
23.90612	0.0372	1.38	1.86	1.999	2.373	1.43E+00	6.89E-01	1	-99	-7.13	1.12	-99
23.97792	0.0406	1.38	1.87	2.172	2.412	1.44E+00	6.91E-01	1	-99	-7.13	1.15	-99
24.04833	0.0434	1.51	2	2.17	2.448	1.44E+00	6.93E-01	1	-99	-7.13	1.18	-99
24.11734	0.0489	1.63	2.13	2.292	2.473	1.45E+00	6.95E-01	1	-99	-7.13	1.2	-99
24.18496	0.0535	1.76	2.26	2.366	2.49	1.45E+00	6.97E-01	2	-99	0.02	1.21	-99
24.25467	0.0556	2.01	2.52	2.201	2.554	1.46E+00	6.99E-01	1	-99	0.04	1.26	95.54
24.32369	0.0635	2.26	2.79	2.278	2.622	1.46E+00	7.01E-01	3	-99	0.05	1.32	92.75
24.39479	0.0717	2.51	3.06	2.341	2.732	1.46E+00	7.03E-01	3	-99	0.07	1.43	90.13
24.46659	0.081	2.76	3.34	2.425	2.878	1.47E+00	7.05E-01	3	-99	0.09	1.57	87.93
24.54398	0.0937	3.01	3.62	2.589	3.001	1.47E+00	7.07E-01	3	-99	0.1	1.69	86.63
24.62484	0.1069	3.14	3.77	2.838	3.114	1.48E+00	7.09E-01	4	-99	0.11	1.8	87.16
24.7064	0.1222	3.26	3.91	3.126	3.205	1.48E+00	7.12E-01	4	-99	0.12	1.89	87.93
24.78866	0.1371	3.39	4.05	3.386	3.279	1.49E+00	7.14E-01	4	-99	0.13	1.96	88.46
24.87232	0.2361	3.39	4.07	5.802	3.373	1.49E+00	7.16E-01	4	-99	0.13	2.06	-99
24.95806	0.4199	3.76	4.45	9.437	3.39	1.50E+00	7.19E-01	-99	-99	0.15	2.06	-99
25.04241	0.6003	13.92	14.6	4.111	3.37	1.50E+00	7.21E-01	16	-99	0.83	2.03	58.34
25.12258	0.5662	30.6	31.08	1.822	2.373	1.51E+00	7.24E-01	14	35.68	1.94	1.01	32.72
25.30801	1.2903	64.96	64.97	1.986	0.084	1.52E+00	7.29E-01	25	40.06	4.23	-99	24.39
25.34914	1.2134	80.76	80.77	1.502	0.049	1.52E+00	7.30E-01	31	41.24	-7.13	-99	19.49
25.38679	1.1972	91.92	91.93	1.302	0.072	1.52E+00	7.31E-01	26	41.92	-7.13	-99	17.12
25.41885	1.2713	104.2	104.21	1.22	0.042	1.53E+00	7.32E-01	30	42.56	-7.13	-99	15.58
25.45371	1.3564	102.07	102.08	1.329	0.036	1.53E+00	7.33E-01	29	42.45	-7.13	-99	16.42
25.50111	1.2436	82.64	82.65	1.505	0.042	1.53E+00	7.34E-01	31	41.33	-7.13	-99	19.29
25.54642	1.95	78.37	78.39	2.488	0.062	1.53E+00	7.36E-01	36	41.04	5.12	-99	24.86
25.59592	2.0363	81.76	81.77	2.49	0.062	1.54E+00	7.37E-01	37	41.25	5.35	-99	24.44
25.64681	1.9997	68.72	68.76	2.908	0.201	1.54E+00	7.39E-01	31	40.3	4.48	-99	28.13
25.69561	1.345	75.61	75.64	1.778	0.136	1.54E+00	7.40E-01	29	40.81	4.94	-99	21.69
25.73883	1.0093	78.37	78.39	1.287	0.097	1.54E+00	7.41E-01	22	41	-7.13	-99	18.43
25.79111	1.1865	74.99	75.01	1.582	0.117	1.55E+00	7.43E-01	28	40.75	4.9	-99	20.66
25.84688	1.2218	58.18	58.23	2.098	0.243	1.55E+00	7.44E-01	22	39.33	3.78	-99	26.21
25.90823	1.7764	52.54	52.6	3.377	0.269	1.55E+00	7.46E-01	30	38.73	3.4	-99	33.34
25.9619	2.0018	63.07	63.08	3.173	0.033	1.56E+00	7.48E-01	28	39.76	4.1	-99	30.24
26.01001	2.2	59.94	59.95	3.67	0.049	1.56E+00	7.49E-01	34	39.46	3.89	-99	32.81
26.06508	2.5169	55.43	55.44	4.54	0.062	1.56E+00	7.51E-01	42	39.01	3.59	-99	36.93
26.11666	2.7366	53.92	53.94	5.073	0.117	1.57E+00	7.52E-01	41	38.84	-7.13	-99	39.04
26.16755	2.4152	52.16	52.2	4.627	0.182	1.57E+00	7.54E-01	39	38.63	3.37	-99	38.04
26.20589	2.1942	81.51	81.52	2.692	0.039	1.57E+00	7.55E-01	37	41.11	5.33	-99	25.35
26.29164	1.8505	80.13	80.15	2.309	0.12	1.58E+00	7.57E-01	30	41	5.24	-99	23.81
26.3495	1.9165	42.01	42.01	4.562	-0.006	1.58E+00	7.59E-01	31	37.32	2.7	-99	40.95
26.41433	1.982	39.5	39.51	5.017	0.033	1.59E+00	7.61E-01	44	36.94	2.53	-99	43.44
26.47568	1.9119	46.52	46.57	4.105	0.24	1.59E+00	7.63E-01	26	37.9	3	-99	37.81
26.54121	1.0323	44.52	44.52	2.319	0.039	1.59E+00	7.64E-01	20	37.62	2.86	-99	30.65

26.60464	0.8523	48.4	48.41	1.76	0.039	1.60E+00	7.66E-01	18	38.1	3.12	-99	26.47
26.66808	0.5088	49.03	49.05	1.037	0.078	1.60E+00	7.68E-01	18	38.16	3.16	-99	21.32
26.72176	0.5709	54.55	54.58	1.046	0.14	1.60E+00	7.70E-01	20	38.77	3.53	-99	20.25
26.76986	0.9391	58.56	58.59	1.603	0.143	1.61E+00	7.71E-01	22	39.17	3.8	-99	23.33
26.82005	1.5114	66.08	66.11	2.286	0.127	1.61E+00	7.72E-01	29	39.84	4.3	-99	25.74
26.86606	1.6237	73.23	73.25	2.217	0.104	1.61E+00	7.74E-01	27	40.4	4.77	-99	24.29
26.91834	1.8347	70.85	70.86	2.589	0.065	1.62E+00	7.75E-01	32	40.2	4.62	-99	26.4
26.97272	0	65.46	65.46	0	0.013	1.62E+00	7.77E-01	18	-99	-7.13	-99	-99
27.03128	0	44.39	44.42	0	0.133	1.62E+00	7.79E-01	12	-99	-7.13	-99	-99
27.08635	0	60.19	60.22	0	0.149	1.63E+00	7.80E-01	17	-99	-7.13	-99	-99
27.11842	0	80	80.04	0	0.169	1.63E+00	7.81E-01	22	-99	-7.13	-99	-99
27.18673	0	49.53	49.81	0	1.363	1.63E+00	7.83E-01	14	-99	-7.13	0.18	-99
27.22089	0	43.26	43.54	0	1.353	1.63E+00	7.84E-01	12	-99	-7.13	0.18	-99



Suelos, PSC.

Soil & Construction Materials Laboratory and Environmental Drilling Services

Test Id: CPT C B Date: 4-Nov-21
Site: DIKE C Cone Id: 3045.123xx
Location: Gurabo
Project: DIKE C Density 120 PCF
Operator | w: RTH | Nicolas

Depth (ft)	Sleeve Stress (tsf)	TIPStresUNC (tsf)	TIPStresCOR (tsf)	Ratio COR (%)	Pore Pressure (tsf)	Overburden (tsf)	Eff. Overburden (tsf)	SPT N60c (blows/ft)	Friction Angle (deg)	Su (tsf)	OCR ()	FC (%)
0	0	0	0	0	0	0.00E+00	0.00E+00	-99	0	0	-99	-99
0.12612	0	4.89	4.93	0	0.204	7.57E-03	3.63E-03	4	-99	-7.13	98	-99
0.21112	0	5.64	5.68	0	0.182	1.27E-02	6.08E-03	5	-99	-7.13	38.92	-99
0.29265	0.2279	6.27	6.3	3.619	0.152	1.76E-02	8.43E-03	11	49.98	-7.13	18.44	76.65
0.37487	0.2387	7.14	7.16	3.334	0.081	2.25E-02	1.08E-02	12	49.52	-7.13	4.65	71.55
0.45708	0.2574	7.65	7.64	3.369	-0.022	2.74E-02	1.32E-02	13	49	-7.13	-99	70.04
0.53861	0.2759	8.02	8.01	3.443	-0.035	3.23E-02	1.55E-02	14	48.52	-7.13	-99	69.21
0.61804	0.2865	8.02	8.02	3.572	-0.006	3.71E-02	1.78E-02	14	47.94	-7.13	-99	69.89
0.69886	0.2916	7.65	7.64	3.814	-0.003	4.19E-02	2.01E-02	13	47.21	-7.13	-99	72.42
0.78039	0.2862	7.52	7.52	3.807	-0.013	4.68E-02	2.25E-02	13	46.65	-7.13	-99	72.83
0.85912	0.2719	7.39	7.39	3.678	-0.009	5.16E-02	2.47E-02	13	46.14	-7.13	-99	72.6
0.93925	0.2496	6.89	6.89	3.622	-0.006	5.64E-02	2.71E-02	12	45.41	-7.13	-99	74.18
1.01799	0.2307	6.27	6.27	3.681	0	6.11E-02	2.93E-02	11	44.58	-7.13	-99	77.13
1.09742	0.2178	6.14	6.14	3.547	-0.003	6.59E-02	3.16E-02	10	44.12	-7.13	-99	76.96
1.17824	0.1998	5.77	5.77	3.463	0.013	7.07E-02	3.39E-02	10	43.45	-7.13	-99	78.26
1.25628	0.1782	5.77	5.77	3.089	0.013	7.54E-02	3.62E-02	10	43.13	-7.13	-99	76.01
1.33572	0.1579	5.26	5.27	2.998	0.013	8.01E-02	3.85E-02	9	42.36	0.35	-99	78.04
1.41515	0.1529	5.14	5.14	2.974	0.013	8.49E-02	4.08E-02	9	41.93	0.34	-99	78.58
1.49458	0.1501	5.26	5.27	2.85	0.017	8.97E-02	4.30E-02	9	41.77	0.34	-99	77.07
1.57331	0.1478	5.26	5.27	2.806	0.007	9.44E-02	4.53E-02	9	41.5	0.34	-99	76.78
1.64996	0.1417	5.26	5.27	2.691	0.017	9.90E-02	4.75E-02	9	41.25	0.34	-99	75.99
1.7287	0.1343	5.39	5.39	2.489	0.026	1.04E-01	4.98E-02	9	41.12	0.35	-99	73.88
1.80813	0.1267	5.39	5.39	2.35	0.01	1.09E-01	5.21E-02	6	40.88	0.35	-99	72.86
1.88477	0.1207	5.39	5.39	2.238	0.013	1.13E-01	5.43E-02	6	40.66	0.35	-99	72
1.96351	0.1223	5.39	5.39	2.269	0.013	1.18E-01	5.66E-02	6	40.43	0.35	-99	72.24
2.04224	0.1216	5.26	5.27	2.308	0.01	1.23E-01	5.88E-02	6	40.09	0.34	-99	73.21
2.12028	0.1212	5.39	5.39	2.248	0.01	1.27E-01	6.11E-02	6	40.01	0.35	-99	72.09
2.19623	0.1181	5.39	5.39	2.189	0.02	1.32E-01	6.33E-02	6	39.81	0.35	-99	71.62
2.27287	0.1191	5.26	5.27	2.262	0.01	1.36E-01	6.55E-02	6	39.49	0.34	-99	72.86
2.35021	0.112	5.01	5.02	2.232	0.02	1.41E-01	6.77E-02	6	39.02	0.32	-99	73.99
2.42617	0.1097	5.01	5.02	2.187	0.017	1.46E-01	6.99E-02	6	38.84	0.32	-99	73.63
2.50211	0.106	5.14	5.14	2.061	0.013	1.50E-01	7.21E-02	6	38.81	0.33	-99	71.91
2.57527	0.103	5.14	5.14	2.003	0.013	1.55E-01	7.42E-02	6	38.64	0.33	-99	71.43
2.64495	0.0972	5.01	5.02	1.938	0.02	1.59E-01	7.62E-02	6	38.34	0.32	-99	71.56
2.71393	0.0921	4.89	4.89	1.883	0.017	1.63E-01	7.82E-02	6	38.04	0.32	-99	71.8
2.7843	0.0895	4.89	4.89	1.83	0.017	1.67E-01	8.02E-02	6	37.89	0.31	-99	71.32
2.8512	0.089	4.89	4.89	1.818	0.026	1.71E-01	8.21E-02	6	37.75	0.31	-99	71.2
2.91948	0.0893	5.39	5.39	1.655	0.026	1.75E-01	8.41E-02	5	38.19	0.35	-99	67.01
2.98707	0.0938	5.77	5.77	1.625	0.02	1.79E-01	8.60E-02	7	38.45	0.37	-99	64.93
3.05605	0.0962	6.02	6.02	1.596	0.039	1.83E-01	8.80E-02	7	38.56	0.39	-99	63.53
3.12433	0.1002	6.02	6.02	1.664	0.039	1.88E-01	9.00E-02	7	38.43	0.39	-99	64.16
3.19331	0.1058	6.27	6.28	1.686	0.046	1.92E-01	9.20E-02	7	38.54	0.41	-99	63.3
3.2616	0.1087	6.14	6.15	1.766	0.062	1.96E-01	9.39E-02	7	38.3	0.4	-99	64.53
3.32988	0.1026	6.02	6.03	1.703	0.052	2.00E-01	9.59E-02	7	38.06	0.39	-99	64.51
3.40095	0.096	6.02	6.02	1.593	0.042	2.04E-01	9.80E-02	7	37.94	0.39	-99	63.49
3.46993	0.0928	6.02	6.01	1.544	-0.022	2.08E-01	9.99E-02	5	37.82	0.39	-99	63.08
3.53891	0.0906	6.14	6.12	1.48	-0.103	2.12E-01	1.02E-01	5	37.83	0.4	-99	62
3.60719	0.0869	6.39	6.36	1.366	-0.165	2.16E-01	1.04E-01	5	37.95	0.41	-99	59.87
3.67618	0.0812	6.14	6.09	1.334	-0.246	2.21E-01	1.06E-01	5	37.6	0.39	-99	60.61
3.74655	0.0718	5.89	5.84	1.229	-0.229	2.25E-01	1.08E-01	5	37.24	0.38	-99	60.53

3.81832	0.0645	6.02	5.97	1.081	-0.216	2.29E-01	1.10E-01	5	37.25	0.39	-99	58.25
3.88799	0.0586	5.64	5.61	1.045	-0.165	2.33E-01	1.12E-01	5	36.75	0.36	-99	59.41
3.9514	0.0531	5.51	5.5	0.966	-0.068	2.37E-01	1.14E-01	5	36.52	0.35	-99	58.88
4.0162	0.0522	5.39	5.38	0.971	-0.048	2.41E-01	1.16E-01	5	36.28	0.34	-99	59.52
4.0817	0.0522	5.26	5.26	0.993	-0.035	2.45E-01	1.18E-01	4	36.03	0.33	-99	60.41
4.14719	0.0486	5.01	5.01	0.971	-0.042	2.49E-01	1.19E-01	4	35.63	0.32	-99	61.39
4.21269	0.0458	5.14	5.13	0.892	-0.032	2.53E-01	1.21E-01	4	35.69	0.33	-99	59.66
4.27749	0.0448	5.01	5.01	0.893	-0.003	2.57E-01	1.23E-01	4	35.44	0.32	-99	60.29
4.34229	0.044	4.89	4.89	0.9	0.004	2.61E-01	1.25E-01	4	35.18	0.31	-99	61.04
4.40848	0.0421	4.76	4.76	0.885	0.004	2.65E-01	1.27E-01	4	34.92	0.3	-99	61.52
4.47677	0.0426	4.64	4.64	0.918	0.02	2.69E-01	1.29E-01	4	34.65	0.29	-99	62.67
4.54296	0.044	4.89	4.89	0.898	0.023	2.73E-01	1.31E-01	4	34.9	0.31	-99	61
4.60915	0.0446	4.89	4.89	0.91	0.033	2.77E-01	1.33E-01	4	34.8	0.31	-99	61.16
4.67535	0.0475	4.76	4.77	0.996	0.033	2.81E-01	1.35E-01	4	34.55	0.3	-99	63.01
4.74293	0.0485	4.89	4.89	0.991	0.029	2.85E-01	1.37E-01	4	34.62	0.31	-99	62.25
4.80913	0.0503	4.64	4.64	1.084	0.023	2.89E-01	1.39E-01	4	34.19	0.29	-99	64.88
4.87393	0.0522	4.64	4.64	1.124	0.033	2.92E-01	1.40E-01	4	34.11	0.29	-99	65.37
4.93873	0.0536	4.76	4.77	1.124	0.033	2.96E-01	1.42E-01	4	34.19	0.3	-99	64.64
5.00422	0.0567	5.14	5.15	1.102	0.033	3.00E-01	1.44E-01	4	34.6	0.32	-99	62.34
5.07042	0.0599	5.51	5.52	1.084	0.029	3.04E-01	1.46E-01	5	34.96	0.35	-99	60.29
5.13591	0.063	5.51	5.52	1.141	0.013	3.08E-01	1.48E-01	5	34.88	0.35	-99	60.99
5.2035	0.0736	5.77	5.76	1.279	-0.039	3.12E-01	1.50E-01	5	35.08	0.36	-99	61.46
5.43901	0.1104	7.14	7.13	1.547	-0.045	3.26E-01	1.57E-01	6	36.15	0.45	-99	58.8
5.49266	0.118	7.39	7.39	1.597	-0.022	3.30E-01	1.58E-01	6	36.3	0.47	-99	58.41
5.55049	0.1246	7.52	7.52	1.656	0.007	3.33E-01	1.60E-01	6	36.34	0.48	-99	58.52
5.60972	0.1333	7.9	7.9	1.687	0.026	3.37E-01	1.62E-01	6	36.57	0.5	-99	57.61
5.67243	0.1389	8.4	8.4	1.653	0.033	3.40E-01	1.63E-01	7	36.88	0.54	-99	55.85
5.74629	0.1447	8.77	8.78	1.648	0.029	3.45E-01	1.66E-01	7	37.06	0.56	-99	54.8
5.83408	0.1499	9.4	9.41	1.594	0.036	3.50E-01	1.68E-01	8	37.39	0.6	-99	52.76
5.92257	0.1456	9.65	9.65	1.509	-0.013	3.55E-01	1.71E-01	8	37.45	0.62	-99	51.45
6.01176	0.144	9.78	9.77	1.474	-0.026	3.61E-01	1.73E-01	8	37.44	0.63	-99	50.86
6.10094	0.1517	10.28	10.28	1.476	0	3.66E-01	1.76E-01	8	37.65	0.66	-99	49.79
6.18874	0.1593	10.9	10.9	1.461	-0.006	3.71E-01	1.78E-01	9	37.92	0.7	-99	48.4
6.27792	0.163	10.53	10.53	1.547	0.017	3.77E-01	1.81E-01	8	37.62	0.68	-99	49.9
6.3692	0.166	10.28	10.29	1.614	0.039	3.82E-01	1.83E-01	8	37.39	0.66	-99	50.98
6.46257	0.1664	10.4	10.42	1.596	0.101	3.88E-01	1.86E-01	8	37.38	0.67	-99	50.54
6.55385	0.1678	10.78	10.81	1.553	0.136	3.93E-01	1.89E-01	9	37.51	0.69	-99	49.4
6.64512	0.1667	10.9	10.93	1.525	0.107	3.99E-01	1.91E-01	9	37.49	0.7	-99	48.93
6.73779	0.1631	11.03	11.05	1.476	0.084	4.04E-01	1.94E-01	9	37.48	0.71	-99	48.26
6.82977	0.1631	11.03	11.05	1.476	0.104	4.10E-01	1.97E-01	9	37.4	0.71	-99	48.25
6.91965	0.1544	11.28	11.31	1.366	0.143	4.15E-01	1.99E-01	9	37.45	0.72	-99	46.77
7.01163	0.1595	11.53	11.57	1.379	0.175	4.21E-01	2.02E-01	9	37.51	0.74	-99	46.43
7.1036	0.1617	11.78	11.85	1.365	0.33	4.26E-01	2.05E-01	9	37.56	0.76	0.13	45.81
7.19488	0.1957	12.66	12.76	1.534	0.482	4.32E-01	2.07E-01	10	37.91	0.82	0.45	45.83
7.28685	0.2317	13.29	13.4	1.729	0.573	4.37E-01	2.10E-01	10	38.12	0.86	0.67	46.43
7.36349	0.252	13.66	13.78	1.828	0.605	4.42E-01	2.12E-01	11	38.22	0.88	0.74	46.63
7.42621	0.2543	14.04	14.13	1.799	0.473	4.46E-01	2.14E-01	11	38.33	0.91	0.39	45.93
7.48891	0.2536	13.66	13.74	1.846	0.376	4.49E-01	2.16E-01	11	38.12	0.88	0.18	46.84
7.55093	0.2525	12.91	12.97	1.947	0.317	4.53E-01	2.18E-01	10	37.74	0.83	0.08	48.73
7.61294	0.2486	11.91	11.96	2.079	0.256	4.57E-01	2.19E-01	9	37.21	0.76	0.01	51.37
7.67774	0.2352	10.78	10.81	2.175	0.178	4.61E-01	2.21E-01	8	36.55	0.69	-99	54.22
7.74324	0.2073	9.27	9.29	2.231	0.078	4.65E-01	2.23E-01	7	35.57	0.59	-99	58.06
7.80804	0.1711	7.52	7.52	2.274	0.01	4.69E-01	2.25E-01	8	34.19	0.47	-99	63.47
7.87144	0.1333	6.02	6.01	2.216	-0.019	4.72E-01	2.27E-01	6	32.66	0.37	-99	68.86
7.93485	0.1009	5.14	5.14	1.963	-0.009	4.76E-01	2.29E-01	5	31.54	0.31	-99	71.12
7.99756	0.0792	5.14	5.15	1.538	0.036	4.80E-01	2.30E-01	4	31.48	0.31	-99	67.15
8.05957	0.0546	5.39	5.41	1.009	0.101	4.84E-01	2.32E-01	4	31.76	0.33	-99	59.87
8.12019	0.0308	5.26	5.29	0.582	0.13	4.87E-01	2.34E-01	4	31.55	0.32	-99	54.04
8.1822	0.0264	4.64	4.68	0.564	0.198	4.91E-01	2.36E-01	4	30.61	0.28	-99	56.81
8.24073	0.0258	4.26	4.32	0.597	0.269	4.94E-01	2.37E-01	3	29.97	0.25	0	59.52
8.29996	0.0253	4.39	4.46	0.567	0.379	4.98E-01	2.39E-01	3	30.12	0.26	0.12	58.09
8.35918	0.0249	4.76	4.86	0.512	0.479	5.02E-01	2.41E-01	4	30.65	0.28	0.29	54.86
8.4212	0.0244	5.89	5.98	0.408	0.46	5.05E-01	2.43E-01	4	32.07	0.36	0.25	47.77
8.4846	0.0394	6.89	6.96	0.565	0.337	5.09E-01	2.44E-01	5	33.07	0.43	0.06	47.3
8.74171	0.0218	4.89	4.9	0.444	0.065	5.25E-01	2.52E-01	4	30.52	0.29	-99	53.29
8.80512	0.0195	3.51	3.53	0.552	0.114	5.28E-01	2.54E-01	3	28.09	0.2	-99	64.15

8.87131	0.0133	2.88	2.95	0.453	0.314	5.32E-01	2.56E-01	2	26.56	0.16	0.02	67.29
8.94029	0.0238	2.88	2.96	0.804	0.389	5.36E-01	2.58E-01	2	26.5	0.16	0.1	73.88
9.00997	0.0132	3.51	3.6	0.366	0.437	5.41E-01	2.60E-01	3	27.92	0.2	0.16	59.58
9.08801	-0.0038	4.51	4.61	-0.083	0.469	5.45E-01	2.62E-01	-99	-99	-7.13	0.2	-99
9.16814	-0.0004	5.14	5.21	-0.008	0.347	5.50E-01	2.64E-01	-99	-99	-7.13	0.04	-99
9.24827	0.0242	6.39	6.44	0.375	0.233	5.55E-01	2.66E-01	5	31.98	0.39	-99	45.41
9.32839	0.0645	9.65	9.72	0.663	0.334	5.60E-01	2.69E-01	6	34.65	0.61	0.02	41.79
9.40783	0.0734	9.78	9.8	0.748	0.136	5.65E-01	2.71E-01	6	34.67	0.61	-99	42.8
9.48726	0.06	9.27	9.3	0.645	0.127	5.69E-01	2.73E-01	7	34.28	0.58	-99	42.4
9.56739	0.0529	7.14	7.17	0.737	0.133	5.74E-01	2.76E-01	5	32.51	0.44	-99	49.34
9.64682	0.0344	6.39	6.43	0.534	0.185	5.79E-01	2.78E-01	5	31.7	0.39	-99	48.56
9.72904	0.0109	7.77	7.82	0.139	0.259	5.84E-01	2.80E-01	6	32.96	0.48	-99	35.41
9.80917	0.0014	10.65	10.69	0.013	0.162	5.89E-01	2.83E-01	6	-99	-7.13	-99	28.88
9.8886	0.0124	13.41	13.43	0.092	0.081	5.93E-01	2.85E-01	8	-99	-7.13	-99	24.81
9.97012	0.0347	14.66	14.68	0.236	0.062	5.98E-01	2.87E-01	9	36.84	-7.13	-99	26.99
10.05095	0.064	13.79	13.8	0.464	0.062	6.03E-01	2.90E-01	8	36.41	-7.13	-99	32.25
10.13317	0.1109	11.78	11.8	0.94	0.075	6.08E-01	2.92E-01	7	35.39	0.74	-99	41.54
10.21469	0.1381	10.53	10.55	1.309	0.094	6.13E-01	2.94E-01	8	34.62	0.66	-99	47.68
10.299	0.1266	10.03	10.05	1.26	0.11	6.18E-01	2.97E-01	7	34.26	0.63	-99	48.21
10.38331	0.0988	7.52	7.54	1.309	0.107	6.23E-01	2.99E-01	6	32.3	0.46	-99	55.13
10.46832	0.0587	5.01	5.05	1.162	0.198	6.28E-01	3.02E-01	4	29.42	0.29	-99	63.54
10.55402	0.0229	6.14	6.19	0.37	0.262	6.33E-01	3.04E-01	4	30.8	0.37	-99	46.18
10.6453	0.0149	7.77	7.81	0.191	0.217	6.39E-01	3.07E-01	6	32.35	0.48	-99	36.92
10.73239	0.0524	11.53	11.57	0.453	0.214	6.44E-01	3.09E-01	7	34.89	0.73	-99	35.13
10.81949	0.0935	9.53	9.55	0.979	0.11	6.49E-01	3.12E-01	7	33.6	0.59	-99	46.26
10.91007	0.1032	5.89	5.91	1.747	0.081	6.55E-01	3.14E-01	6	30.27	0.35	-99	65.43
11.00204	0.0851	4.51	4.54	1.875	0.139	6.60E-01	3.17E-01	3	28.3	0.26	-99	73.85
11.09402	0.0847	3.63	3.66	2.315	0.123	6.66E-01	3.20E-01	5	-99	0.2	-99	84.12
11.1853	0.0593	4.14	4.17	1.422	0.146	6.71E-01	3.22E-01	3	27.53	0.23	-99	71.88
11.27588	0.0317	6.39	6.43	0.493	0.169	6.77E-01	3.25E-01	5	30.62	0.38	-99	47.82
11.36715	0.0317	8.02	8.06	0.393	0.214	6.82E-01	3.27E-01	6	32.12	0.49	-99	40.98
11.45564	0.0278	11.53	11.58	0.24	0.249	6.87E-01	3.30E-01	7	34.47	-7.13	-99	30.92
11.54553	0.0094	14.04	14.07	0.067	0.156	6.93E-01	3.33E-01	8	-99	-7.13	-99	23.48
11.63541	-0.0065	18.05	18.09	-0.036	0.188	6.98E-01	3.35E-01	-99	-99	-7.13	-99	-99
11.72599	0.0304	19.3	19.32	0.157	0.11	7.04E-01	3.38E-01	9	37.51	-7.13	-99	21.28
11.81518	0.0513	16.42	16.44	0.312	0.084	7.09E-01	3.40E-01	9	36.49	-7.13	-99	26.8
11.91272	0.0504	15.79	15.81	0.319	0.065	7.15E-01	3.43E-01	9	36.2	-7.13	-99	27.52
11.99285	0.0504	16.17	16.19	0.311	0.094	7.20E-01	3.45E-01	9	36.31	-7.13	-99	27.01
12.07019	0.0474	18.55	18.58	0.255	0.143	7.24E-01	3.48E-01	9	37.1	-7.13	-99	23.91
12.14823	0.0375	22.81	22.83	0.164	0.117	7.29E-01	3.50E-01	11	38.29	-7.13	-99	19.31
12.22488	0.0204	25.44	25.46	0.08	0.065	7.34E-01	3.52E-01	12	-99	-7.13	-99	16.16
12.30222	0.0153	26.7	26.71	0.057	0.065	7.38E-01	3.54E-01	13	-99	-7.13	-99	15.19
12.38026	0.0149	26.82	26.84	0.056	0.068	7.43E-01	3.57E-01	13	-99	-7.13	-99	15.12
12.45621	0.0211	26.2	26.21	0.081	0.075	7.47E-01	3.59E-01	12	-99	-7.13	-99	15.85
12.53355	0.0286	25.94	25.96	0.11	0.075	7.52E-01	3.61E-01	12	38.85	-7.13	-99	16.61
12.61089	0.036	26.45	26.46	0.136	0.084	7.57E-01	3.63E-01	12	38.93	-7.13	-99	16.95
12.68684	0.0401	27.57	27.59	0.145	0.091	7.61E-01	3.65E-01	13	39.13	-7.13	-99	16.69
12.76279	0.047	29.33	29.35	0.16	0.084	7.66E-01	3.68E-01	14	39.45	-7.13	-99	16.32
12.84013	0.0677	29.7	29.72	0.228	0.078	7.70E-01	3.70E-01	14	39.48	-7.13	-99	17.49
12.91886	0.0967	27.32	27.34	0.354	0.068	7.75E-01	3.72E-01	13	38.97	-7.13	-99	20.6
13.00178	0.1209	21.93	21.95	0.551	0.065	7.80E-01	3.75E-01	10	37.66	-7.13	-99	26.35
13.08679	0.1322	16.54	16.56	0.798	0.062	7.85E-01	3.77E-01	9	35.91	1.05	-99	33.8
13.17319	0.1356	15.29	15.31	0.886	0.088	7.90E-01	3.79E-01	9	35.38	0.97	-99	36.14
13.26377	0.1382	16.17	16.2	0.853	0.149	7.96E-01	3.82E-01	9	35.68	1.02	-99	34.8
13.35435	0.1462	15.92	15.94	0.917	0.123	8.01E-01	3.85E-01	9	35.54	1.01	-99	35.79
13.44284	0.1441	10.53	10.55	1.366	0.094	8.07E-01	3.87E-01	7	32.83	0.65	-99	48.22
13.53063	0.1394	6.77	6.8	2.05	0.146	8.12E-01	3.90E-01	6	29.73	0.4	-99	64.34
13.62121	0.1083	5.01	5.05	2.142	0.201	8.17E-01	3.92E-01	5	-99	0.28	-99	73.06
13.71249	0.0554	4.01	4.06	1.363	0.246	8.23E-01	3.95E-01	3	25.76	0.21	-99	71.97
13.80168	0.0075	2.26	2.31	0.323	0.288	8.28E-01	3.98E-01	2	-99	0.1	-99	71.35
13.89226	-0.0197	1.5	1.58	-1.247	0.392	8.34E-01	4.00E-01	-99	-99	-7.13	-99	-99
13.98075	-0.0327	1.13	1.22	-2.689	0.434	8.39E-01	4.03E-01	-99	-99	-7.13	-99	-99
14.06993	-0.0386	1	1.1	-3.518	0.466	8.44E-01	4.05E-01	-99	-99	-7.13	0.01	-99
14.15703	-0.0378	1	1.1	-3.426	0.499	8.49E-01	4.08E-01	-99	-99	-7.13	0.02	-99
14.24691	-0.0392	0.88	0.98	-3.976	0.531	8.55E-01	4.10E-01	-99	-99	-7.13	0.04	-99
14.3368	-0.0387	0.88	0.99	-3.901	0.563	8.60E-01	4.13E-01	-99	-99	-7.13	0.05	-99

14.42598	-0.0368	1	1.12	-3.278	0.599	8.66E-01	4.16E-01	-99	-99	-7.13	0.08	-99
14.51657	-0.0354	0.88	1	-3.527	0.628	8.71E-01	4.18E-01	-99	-99	-7.13	0.1	-99
14.60715	-0.0354	1	1.14	-3.116	0.664	8.76E-01	4.21E-01	-99	-99	-7.13	0.12	-99
14.69772	-0.0351	1.13	1.27	-2.767	0.699	8.82E-01	4.23E-01	-99	-99	-7.13	0.15	-99
14.78831	-0.0337	1.25	1.4	-2.405	0.728	8.87E-01	4.26E-01	-99	-99	-7.13	0.17	-99
14.88098	-0.0346	1.13	1.28	-2.699	0.761	8.93E-01	4.29E-01	-99	-99	-7.13	0.2	-99
14.97643	-0.0354	1.25	1.41	-2.505	0.796	8.99E-01	4.31E-01	-99	-99	-7.13	0.22	-99
15.0705	-0.0354	1.38	1.55	-2.289	0.835	9.04E-01	4.34E-01	-99	-99	-7.13	0.26	-99
15.25723	-0.0388	1.38	1.57	-2.465	0.961	9.15E-01	4.39E-01	-99	-99	-7.13	0.38	-99
15.34782	-0.0379	1.25	1.46	-2.596	1.023	9.21E-01	4.42E-01	-99	-99	-7.13	0.44	-99
15.44049	-0.0407	1.13	1.35	-3.023	1.081	9.26E-01	4.45E-01	-99	-99	-7.13	0.5	-99
15.53246	-0.0392	1.13	1.36	-2.883	1.136	9.32E-01	4.47E-01	-99	-99	-7.13	0.56	-99
15.62652	-0.0384	1.13	1.37	-2.814	1.172	9.38E-01	4.50E-01	-99	-99	-7.13	0.6	-99
15.71919	-0.0336	1.25	1.5	-2.245	1.194	9.43E-01	4.53E-01	-99	-99	-7.13	0.62	-99
15.81326	-0.0324	1.5	1.73	-1.87	1.13	9.49E-01	4.55E-01	-99	-99	-7.13	0.53	-99
15.90802	-0.0298	2.13	2.33	-1.282	0.974	9.55E-01	4.58E-01	-99	-99	-7.13	0.35	-99
16.00348	-0.028	2.88	3.07	-0.913	0.926	9.60E-01	4.61E-01	-99	-99	-7.13	0.3	-99
16.0857	-0.0354	2.51	2.66	-1.331	0.764	9.65E-01	4.63E-01	-99	-99	-7.13	0.15	-99
16.15468	-0.0356	2.38	2.53	-1.404	0.757	9.69E-01	4.65E-01	-99	-99	-7.13	0.14	-99
16.22714	-0.0378	1.75	1.89	-2.002	0.667	9.74E-01	4.67E-01	-99	-99	-7.13	0.07	-99
16.29961	-0.0423	1.5	1.65	-2.564	0.719	9.78E-01	4.69E-01	-99	-99	-7.13	0.11	-99
16.36998	-0.0386	1.5	1.67	-2.319	0.796	9.82E-01	4.72E-01	-99	-99	-7.13	0.16	-99
16.44245	-0.0465	1.38	1.55	-2.996	0.861	9.87E-01	4.74E-01	-99	-99	-7.13	0.21	-99
16.51421	-0.0346	2.26	2.44	-1.417	0.932	9.91E-01	4.76E-01	-99	-99	-7.13	0.27	-99
16.58598	-0.0232	6.02	6.22	-0.373	0.994	9.95E-01	4.78E-01	-99	-99	-7.13	0.33	-99
16.65566	-0.0131	11.28	11.42	-0.115	0.683	9.99E-01	4.80E-01	-99	-99	-7.13	0.07	-99
16.72464	-0.0075	17.3	17.38	-0.043	0.411	1.00E+00	4.82E-01	-99	-99	-7.13	-99	-99
16.79153	-0.0075	24.69	24.76	-0.03	0.347	1.01E+00	4.84E-01	-99	-99	-7.13	-99	-99
16.86121	-0.0068	29.58	29.63	-0.023	0.233	1.01E+00	4.86E-01	-99	-99	-7.13	-99	-99
16.93228	0.0054	31.21	31.25	0.017	0.191	1.02E+00	4.88E-01	14	-99	-7.13	-99	13.98
17.00335	0.0358	29.08	29.11	0.123	0.172	1.02E+00	4.90E-01	13	37.74	-7.13	-99	15.63
17.07581	0.0625	24.69	24.72	0.253	0.143	1.03E+00	4.92E-01	11	36.73	-7.13	-99	20.11
17.15106	0.0612	19.43	19.45	0.315	0.13	1.03E+00	4.94E-01	8	35.22	-7.13	-99	24.4
17.22701	0.0445	15.17	15.19	0.293	0.13	1.03E+00	4.96E-01	8	33.6	0.94	-99	27.64
17.30505	0.0325	11.66	11.69	0.278	0.178	1.04E+00	4.98E-01	6	31.81	0.71	-99	31.61
17.38239	0.0285	7.9	7.94	0.359	0.23	1.04E+00	5.01E-01	5	29.04	0.46	-99	40.6
17.46113	0.0083	5.77	5.82	0.143	0.288	1.05E+00	5.03E-01	4	26.68	0.31	-99	41.59
17.54195	-0.0067	4.26	4.35	-0.154	0.421	1.05E+00	5.05E-01	-99	-99	-7.13	-99	-99
17.62208	-0.0319	4.26	4.36	-0.733	0.469	1.06E+00	5.08E-01	-99	-99	-7.13	-99	-99
17.70012	-0.0448	4.89	5	-0.896	0.544	1.06E+00	5.10E-01	-99	-99	-7.13	-99	-99
17.77816	-0.0371	4.01	4.13	-0.9	0.573	1.07E+00	5.12E-01	-99	-99	-7.13	0	-99
17.85829	-0.0306	2.63	2.76	-1.109	0.615	1.07E+00	5.14E-01	-99	-99	-7.13	0.01	-99
17.93911	-0.0288	1.63	1.78	-1.619	0.728	1.08E+00	5.17E-01	-99	-99	-7.13	0.07	-99
18.02063	-0.0355	1.38	1.55	-2.3	0.822	1.08E+00	5.19E-01	-99	-99	-7.13	0.12	-99
18.10146	-0.0422	1.25	1.43	-2.953	0.871	1.09E+00	5.21E-01	-99	-99	-7.13	0.15	-99
18.18577	-0.0443	1.5	1.69	-2.628	0.903	1.09E+00	5.24E-01	-99	-99	-7.13	0.18	-99
18.26799	-0.0464	1.38	1.57	-2.963	0.926	1.10E+00	5.26E-01	-99	-99	-7.13	0.19	-99
18.34812	-0.043	1	1.2	-3.571	0.99	1.10E+00	5.28E-01	-99	-99	-7.13	0.24	-99
18.57039	-0.0414	7.9	8.04	-0.515	0.712	1.11E+00	5.35E-01	-99	-99	-7.13	0.05	-99
18.64355	-0.0445	8.02	8.08	-0.551	0.269	1.12E+00	5.37E-01	-99	-99	-7.13	-99	-99
18.71532	-0.0564	6.02	6.06	-0.93	0.237	1.12E+00	5.39E-01	-99	-99	-7.13	-99	-99
18.79127	-0.0628	4.26	4.33	-1.449	0.353	1.13E+00	5.41E-01	-99	-99	-7.13	-99	-99
18.86721	-0.0634	3.26	3.35	-1.89	0.473	1.13E+00	5.43E-01	-99	-99	-7.13	-99	-99
18.94316	-0.0601	2.01	2.11	-2.844	0.531	1.14E+00	5.46E-01	-99	-99	-7.13	-99	-99
19.01702	-0.0597	1.38	1.51	-3.945	0.66	1.14E+00	5.48E-01	-99	-99	-7.13	0.02	-99
19.09366	-0.0512	1.25	1.41	-3.624	0.793	1.15E+00	5.50E-01	-99	-99	-7.13	0.08	-99
19.16962	-0.0469	1.38	1.56	-3.007	0.9	1.15E+00	5.52E-01	-99	-99	-7.13	0.14	-99
19.24556	-0.0382	1.5	1.7	-2.244	0.971	1.16E+00	5.54E-01	-99	-99	-7.13	0.19	-99
19.31942	-0.039	1.63	1.84	-2.112	1.062	1.16E+00	5.56E-01	-99	-99	-7.13	0.25	-99
19.39467	-0.0457	1.75	1.98	-2.311	1.104	1.16E+00	5.59E-01	-99	-99	-7.13	0.28	-99
19.46992	-0.0482	2.01	2.23	-2.16	1.12	1.17E+00	5.61E-01	-99	-99	-7.13	0.29	-99
19.54657	-0.0438	1.63	1.84	-2.38	1.032	1.17E+00	5.63E-01	-99	-99	-7.13	0.22	-99
19.62113	-0.0368	1.25	1.48	-2.481	1.126	1.18E+00	5.65E-01	-99	-99	-7.13	0.29	-99
19.69777	-0.0354	3.13	3.39	-1.046	1.246	1.18E+00	5.67E-01	-99	-99	-7.13	0.38	-99
19.77511	-0.0339	7.14	7.34	-0.461	0.961	1.19E+00	5.70E-01	-99	-99	-7.13	0.16	-99
19.85245	-0.0336	11.91	12.03	-0.279	0.605	1.19E+00	5.72E-01	-99	-99	-7.13	-99	-99

19.9284	-0.0412	12.41	12.46	-0.33	0.266	1.20E+00	5.74E-01	-99	-99	-7.13	-99	-99
20.00365	-0.0548	10.9	10.94	-0.501	0.188	1.20E+00	5.76E-01	-99	-99	-7.13	-99	-99
20.08099	-0.0608	10.15	10.21	-0.595	0.311	1.21E+00	5.78E-01	-99	-99	-7.13	-99	-99
20.15903	-0.0659	9.4	9.48	-0.695	0.414	1.21E+00	5.81E-01	-99	-99	-7.13	-99	-99
20.23637	-0.0671	9.53	9.61	-0.698	0.431	1.21E+00	5.83E-01	-99	-99	-7.13	-99	-99
20.31302	-0.0616	9.65	9.74	-0.632	0.437	1.22E+00	5.85E-01	-99	-99	-7.13	-99	-99
20.39106	-0.0428	8.27	8.36	-0.512	0.431	1.22E+00	5.87E-01	-99	-99	-7.13	-99	-99
20.47049	-0.0329	6.52	6.62	-0.497	0.499	1.23E+00	5.90E-01	-99	-99	-7.13	-99	-99
20.54992	-0.0332	5.64	5.76	-0.576	0.586	1.23E+00	5.92E-01	-99	-99	-7.13	-99	-99
20.62657	-0.0379	5.64	5.77	-0.656	0.657	1.24E+00	5.94E-01	-99	-99	-7.13	0	-99
20.70391	-0.0521	6.02	6.15	-0.847	0.667	1.24E+00	5.96E-01	-99	-99	-7.13	0	-99
20.78125	-0.0574	5.51	5.65	-1.015	0.67	1.25E+00	5.99E-01	-99	-99	-7.13	0	-99
20.85999	-0.049	4.14	4.28	-1.145	0.696	1.25E+00	6.01E-01	-99	-99	-7.13	0.01	-99
20.93872	-0.0296	2.51	2.66	-1.11	0.777	1.26E+00	6.03E-01	-99	-99	-7.13	0.03	-99
21.01537	0.0006	2.76	2.94	0.019	0.926	1.26E+00	6.05E-01	2	-99	-7.13	0.1	55.75
21.0934	0.0183	6.14	6.34	0.289	0.958	1.27E+00	6.08E-01	4	25.72	0.33	0.12	43.81
21.17005	0.0174	8.65	8.79	0.198	0.702	1.27E+00	6.10E-01	5	28.27	0.49	0.01	34.84
21.2453	0.0049	7.52	7.65	0.065	0.618	1.28E+00	6.12E-01	5	-99	-7.13	-99	33.64
21.32125	-0.0072	4.51	4.62	-0.156	0.531	1.28E+00	6.14E-01	-99	-99	-7.13	-99	-99
21.39859	-0.019	3.51	3.64	-0.52	0.657	1.28E+00	6.16E-01	-99	-99	-7.13	-99	-99
21.47663	-0.0308	3.89	4.04	-0.763	0.757	1.29E+00	6.19E-01	-99	-99	-7.13	0.02	-99
21.55536	-0.0127	3.38	3.54	-0.359	0.79	1.29E+00	6.21E-01	-99	-99	-7.13	0.03	-99
21.77625	0.0169	10.4	10.64	0.159	1.191	1.31E+00	6.27E-01	5	29.4	0.61	0.25	30.36
21.84662	0.0224	17.55	17.65	0.127	0.502	1.31E+00	6.29E-01	7	32.99	1.08	-99	21.77
21.92118	0.0246	22.43	22.48	0.109	0.246	1.32E+00	6.31E-01	9	34.58	-7.13	-99	18.26
21.99434	0.0321	26.82	26.85	0.12	0.152	1.32E+00	6.33E-01	11	35.68	-7.13	-99	16.43
22.0682	0.0352	31.58	31.6	0.111	0.081	1.32E+00	6.36E-01	13	36.67	-7.13	-99	14.53
22.14066	0.0348	35.34	35.35	0.098	0.036	1.33E+00	6.38E-01	11	37.33	-7.13	-99	13.16
22.21173	0.0452	36.72	36.75	0.123	0.12	1.33E+00	6.40E-01	11	37.54	-7.13	-99	13.28
22.28071	0.0685	35.34	35.39	0.194	0.224	1.34E+00	6.42E-01	11	37.29	-7.13	-99	15.01
22.35248	0.0911	32.21	32.25	0.282	0.217	1.34E+00	6.44E-01	13	36.71	-7.13	-99	17.53
22.42494	0.0862	28.08	28.12	0.306	0.217	1.35E+00	6.46E-01	11	35.85	-7.13	-99	19.5
22.4988	0.0923	25.82	25.86	0.357	0.22	1.35E+00	6.48E-01	10	35.3	-7.13	-99	21.34
22.57057	0.1037	28.7	28.75	0.361	0.259	1.35E+00	6.50E-01	11	35.95	-7.13	-99	20.1
22.64233	0.1181	31.46	31.51	0.375	0.259	1.36E+00	6.52E-01	12	36.49	-7.13	-99	19.24
22.7141	0.1287	30.21	30.24	0.426	0.194	1.36E+00	6.54E-01	12	36.22	-7.13	-99	20.45
22.78657	0.1279	27.82	27.87	0.459	0.214	1.37E+00	6.56E-01	11	35.69	-7.13	-99	21.92
22.85903	0.0972	22.69	22.73	0.428	0.214	1.37E+00	6.58E-01	9	34.38	1.42	-99	24.12
22.93219	0.093	19.43	19.48	0.478	0.246	1.38E+00	6.60E-01	8	33.35	1.2	-99	27.04
23.00535	0.0712	21.18	21.26	0.335	0.363	1.38E+00	6.63E-01	8	33.89	1.32	-99	23.53
23.07503	0.0615	26.57	26.64	0.231	0.337	1.39E+00	6.65E-01	10	35.33	-7.13	-99	18.8
23.14401	0.0655	30.83	30.88	0.212	0.214	1.39E+00	6.67E-01	12	36.23	-7.13	-99	16.78
23.20881	0.0843	28.58	28.61	0.295	0.146	1.39E+00	6.68E-01	11	35.75	-7.13	-99	19.1
23.275	0.1373	24.06	24.09	0.57	0.123	1.40E+00	6.70E-01	9	34.64	1.51	-99	25.31
23.34329	0.2124	18.8	18.83	1.128	0.165	1.40E+00	6.72E-01	9	33.01	1.16	-99	35.12
23.41157	0.1984	13.66	13.74	1.445	0.366	1.41E+00	6.74E-01	6	30.82	0.82	-99	43.62
23.48612	0.2035	10.78	10.9	1.868	0.589	1.41E+00	6.76E-01	6	29.11	0.62	-99	51.79
23.5579	0.1815	10.03	10.17	1.785	0.709	1.41E+00	6.79E-01	6	28.57	0.57	-99	52.64
23.62827	0.1562	10.4	10.57	1.477	0.848	1.42E+00	6.81E-01	6	28.81	0.6	0.03	49.19
23.70004	0.1294	14.54	14.71	0.88	0.822	1.42E+00	6.83E-01	7	31.16	0.87	0.02	36.78
23.76762	0.1009	21.06	21.21	0.476	0.748	1.43E+00	6.85E-01	8	33.64	1.31	0	25.79
23.83382	0.0792	23.81	23.91	0.331	0.499	1.43E+00	6.86E-01	9	34.42	1.49	-99	21.91
23.89722	0.0718	24.69	24.77	0.29	0.392	1.43E+00	6.88E-01	10	34.64	-7.13	-99	20.75
23.96202	0.0866	23.94	24	0.361	0.321	1.44E+00	6.90E-01	9	34.42	1.5	-99	22.35
24.02891	0.1108	20.68	20.73	0.534	0.262	1.44E+00	6.92E-01	8	33.45	1.28	-99	26.94
24.09511	0.1077	16.92	16.96	0.635	0.217	1.45E+00	6.94E-01	8	32.09	1.03	-99	31.37
24.15991	0.0785	14.16	14.21	0.553	0.211	1.45E+00	6.96E-01	7	30.85	0.85	-99	33.14
24.22401	0.0448	13.54	13.6	0.329	0.311	1.45E+00	6.98E-01	6	30.51	0.81	-99	30.11
24.28811	0.0191	13.66	13.74	0.139	0.376	1.46E+00	7.00E-01	6	30.56	0.81	-99	25.7
24.35222	0.0075	13.54	13.61	0.055	0.379	1.46E+00	7.01E-01	6	-99	-7.13	-99	23.72
24.41702	0.0056	11.78	11.9	0.047	0.602	1.47E+00	7.03E-01	5	-99	-7.13	-99	25.63
24.48112	-0.0004	9.4	9.54	-0.005	0.709	1.47E+00	7.05E-01	-99	-99	-7.13	-99	-99
24.54731	-0.0107	7.52	7.67	-0.14	0.741	1.47E+00	7.07E-01	-99	-99	-7.13	-99	-99
24.6135	-0.0111	5.64	5.8	-0.192	0.806	1.48E+00	7.09E-01	-99	-99	-7.13	0.01	-99
24.6804	-0.0016	4.26	4.43	-0.035	0.842	1.48E+00	7.11E-01	-99	-99	-7.13	0.01	-99
24.74728	0.0103	3.76	3.94	0.261	0.906	1.49E+00	7.13E-01	2	-99	0.15	0.03	54.38

24.81557	0.0263	4.14	4.34	0.607	0.997	1.49E+00	7.15E-01	2	-99	0.18	0.06	59.57
24.88246	0.0177	5.39	5.6	0.315	1.062	1.49E+00	7.17E-01	3	-99	0.26	0.09	47.2
24.93054	-0.0031	6.14	6.36	-0.049	1.075	1.50E+00	7.18E-01	-99	-99	-7.13	0.09	-99
25.0462	-0.0138	7.65	7.81	-0.176	0.816	1.50E+00	7.21E-01	-99	-99	-7.13	0	-99
25.13957	0.0017	4.89	5.04	0.034	0.764	1.51E+00	7.24E-01	3	-99	-7.13	-99	41.72
25.23433	-0.0177	4.39	4.59	-0.385	1	1.51E+00	7.27E-01	-99	-99	-7.13	0.06	-99
25.3277	-0.0003	8.4	8.63	-0.004	1.165	1.52E+00	7.29E-01	-99	-99	-7.13	0.13	-99
25.41898	0.0518	15.79	16.01	0.324	1.055	1.53E+00	7.32E-01	7	31.25	0.95	0.08	27.42
25.50886	0.0837	16.29	16.42	0.51	0.615	1.53E+00	7.35E-01	7	31.44	0.98	-99	30.12
25.58341	0.0656	13.66	13.78	0.476	0.589	1.54E+00	7.37E-01	6	30.19	0.81	-99	32.47
25.64194	0.0512	12.16	12.29	0.417	0.644	1.54E+00	7.39E-01	6	29.35	0.71	-99	33.44
25.70256	0.0427	9.9	10.04	0.425	0.66	1.54E+00	7.40E-01	4	27.83	0.56	-99	37.29
25.76527	0.032	7.65	7.8	0.411	0.77	1.55E+00	7.42E-01	4	25.87	0.41	-99	42.01
25.83077	0.017	6.52	6.71	0.254	0.935	1.55E+00	7.44E-01	4	-99	0.33	0.03	41.71
25.89766	-0.0138	6.39	6.6	-0.21	1.013	1.55E+00	7.46E-01	-99	-99	-7.13	0.05	-99
25.97221	-0.0315	6.77	6.99	-0.452	1.071	1.56E+00	7.48E-01	-99	-99	-7.13	0.07	-99
26.05234	-0.0315	5.77	5.97	-0.528	1.032	1.56E+00	7.50E-01	-99	-99	-7.13	0.06	-99
26.13386	-0.0216	4.01	4.23	-0.51	1.097	1.57E+00	7.53E-01	-99	-99	-7.13	0.08	-99
26.21609	-0.0114	2.88	3.17	-0.36	1.395	1.57E+00	7.55E-01	-99	-99	-7.13	0.23	-99
26.30179	-0.0012	2.88	3.21	-0.036	1.612	1.58E+00	7.58E-01	-99	-99	-7.13	0.35	-99
26.38679	0.009	3.01	3.37	0.267	1.767	1.58E+00	7.60E-01	2	-99	0.09	0.45	58.76
26.47041	0.0131	3.01	3.4	0.384	1.919	1.59E+00	7.62E-01	2	-99	0.09	0.55	61.6
26.55402	0.0144	3.13	3.55	0.404	2.048	1.59E+00	7.65E-01	2	-99	0.1	0.64	60.86
26.64042	0.0185	3.26	3.7	0.5	2.181	1.60E+00	7.67E-01	2	-99	0.11	0.74	61.81
26.72891	0.0262	3.38	3.85	0.68	2.304	1.60E+00	7.70E-01	2	-99	0.12	0.83	64.1
26.8167	0.0365	3.51	4	0.912	2.401	1.61E+00	7.72E-01	2	-99	0.13	0.9	66.71
26.90658	0.0376	3.51	4.01	0.938	2.466	1.61E+00	7.75E-01	2	-99	0.13	0.95	66.98
26.99647	0.0377	3.38	3.89	0.969	2.479	1.62E+00	7.78E-01	2	-99	0.12	0.95	68.32
27.08635	0.048	3.89	4.4	1.091	2.547	1.63E+00	7.80E-01	2	-99	0.15	1	66.43
27.17484	0.0462	4.51	5.04	0.917	2.621	1.63E+00	7.83E-01	3	-99	0.19	1.05	60.46
27.26542	0.0456	4.89	5.34	0.854	2.223	1.64E+00	7.85E-01	3	-99	0.22	0.73	58.11
27.356	0.0469	4.26	4.71	0.997	2.2	1.64E+00	7.88E-01	2	-99	0.17	0.71	63.37
27.44937	0.0388	4.14	4.62	0.84	2.395	1.65E+00	7.91E-01	2	-99	0.17	0.85	61.67
27.53926	0.0335	4.26	4.8	0.697	2.647	1.65E+00	7.93E-01	2	-99	0.17	1.05	58.47
27.63053	0.0387	4.39	4.94	0.784	2.715	1.66E+00	7.96E-01	2	-99	0.18	1.1	59.09
27.72181	0.0411	4.64	5.21	0.789	2.805	1.66E+00	7.98E-01	3	-99	0.2	1.16	57.81
27.81239	0.0536	4.89	5.47	0.98	2.877	1.67E+00	8.01E-01	3	-99	0.21	1.22	59.21
27.90088	0.0595	5.14	5.71	1.041	2.825	1.67E+00	8.04E-01	3	-99	0.23	1.17	58.89
27.99216	0.0655	5.01	5.5	1.192	2.388	1.68E+00	8.06E-01	3	-99	0.22	0.81	61.68
28.08483	0.0657	4.76	5.28	1.244	2.547	1.69E+00	8.09E-01	3	-99	0.21	0.92	63.35
28.31058	0.0609	5.26	5.82	1.047	2.731	1.70E+00	8.15E-01	3	-99	0.24	1.05	58.5
28.39838	0.0622	5.26	5.85	1.064	2.883	1.70E+00	8.18E-01	3	-99	0.24	1.17	58.57
28.48687	0.0603	5.39	6.01	1.004	3.038	1.71E+00	8.20E-01	3	-99	0.25	1.3	57.17
28.57536	0.0615	5.51	6.14	1.002	3.103	1.72E+00	8.23E-01	3	-99	0.25	1.34	56.58
28.66385	0.0628	5.77	6.39	0.982	3.103	1.72E+00	8.26E-01	3	-99	0.27	1.33	55.35
28.75164	0.0717	5.89	6.51	1.102	3.045	1.73E+00	8.28E-01	3	-99	0.28	1.28	56.38
28.84013	0.0964	6.02	6.59	1.462	2.844	1.73E+00	8.31E-01	3	-99	0.29	1.1	59.94
28.92862	0.119	6.02	6.56	1.814	2.679	1.74E+00	8.33E-01	4	-99	0.29	0.97	63.3
29.01572	0.1113	6.64	7.17	1.553	2.611	1.74E+00	8.36E-01	4	-99	0.33	0.91	58.73
29.10212	0.0825	9.4	9.88	0.835	2.362	1.75E+00	8.38E-01	4	26.52	0.51	0.72	43.79
29.18782	0.0776	11.78	12.08	0.643	1.485	1.75E+00	8.41E-01	5	28.18	0.67	0.19	37.3
29.27352	0.0865	11.28	11.5	0.752	1.097	1.76E+00	8.43E-01	5	27.84	0.63	0.04	39.72
29.36202	0.0896	10.9	11.15	0.804	1.194	1.76E+00	8.46E-01	5	27.56	0.61	0.07	40.99
29.44493	0.1528	17.42	17.7	0.863	1.388	1.77E+00	8.48E-01	7	30.91	1.04	0.14	33.44
29.52576	0.2549	25.07	25.2	1.012	0.638	1.77E+00	8.50E-01	9	33.36	1.55	-99	29.52
29.60728	0.2713	22.69	22.73	1.193	0.24	1.78E+00	8.53E-01	10	32.68	1.39	-99	32.71
29.6902	0.2206	15.92	15.96	1.382	0.23	1.78E+00	8.55E-01	7	30.22	0.94	-99	40.27
29.77242	0.1735	11.78	11.88	1.46	0.505	1.79E+00	8.57E-01	6	28.03	0.67	-99	46.61
29.85533	0.1942	8.02	8.18	2.375	0.77	1.79E+00	8.60E-01	6	-99	0.42	-99	62.12
29.93894	0.23	9.15	9.46	2.431	1.54	1.80E+00	8.62E-01	5	-99	0.49	0.2	59.02
30.02046	0.2322	13.79	14.13	1.643	1.692	1.80E+00	8.65E-01	7	29.12	0.8	0.27	44.72
30.0999	0.2694	14.04	14.16	1.903	0.599	1.81E+00	8.67E-01	7	29.23	0.82	-99	46.66
30.18003	0.2709	13.79	13.94	1.942	0.777	1.81E+00	8.69E-01	7	29.08	0.8	-99	47.25
30.25876	0.2906	21.68	21.85	1.33	0.812	1.82E+00	8.72E-01	9	32.23	1.32	-99	34.5
30.33331	0.3127	25.82	25.89	1.208	0.363	1.82E+00	8.74E-01	11	33.38	1.6	-99	30.87
30.40717	0.302	24.94	24.97	1.209	0.133	1.82E+00	8.76E-01	11	33.13	1.54	-99	31.42

30.47824	0.2638	25.44	25.47	1.036	0.11	1.83E+00	8.78E-01	9	33.25	1.57	-99	29.59
30.54792	0.2362	26.2	26.21	0.901	0.081	1.83E+00	8.80E-01	9	33.43	1.62	-99	27.88
30.61969	0.2936	27.32	27.33	1.074	0.059	1.84E+00	8.82E-01	10	33.69	1.7	-99	28.92
30.69006	0.2949	26.7	26.7	1.104	0.036	1.84E+00	8.84E-01	9	33.52	1.66	-99	29.52
30.76114	0.2836	23.19	23.19	1.223	0.033	1.85E+00	8.86E-01	10	32.57	1.42	-99	32.65
30.83221	0.3349	22.31	22.32	1.5	0.039	1.85E+00	8.88E-01	9	32.29	1.36	-99	35.52
30.90397	0.3941	20.55	20.58	1.915	0.12	1.85E+00	8.90E-01	9	31.72	1.25	-99	39.86
30.97295	0.382	16.92	16.94	2.255	0.117	1.86E+00	8.92E-01	9	30.36	1	-99	45.59
31.04263	0.37	13.79	13.81	2.679	0.117	1.86E+00	8.94E-01	7	-99	0.79	-99	52.23
31.11231	0.3247	11.91	11.96	2.715	0.256	1.87E+00	8.96E-01	6	-99	0.67	-99	55.52
31.18129	0.3361	10.53	10.59	3.174	0.301	1.87E+00	8.98E-01	7	-99	0.58	-99	60.9
31.24888	0.3472	12.03	12.13	2.863	0.46	1.88E+00	9.00E-01	6	-99	0.68	-99	56.09
31.31647	0.3729	14.92	15.01	2.485	0.466	1.88E+00	9.02E-01	8	29.38	0.87	-99	49.37
31.38196	0.3228	14.92	15	2.152	0.434	1.88E+00	9.04E-01	8	29.37	0.87	-99	47.25
31.57497	0.4225	10.65	10.77	3.921	0.596	1.89E+00	9.09E-01	11	-99	0.58	-99	64.35
31.61677	0.4574	12.16	12.35	3.703	0.974	1.90E+00	9.11E-01	8	-99	0.68	-99	60.12
31.65997	0.4381	15.04	15.37	2.85	1.647	1.90E+00	9.12E-01	8	-99	0.88	0.21	51.02
31.70317	0.4469	20.43	20.86	2.142	2.142	1.90E+00	9.13E-01	9	31.5	1.24	0.46	41.1
31.74567	0.5639	19.3	19.83	2.843	2.628	1.91E+00	9.14E-01	10	31.1	1.16	0.75	46.07
31.78748	0.6103	19.93	20.42	2.988	2.443	1.91E+00	9.16E-01	10	31.32	1.2	0.63	46.29
31.82998	0.6633	21.43	21.9	3.029	2.298	1.91E+00	9.17E-01	11	31.81	1.3	0.54	45.24
31.87109	0.7328	23.31	23.69	3.094	1.845	1.91E+00	9.18E-01	12	32.37	1.43	0.3	44.17
31.9122	0.8322	24.69	24.99	3.331	1.463	1.92E+00	9.19E-01	13	32.74	1.52	0.13	44.37
31.95262	0.9497	25.07	25.37	3.743	1.495	1.92E+00	9.20E-01	13	32.84	1.54	0.14	45.96
31.99303	1.093	25.69	26.28	4.159	2.906	1.92E+00	9.21E-01	18	-99	1.58	0.93	47.06
32.03205	1.1608	27.45	28.15	4.123	3.485	1.92E+00	9.23E-01	19	33.42	1.7	1.35	45.73
32.06968	1.3313	30.96	31.88	4.176	4.543	1.92E+00	9.24E-01	21	34.2	1.94	2.23	43.85
32.11148	1.5124	37.48	38.54	3.924	5.258	1.93E+00	9.25E-01	19	35.41	2.37	2.88	39.89
32.15468	1.5609	44.62	45.64	3.42	5.035	1.93E+00	9.26E-01	23	36.48	2.85	2.66	35.42
32.20137	1.5869	51.89	52.85	3.003	4.75	1.93E+00	9.27E-01	21	37.39	3.33	2.4	31.7
32.25014	1.6211	55.4	56.23	2.883	4.093	1.94E+00	9.29E-01	23	37.77	3.56	1.82	30.4
32.29404	1.6261	55.77	56.73	2.866	4.737	1.94E+00	9.30E-01	23	37.8	3.59	2.37	30.21
32.33654	1.6702	54.9	55.35	3.017	2.262	1.94E+00	9.31E-01	23	37.7	3.53	0.5	31.18
32.37835	1.6675	51.89	52.37	3.184	2.385	1.94E+00	9.33E-01	21	37.35	3.33	0.57	32.59
32.42225	1.6283	45.37	46.19	3.525	4.045	1.95E+00	9.34E-01	23	36.53	2.9	1.76	35.68
32.46614	1.6023	42.24	43.19	3.71	4.714	1.95E+00	9.35E-01	22	36.09	2.69	2.33	37.36
32.51143	1.5673	41.61	42.74	3.667	5.594	1.95E+00	9.36E-01	21	35.99	2.64	3.14	37.34
32.55463	1.4776	43.87	44.79	3.299	4.533	1.95E+00	9.38E-01	23	36.3	2.79	2.16	35.17
32.59922	1.3927	43.99	44.6	3.123	2.987	1.96E+00	9.39E-01	18	36.31	2.8	0.95	34.47
32.648	1.3202	37.6	38.43	3.435	4.113	1.96E+00	9.40E-01	19	35.33	2.38	1.79	37.94
32.69538	1.2727	36.1	36.73	3.465	3.113	1.96E+00	9.42E-01	19	35.06	2.28	1.03	38.74
32.74694	1.2539	32.46	33.19	3.778	3.605	1.97E+00	9.43E-01	17	34.37	2.03	1.38	41.61
32.7985	1.2296	29.08	29.96	4.105	4.329	1.97E+00	9.45E-01	20	33.65	1.81	1.95	44.6
32.85146	1.2099	26.7	27.5	4.399	3.983	1.97E+00	9.46E-01	18	-99	1.65	1.67	47.21
32.90371	1.1769	24.44	25.21	4.668	3.812	1.97E+00	9.48E-01	25	-99	1.5	1.53	49.78
32.95806	1.2119	23.94	24.67	4.912	3.618	1.98E+00	9.49E-01	25	-99	1.46	1.37	51.08
33.01102	1.302	27.45	28.54	4.562	5.384	1.98E+00	9.51E-01	19	-99	1.7	2.86	47.19
33.05909	1.3923	34.22	35.49	3.923	6.293	1.98E+00	9.52E-01	17	34.65	2.15	3.74	41.14
33.10647	1.4642	38.35	39.93	3.667	7.808	1.99E+00	9.54E-01	20	35.36	2.42	5.34	38.33
33.15107	1.5137	41.24	42.74	3.541	7.445	1.99E+00	9.55E-01	21	35.81	2.62	4.93	36.84
33.19706	1.5732	42.86	44.14	3.564	6.3	1.99E+00	9.56E-01	22	36.04	2.72	3.72	36.47
33.23677	1.6455	43.49	44.48	3.699	4.896	1.99E+00	9.57E-01	22	36.12	2.77	2.39	36.9
33.27788	1.7236	43.49	44.34	3.887	4.213	2.00E+00	9.58E-01	22	36.11	2.77	1.81	37.68
33.32526	1.7911	43.37	44.2	4.052	4.135	2.00E+00	9.60E-01	22	36.09	2.76	1.74	38.35
33.37752	1.828	42.61	43.62	4.191	4.957	2.00E+00	9.61E-01	22	35.97	2.71	2.42	39.06
33.43814	1.7793	42.11	43.17	4.122	5.219	2.01E+00	9.63E-01	21	35.89	2.67	2.65	38.95
33.50154	1.6523	41.61	42.63	3.876	5.041	2.01E+00	9.65E-01	21	35.8	2.64	2.48	38.2
33.56356	1.5668	41.11	41.95	3.735	4.168	2.01E+00	9.67E-01	21	35.71	2.61	1.74	37.88
33.62766	1.5163	39.36	40.24	3.768	4.349	2.02E+00	9.69E-01	20	35.43	2.49	1.88	38.63
33.69037	1.4983	38.48	39.34	3.808	4.265	2.02E+00	9.70E-01	20	35.27	2.43	1.81	39.12
33.75169	1.4647	35.85	36.88	3.971	5.125	2.03E+00	9.72E-01	18	34.81	2.25	2.52	40.74
33.81439	1.4166	34.59	35.76	3.962	5.743	2.03E+00	9.74E-01	18	34.57	2.17	3.07	41.18
33.8785	1.3897	34.72	35.75	3.888	5.074	2.03E+00	9.76E-01	18	34.59	2.18	2.46	40.9
33.94608	1.3659	33.21	34.06	4.01	4.197	2.04E+00	9.78E-01	17	34.29	2.08	1.73	42.13
34.01228	1.348	32.09	33.02	4.082	4.621	2.04E+00	9.80E-01	22	34.05	2	2.06	42.92
34.07847	1.3583	31.21	32.31	4.204	5.436	2.05E+00	9.82E-01	21	33.86	1.94	2.75	43.74

34.14606	1.3667	30.71	31.75	4.305	5.148	2.05E+00	9.83E-01	21	33.74	1.91	2.49	44.41
34.21573	1.3822	31.46	32.62	4.237	5.734	2.05E+00	9.85E-01	21	33.88	1.96	3	43.71
34.28193	1.405	32.71	33.9	4.145	5.857	2.06E+00	9.87E-01	22	34.13	2.04	3.11	42.74
34.34673	1.4323	32.71	33.84	4.232	5.582	2.06E+00	9.89E-01	22	34.11	2.04	2.85	43.1
34.41223	1.4748	32.46	33.43	4.411	4.795	2.07E+00	9.91E-01	22	34.05	2.03	2.16	43.97
34.47633	1.4984	32.59	33.43	4.481	4.184	2.07E+00	9.93E-01	22	-99	2.03	1.67	44.23
34.54113	1.5033	31.58	32.35	4.647	3.776	2.07E+00	9.95E-01	21	-99	1.97	1.36	45.37
34.60523	1.5082	32.09	32.93	4.579	4.184	2.08E+00	9.97E-01	21	-99	2	1.66	44.83
34.66864	1.5423	32.34	33.18	4.649	4.155	2.08E+00	9.99E-01	22	-99	2.02	1.63	44.96
34.73413	1.5721	31.71	32.55	4.83	4.155	2.08E+00	1.00E+00	32	-99	1.98	1.62	45.92
34.90554	1.6015	34.09	34.87	4.593	3.841	2.09E+00	1.01E+00	23	-99	2.13	1.38	43.95
34.94107	1.6147	33.59	34.35	4.701	3.75	2.10E+00	1.01E+00	22	-99	2.1	1.31	44.58
34.98358	1.6052	33.59	34.4	4.666	4.016	2.10E+00	1.01E+00	22	-99	2.1	1.5	44.43
35.02747	1.5905	34.34	35.13	4.528	3.889	2.10E+00	1.01E+00	23	34.3	2.15	1.4	43.6
35.07206	1.6191	34.97	35.65	4.542	3.359	2.10E+00	1.01E+00	23	34.41	2.19	1.04	43.41
35.11666	1.6439	34.97	35.6	4.618	3.103	2.11E+00	1.01E+00	23	-99	2.19	0.87	43.71
35.16265	1.6241	36.35	37.01	4.388	3.268	2.11E+00	1.01E+00	24	34.64	2.28	0.97	42.26
35.20933	1.6161	37.22	37.74	4.282	2.566	2.11E+00	1.01E+00	25	34.78	2.34	0.56	41.57
35.25392	1.6336	38.23	38.81	4.21	2.857	2.12E+00	1.02E+00	25	34.95	2.41	0.72	40.87
35.29991	1.8195	38.23	38.87	4.681	3.194	2.12E+00	1.02E+00	25	34.94	2.41	0.92	42.55
35.3452	2.0617	39.48	40.18	5.131	3.459	2.12E+00	1.02E+00	39	-99	2.49	1.09	43.56
35.3891	2.1073	45.37	46.36	4.546	4.866	2.12E+00	1.02E+00	30	36	2.88	2.11	39.44
35.43299	2.08	46.12	47.32	4.396	5.915	2.13E+00	1.02E+00	30	36.09	2.93	2.98	38.62
35.47689	2.1267	49.51	50.83	4.184	6.533	2.13E+00	1.02E+00	25	36.52	3.16	3.53	36.87
35.52079	2.143	59.91	60.66	3.533	3.718	2.13E+00	1.02E+00	30	37.66	3.85	1.25	32.14
35.57096	2.1467	57.15	57.5	3.733	1.731	2.13E+00	1.02E+00	28	37.37	3.67	0.16	33.58
35.62252	2.1186	52.52	53.1	3.99	2.899	2.14E+00	1.03E+00	26	36.85	3.36	0.73	35.57
35.67687	2.1862	56.4	56.98	3.837	2.883	2.14E+00	1.03E+00	28	37.27	3.62	0.71	34.08
35.734	2.2702	54.14	54.71	4.149	2.802	2.14E+00	1.03E+00	27	37.02	3.47	0.67	35.75
35.78626	2.248	62.67	63.19	3.557	2.589	2.15E+00	1.03E+00	31	37.88	4.03	0.55	31.73
35.83643	2.1788	61.16	61.59	3.538	2.09	2.15E+00	1.03E+00	30	37.73	3.93	0.3	31.97
35.8845	2.1236	61.66	61.9	3.431	1.181	2.15E+00	1.03E+00	24	37.77	3.97	0.01	31.49
35.93607	2.0487	59.78	59.96	3.417	0.867	2.16E+00	1.04E+00	24	37.58	3.84	-99	31.83
35.9946	2.0255	53.77	54.08	3.745	1.54	2.16E+00	1.04E+00	26	36.93	3.44	0.09	34.42
36.05382	2.1641	52.89	53.46	4.048	2.793	2.16E+00	1.04E+00	26	36.82	3.38	0.65	35.7
36.11235	2.2257	50.13	50.89	4.373	3.741	2.17E+00	1.04E+00	33	36.49	3.2	1.22	37.53
36.17297	2.2161	53.64	55.09	4.023	7.118	2.17E+00	1.04E+00	26	36.89	3.43	3.96	35.21
36.22871	2.3152	61.66	63.18	3.664	7.481	2.17E+00	1.04E+00	30	37.71	3.97	4.29	32.14
36.28445	2.4097	63.04	63.7	3.783	3.255	2.18E+00	1.05E+00	31	37.83	4.06	0.9	32.48
36.34507	2.3375	57.4	57.78	4.045	1.867	2.18E+00	1.05E+00	28	37.27	3.68	0.2	34.66
36.40708	2.1569	54.77	55.1	3.915	1.615	2.18E+00	1.05E+00	27	36.97	3.51	0.11	34.81
36.47049	2.0343	49.26	49.45	4.114	0.955	2.19E+00	1.05E+00	24	36.32	3.14	-99	37
36.53668	1.8983	42.11	42.45	4.472	1.67	2.19E+00	1.05E+00	27	35.33	2.66	0.12	40.47
36.60566	1.9958	36.97	38.02	5.25	5.148	2.20E+00	1.05E+00	36	-99	2.32	2.2	44.82
36.67952	2.2424	41.36	42.8	5.24	7.089	2.20E+00	1.06E+00	40	-99	2.61	3.84	42.94
36.74989	2.3005	45.62	47.23	4.87	7.953	2.21E+00	1.06E+00	30	35.8	2.89	4.64	40.27
36.814	2.2596	47.13	48.48	4.661	6.685	2.21E+00	1.06E+00	31	35.99	2.99	3.45	39.19
36.86765	2.2158	52.26	52.69	4.205	2.12	2.21E+00	1.06E+00	25	36.61	3.34	0.29	36.46
36.91573	2.1592	45.5	45.71	4.724	1.058	2.22E+00	1.06E+00	29	35.75	2.89	-99	40.26
36.96381	2.0572	39.36	39.58	5.197	1.13	2.22E+00	1.07E+00	38	-99	2.48	-99	44.01
37.01397	1.9075	34.47	34.8	5.482	1.625	2.22E+00	1.07E+00	33	-99	2.15	0.1	47.01
37.06344	0	31.71	32.31	0	2.987	2.22E+00	1.07E+00	10	-99	-7.13	0.71	-99
37.1164	0	31.21	32.02	0	3.996	2.23E+00	1.07E+00	10	-99	-7.13	1.32	-99
37.17632	0	32.09	33.05	0	4.776	2.23E+00	1.07E+00	10	-99	-7.13	1.86	-99
37.23555	0	34.34	35.54	0	5.902	2.23E+00	1.07E+00	8	-99	-7.13	2.72	-99
37.29408	0	40.73	42.22	0	7.338	2.24E+00	1.07E+00	10	-99	-7.13	3.95	-99
37.3324	0	56.28	57.8	0	7.513	2.24E+00	1.08E+00	14	-99	-7.13	4.11	-99



Suelos, PSC.

Soil & Construction Materials Laboratory and Environmental Drilling Services

Test Id: CPT C C Date: 3-Nov-21
Site: DIKE C Cone Id: 3045.123xx
Location: Gurabo
Project: DIKES Density 120 PCF
Operator | w: RTH | Nicolas

Depth (ft)	Sleeve Stress (tsf)	TIPStresUNC (tsf)	TIPStresCOR (tsf)	Ratio COR (%)	Pore Pressure (tsf)	Overburden (tsf)	Eff. Overburden (tsf)	SPT N60c (blows/ft)	Friction Angle (deg)	Su (tsf)	OCR ()	FC (%)
0	0	0	0	0	0	0.00E+00	0.00E+00	-99	0	0	-99	-99
0.19659	0	4.14	4.17	0	0.159	1.18E-02	5.66E-03	4	-99	-7.13	35.53	-99
0.29279	0.1298	3.89	3.9	3.324	0.094	1.76E-02	8.43E-03	7	48.04	-7.13	8.78	89.24
0.39247	0.0952	3.13	3.13	3.041	-0.013	2.36E-02	1.13E-02	5	45.8	-7.13	-99	94.67
0.49147	0.0877	2.63	2.61	3.36	-0.11	2.95E-02	1.42E-02	4	43.9	-7.13	-99	-99
0.58976	0.0915	1.88	1.87	4.901	-0.064	3.54E-02	1.70E-02	3	41.24	-7.13	-99	-99
0.65598	0.0908	1.5	1.5	6.057	-0.026	3.94E-02	1.89E-02	3	39.43	-7.13	-99	-99
0.69851	0.0876	1.5	1.51	5.819	0.007	4.19E-02	2.01E-02	3	39.08	-7.13	-99	-99
0.74731	0.0856	1.5	1.5	5.695	-0.003	4.48E-02	2.15E-02	3	38.69	-7.13	-99	-99
0.81214	0.0844	1.76	1.75	4.819	-0.016	4.87E-02	2.34E-02	3	39.1	-7.13	-99	-99
0.91182	0.0931	1.88	1.88	4.945	0.01	5.47E-02	2.63E-02	3	38.83	-7.13	-99	-99
1.01151	0.0972	1.88	1.88	5.159	0.017	6.07E-02	2.91E-02	3	38.23	0.12	-99	-99
1.1119	0.092	2.01	2.01	4.581	0.007	6.67E-02	3.20E-02	3	38.05	0.13	-99	-99
1.21158	0.0973	1.76	1.77	5.491	0.081	7.27E-02	3.49E-02	3	-99	0.11	0.45	-99
1.30988	0.0882	1.76	1.76	4.999	0.046	7.86E-02	3.77E-02	3	36.27	0.11	0.02	-99
1.40886	0.075	1.88	1.89	3.979	0.026	8.45E-02	4.06E-02	3	36.24	0.12	-99	-99
1.50716	0.0713	1.5	1.51	4.731	0.017	9.04E-02	4.34E-02	3	-99	0.09	-99	-99
1.60545	0.0566	1.13	1.13	5.016	0	9.63E-02	4.62E-02	2	-99	0.07	-99	-99
1.70305	0.0433	1.25	1.25	3.457	-0.003	1.02E-01	4.91E-02	2	32.41	0.08	-99	-99
1.80274	0.0224	0.75	0.75	2.97	0.007	1.08E-01	5.19E-02	-99	-99	0.04	-99	-99
1.90103	0.0109	0	0	793.802	0.007	1.14E-01	5.48E-02	-99	-99	-7.13	-99	-99
1.99723	-0.0003	0	0	-8.18	0.017	1.20E-01	5.75E-02	-99	-99	-7.13	-99	-99
2.09343	-0.0092	0.25	0.25	-3.688	0	1.26E-01	6.03E-02	-99	-99	-7.13	-99	-99
2.18963	-0.0128	-0.13	-0.13	9.82	-0.026	1.31E-01	6.31E-02	-99	-99	-7.13	-99	-99
2.28444	-0.0144	0.25	0.24	-5.94	-0.039	1.37E-01	6.58E-02	-99	-99	-7.13	-99	-99
2.37995	-0.0121	0.38	0.37	-3.261	-0.029	1.43E-01	6.85E-02	-99	-99	-7.13	-99	-99
2.47615	-0.0048	1	1	-0.477	-0.022	1.49E-01	7.13E-02	-99	-99	-7.13	-99	-99
2.57095	0.0022	1.25	1.25	0.179	-0.006	1.54E-01	7.40E-02	1	29.55	0.07	-99	87.45
2.66576	0.0263	1.63	1.63	1.617	-0.003	1.60E-01	7.68E-02	1	31.14	0.1	-99	-99
2.76196	0.0497	1.5	1.5	3.317	-0.029	1.66E-01	7.95E-02	3	-99	0.09	-99	-99
2.85747	0.0787	2.26	2.24	3.519	-0.1	1.71E-01	8.23E-02	4	32.88	0.14	-99	-99
2.95227	0.1013	2.63	2.6	3.894	-0.152	1.77E-01	8.50E-02	4	33.68	0.16	-99	-99
3.04708	0.104	2.63	2.59	4.014	-0.213	1.83E-01	8.78E-02	4	33.48	0.16	-99	-99
3.14398	0.0852	3.01	2.95	2.887	-0.291	1.89E-01	9.06E-02	5	34.14	0.19	-99	95.62
3.24018	0.0595	1.76	1.68	3.549	-0.385	1.94E-01	9.33E-02	3	-99	0.1	-99	-99
3.33638	0.03	1.13	1.07	2.797	-0.272	2.00E-01	9.61E-02	2	-99	0.06	-99	-99
3.43398	0.0114	1	1	1.141	-0.019	2.06E-01	9.89E-02	-99	25.75	0.05	-99	-99
3.53227	-0.0006	0.63	0.62	-0.092	-0.029	2.12E-01	1.02E-01	-99	-99	-7.13	-99	-99
3.62917	-0.0042	0.38	0.37	-1.117	-0.009	2.18E-01	1.05E-01	-99	-99	-7.13	-99	-99
3.72677	-0.0054	0.63	0.62	-0.867	-0.022	2.24E-01	1.07E-01	-99	-99	-7.13	-99	-99
3.80066	0.0004	1.25	1.25	0.03	-0.009	2.28E-01	1.10E-01	1	-99	-7.13	-99	81.93
4.00143	0.0067	2.01	2	0.334	-0.006	2.40E-01	1.15E-01	2	29.75	0.12	-99	76.28
4.08578	0.0115	1.63	1.62	0.708	-0.029	2.45E-01	1.18E-01	1	28.09	0.09	-99	92.4
4.18477	0.0134	1.63	1.64	0.819	0.039	2.51E-01	1.21E-01	1	27.91	0.09	-99	94.17
4.28237	0.0171	1.5	1.52	1.126	0.055	2.57E-01	1.23E-01	1	27.15	0.08	-99	-99
4.38066	0.0244	1.38	1.39	1.762	0.036	2.63E-01	1.26E-01	1	-99	0.07	-99	-99
4.47965	0.0265	1.25	1.26	2.102	0.023	2.69E-01	1.29E-01	1	-99	0.07	-99	-99
4.57864	0.0469	2.26	2.27	2.07	0.052	2.75E-01	1.32E-01	2	29.62	0.13	-99	98.17
4.67693	0.0621	2.26	2.27	2.738	0.055	2.81E-01	1.35E-01	4	-99	0.13	-99	-99
4.77523	0.0714	2.51	2.49	2.866	-0.084	2.87E-01	1.38E-01	4	-99	0.15	-99	-99

4.87282	0.0753	2.26	2.23	3.373	-0.119	2.92E-01	1.40E-01	4	-99	0.13	-99	-99
4.96903	0.0844	2.26	2.23	3.792	-0.149	2.98E-01	1.43E-01	4	-99	0.13	-99	-99
5.06592	0.0898	2.51	2.46	3.644	-0.217	3.04E-01	1.46E-01	4	-99	0.15	-99	-99
5.16352	0.0827	2.76	2.72	3.044	-0.197	3.10E-01	1.49E-01	4	-99	0.16	-99	99.61
5.26112	0.0757	2.63	2.6	2.906	-0.139	3.16E-01	1.52E-01	4	-99	0.15	-99	-99
5.35801	0.0745	3.01	2.97	2.509	-0.2	3.22E-01	1.54E-01	5	30.55	0.18	-99	92.54
5.61664	0.0783	3.51	3.46	2.264	-0.265	3.37E-01	1.62E-01	6	31.29	0.21	-99	85.53
5.71912	0.0957	3.38	3.33	2.877	-0.291	3.43E-01	1.65E-01	5	30.92	0.2	-99	91.49
5.81601	0.0981	3.26	3.2	3.065	-0.291	3.49E-01	1.68E-01	5	-99	0.19	-99	94.09
5.86969	0.0958	3.13	3.07	3.117	-0.297	3.52E-01	1.69E-01	5	-99	0.19	-99	95.82
5.92337	0.0936	3.01	2.95	3.173	-0.284	3.55E-01	1.71E-01	5	-99	0.18	-99	97.61
5.97217	0.0936	3.01	2.95	3.178	-0.307	3.58E-01	1.72E-01	5	-99	0.18	-99	97.7
6.04188	0.0945	2.76	2.7	3.501	-0.294	3.63E-01	1.74E-01	4	-99	0.16	-99	-99
6.12693	0.0955	2.63	2.58	3.705	-0.272	3.68E-01	1.77E-01	4	-99	0.15	-99	-99
6.21476	0.0946	2.63	2.58	3.67	-0.268	3.73E-01	1.79E-01	4	-99	0.15	-99	-99
6.29842	0.0885	2.13	2.07	4.264	-0.278	3.78E-01	1.81E-01	3	-99	0.12	-99	-99
6.38277	0.074	2.01	1.95	3.794	-0.278	3.83E-01	1.84E-01	3	-99	0.11	-99	-99
6.46921	0.0603	1.88	1.83	3.292	-0.236	3.88E-01	1.86E-01	3	-99	0.1	-99	-99
6.55287	0.0538	1.63	1.59	3.391	-0.207	3.93E-01	1.89E-01	3	-99	0.08	-99	-99
6.63791	0.0499	1.5	1.47	3.397	-0.174	3.98E-01	1.91E-01	2	-99	0.07	-99	-99
6.72296	0.0472	1.5	1.47	3.205	-0.149	4.03E-01	1.94E-01	2	-99	0.07	-99	-99
6.8094	0.0427	1.38	1.35	3.161	-0.132	4.09E-01	1.96E-01	2	-99	0.06	-99	-99
6.89306	0.0366	1.38	1.36	2.694	-0.103	4.14E-01	1.99E-01	2	-99	0.06	-99	-99
6.9788	0.0292	1.13	1.11	2.618	-0.071	4.19E-01	2.01E-01	2	-99	0.05	-99	-99
7.06594	0.0231	1	0.99	2.326	-0.039	4.24E-01	2.04E-01	-99	-99	0.04	-99	-99
7.15308	0.0187	1	1	1.859	0.004	4.29E-01	2.06E-01	-99	-99	0.04	-99	-99
7.23882	0.0138	0.88	0.88	1.562	0.033	4.34E-01	2.09E-01	-99	-99	0.03	-99	-99
7.32527	0.0123	0.75	0.76	1.61	0.062	4.40E-01	2.11E-01	-99	-99	0.02	-99	-99
7.41241	0.012	0.75	0.77	1.549	0.097	4.45E-01	2.14E-01	-99	-99	0.02	-99	-99
7.49885	0.0083	0.63	0.65	1.273	0.136	4.50E-01	2.16E-01	-99	-99	-7.13	-99	-99
7.58389	0.0047	0.63	0.66	0.717	0.172	4.55E-01	2.18E-01	-99	-99	-7.13	-99	-99
7.67103	0.0034	0.63	0.67	0.504	0.211	4.60E-01	2.21E-01	-99	-99	-7.13	-99	-99
7.76026	0.0071	0.75	0.8	0.885	0.246	4.66E-01	2.24E-01	-99	-99	0.02	0	-99
7.8488	0.0091	0.75	0.81	1.126	0.285	4.71E-01	2.26E-01	-99	-99	0.02	0.03	-99
7.93733	0.0078	0.75	0.82	0.958	0.324	4.76E-01	2.29E-01	-99	-99	0.02	0.07	-99
8.02726	0.0086	0.75	0.82	1.039	0.353	4.82E-01	2.31E-01	-99	-99	0.02	0.1	-99
8.11579	0.009	0.63	0.71	1.27	0.395	4.87E-01	2.34E-01	-99	-99	-7.13	0.16	-99
8.20293	0.0071	0.63	0.71	0.998	0.434	4.92E-01	2.36E-01	-99	-99	-7.13	0.22	-99
8.28728	0.0045	0.75	0.85	0.531	0.486	4.97E-01	2.39E-01	-99	-99	0.02	0.31	-99
8.37442	0.0005	0.75	0.86	0.053	0.521	5.03E-01	2.41E-01	-99	-99	0.02	0.37	96.55
8.46505	-0.0035	0.63	0.74	-0.477	0.544	5.08E-01	2.44E-01	-99	-99	-7.13	0.4	-99
8.55009	-0.0071	0.38	0.49	-1.448	0.567	5.13E-01	2.46E-01	-99	-99	-7.13	0.44	-99
8.63026	-0.0097	0.38	0.5	-1.96	0.599	5.18E-01	2.49E-01	-99	-99	-7.13	0.49	-99
8.70973	-0.0102	0.38	0.5	-2.025	0.631	5.23E-01	2.51E-01	-99	-99	-7.13	0.55	-99
8.80036	-0.0076	0.5	0.64	-1.185	0.673	5.28E-01	2.54E-01	-99	-99	-7.13	0.63	-99
8.8868	-0.0052	0.5	0.65	-0.81	0.712	5.33E-01	2.56E-01	-99	-99	-7.13	0.7	-99
8.97464	-0.0041	0.38	0.53	-0.768	0.754	5.39E-01	2.59E-01	-99	-99	-7.13	0.78	-99
9.06178	-0.0019	0.38	0.53	-0.363	0.784	5.44E-01	2.61E-01	-99	-99	-7.13	0.83	-99
9.14822	-0.0037	0.38	0.54	-0.694	0.787	5.49E-01	2.64E-01	-99	-99	-7.13	0.82	-99
9.23884	-0.0052	0.38	0.53	-0.989	0.754	5.54E-01	2.66E-01	-99	-99	-7.13	0.73	-99
9.33365	-0.0052	0.38	0.53	-0.985	0.764	5.60E-01	2.69E-01	-99	-99	-7.13	0.74	-99
9.42497	-0.0061	0.38	0.54	-1.14	0.803	5.66E-01	2.71E-01	-99	-99	-7.13	0.81	-99
9.5149	-0.009	0.38	0.54	-1.671	0.79	5.71E-01	2.74E-01	-99	-99	-7.13	0.76	-99
9.60692	-0.009	0.25	0.42	-2.147	0.822	5.76E-01	2.77E-01	-99	-99	-7.13	0.81	-99
9.69685	-0.0085	0.25	0.43	-1.986	0.884	5.82E-01	2.79E-01	-99	-99	-7.13	0.93	-99
9.78677	-0.0078	0.25	0.42	-1.859	0.842	5.87E-01	2.82E-01	-99	-99	-7.13	0.82	-99
9.8774	-0.0101	0.25	0.41	-2.444	0.803	5.93E-01	2.85E-01	-99	-99	-7.13	0.72	-99
9.96942	-0.0075	0.13	0.29	-2.579	0.809	5.98E-01	2.87E-01	-99	-99	-7.13	0.72	-99
10.06283	-0.0086	0.13	0.29	-2.948	0.816	6.04E-01	2.90E-01	-99	-99	-7.13	0.72	-99
10.15346	-0.0071	0.13	0.29	-2.44	0.816	6.09E-01	2.92E-01	-99	-99	-7.13	0.7	-99
10.24478	-0.0064	0.25	0.42	-1.53	0.842	6.15E-01	2.95E-01	-99	-99	-7.13	0.74	-99
10.33749	-0.0034	0.25	0.42	-0.806	0.822	6.20E-01	2.98E-01	-99	-99	-7.13	0.69	-99
10.43091	-0.0034	0.38	0.53	-0.63	0.777	6.26E-01	3.00E-01	-99	-99	-7.13	0.59	-99
10.52223	-0.0048	0.38	0.53	-0.909	0.764	6.31E-01	3.03E-01	-99	-99	-7.13	0.55	-99
10.61564	-0.0061	0.38	0.52	-1.165	0.735	6.37E-01	3.06E-01	-99	-99	-7.13	0.49	-99
10.70208	-0.0062	0.38	0.53	-1.179	0.745	6.42E-01	3.08E-01	-99	-99	-7.13	0.5	-99

10.78434	-0.0062	0.25	0.4	-1.531	0.761	6.47E-01	3.11E-01	-99	-99	-7.13	0.51	-99
10.86521	-0.0052	0.25	0.41	-1.274	0.79	6.52E-01	3.13E-01	-99	-99	-7.13	0.55	-99
10.94956	-0.0052	0.38	0.54	-0.968	0.809	6.57E-01	3.15E-01	-99	-99	-7.13	0.58	-99
11.0374	-0.0052	0.38	0.54	-0.96	0.832	6.62E-01	3.18E-01	-99	-99	-7.13	0.61	-99
11.12175	-0.0061	0.25	0.42	-1.45	0.832	6.67E-01	3.20E-01	-99	-99	-7.13	0.59	-99
11.2061	-0.0062	0.38	0.54	-1.146	0.832	6.72E-01	3.23E-01	-99	-99	-7.13	0.58	-99
11.29184	-0.0044	0.38	0.55	-0.798	0.848	6.78E-01	3.25E-01	-99	-99	-7.13	0.6	-99
11.37759	-0.0034	0.5	0.68	-0.494	0.881	6.83E-01	3.28E-01	-99	-99	-7.13	0.65	-99
11.46124	-0.0034	0.63	0.8	-0.42	0.855	6.88E-01	3.30E-01	-99	-99	-7.13	0.59	-99
11.54559	-0.0046	0.63	0.79	-0.582	0.816	6.93E-01	3.33E-01	-99	-99	-7.13	0.52	-99
11.63273	-0.0052	0.5	0.66	-0.794	0.777	6.98E-01	3.35E-01	-99	-99	-7.13	0.45	-99
11.70941	-0.0052	0.5	0.66	-0.794	0.777	7.03E-01	3.37E-01	-99	-99	-7.13	0.44	-99
11.78679	-0.0048	0.5	0.66	-0.729	0.787	7.07E-01	3.40E-01	-99	-99	-7.13	0.44	-99
11.86557	-0.0034	0.5	0.67	-0.503	0.822	7.12E-01	3.42E-01	-99	-99	-7.13	0.49	-99
12.06355	-0.0034	0.5	0.67	-0.504	0.819	7.24E-01	3.47E-01	-99	-99	-7.13	0.47	-99
12.14162	-0.0034	0.5	0.67	-0.498	0.855	7.29E-01	3.50E-01	-99	-99	-7.13	0.51	-99
12.21691	-0.0052	0.5	0.68	-0.765	0.894	7.33E-01	3.52E-01	-99	-99	-7.13	0.56	-99
12.2922	-0.0106	0.5	0.69	-1.552	0.91	7.38E-01	3.54E-01	-99	-99	-7.13	0.58	-99
12.36679	-0.0026	0.63	0.81	-0.321	0.91	7.42E-01	3.56E-01	-99	-99	-7.13	0.57	-99
12.43929	0.019	0.75	0.94	2.02	0.936	7.46E-01	3.58E-01	-99	-99	-7.13	0.6	-99
12.5111	0.019	2.38	2.52	0.753	0.683	7.51E-01	3.60E-01	2	-99	0.11	0.25	78.09
12.58429	0.0171	2.88	2.98	0.574	0.492	7.55E-01	3.62E-01	2	23.86	0.14	0.05	69.5
12.65819	0.0155	1.13	1.3	1.191	0.835	7.60E-01	3.65E-01	1	-99	0.02	0.43	-99
12.73069	0.019	0.5	0.66	2.856	0.803	7.64E-01	3.67E-01	-99	-99	-7.13	0.38	-99
12.80319	0.0167	0.5	0.68	2.471	0.864	7.68E-01	3.69E-01	-99	-99	-7.13	0.46	-99
12.87638	-0.0015	0.5	0.68	-0.218	0.9	7.73E-01	3.71E-01	-99	-99	-7.13	0.5	-99
12.94888	-0.0015	0.63	0.81	-0.184	0.923	7.77E-01	3.73E-01	-99	-99	-7.13	0.53	-99
13.02208	-0.0015	0.75	0.95	-0.158	0.962	7.81E-01	3.75E-01	-99	-99	-7.13	0.58	-99
13.09528	-0.0033	0.75	0.95	-0.35	0.968	7.86E-01	3.77E-01	-99	-99	-7.13	0.58	-99
13.16847	-0.0034	0.75	0.95	-0.354	0.971	7.90E-01	3.79E-01	-99	-99	-7.13	0.57	-99
13.24236	-0.0015	0.75	0.95	-0.156	0.994	7.95E-01	3.81E-01	-99	-99	-7.13	0.6	-99
13.31835	0.0002	0.88	1.08	0.02	0.997	7.99E-01	3.84E-01	1	-99	-7.13	0.6	88.11
13.39085	-0.0033	0.75	0.96	-0.345	1.017	8.04E-01	3.86E-01	-99	-99	-7.13	0.62	-99
13.46265	-0.0016	0.88	1.08	-0.144	1.017	8.08E-01	3.88E-01	-99	-99	-7.13	0.61	-99
13.53585	-0.0051	1	1.21	-0.419	1.026	8.12E-01	3.90E-01	-99	-99	-7.13	0.61	-99
13.60905	-0.007	1	1.23	-0.571	1.097	8.17E-01	3.92E-01	-99	-99	-7.13	0.71	-99
13.68573	-0.0052	1	1.23	-0.426	1.123	8.21E-01	3.94E-01	-99	-99	-7.13	0.74	-99
13.75893	-0.0034	1	1.23	-0.272	1.127	8.26E-01	3.96E-01	-99	-99	-7.13	0.74	-99
13.83282	-0.0015	1	1.23	-0.121	1.12	8.30E-01	3.98E-01	-99	-99	-7.13	0.72	-99
13.90672	-0.0015	1.13	1.35	-0.11	1.104	8.34E-01	4.01E-01	-99	-99	-7.13	0.69	-99
13.97991	-0.0015	1.13	1.36	-0.11	1.143	8.39E-01	4.03E-01	-99	-99	-7.13	0.73	-99
14.05241	-0.0015	1.13	1.36	-0.11	1.13	8.43E-01	4.05E-01	-99	-99	-7.13	0.71	-99
14.12352	-0.0015	1.13	1.35	-0.114	1.114	8.47E-01	4.07E-01	-99	-99	-7.13	0.67	-99
14.19602	-0.0034	1.13	1.35	-0.248	1.11	8.52E-01	4.09E-01	-99	-99	-7.13	0.66	-99
14.26921	-0.0034	1	1.23	-0.273	1.123	8.56E-01	4.11E-01	-99	-99	-7.13	0.67	-99
14.34241	-0.0035	1.13	1.36	-0.257	1.152	8.61E-01	4.13E-01	-99	-99	-7.13	0.7	-99
14.41561	-0.0049	1.13	1.37	-0.36	1.175	8.65E-01	4.15E-01	-99	-99	-7.13	0.73	-99
14.48741	-0.0029	1.13	1.37	-0.21	1.188	8.69E-01	4.17E-01	-99	-99	-7.13	0.74	-99
14.55991	-0.0015	1.25	1.49	-0.1	1.156	8.74E-01	4.19E-01	-99	-99	-7.13	0.69	-99
14.63102	-0.0022	1.25	1.49	-0.151	1.146	8.78E-01	4.21E-01	-99	-99	-7.13	0.66	-99
14.69864	-0.0034	1.25	1.49	-0.225	1.169	8.82E-01	4.23E-01	-99	-99	-7.13	0.69	-99
14.76417	-0.0034	1.13	1.37	-0.246	1.172	8.86E-01	4.25E-01	-99	-99	-7.13	0.69	-99
14.82969	-0.0028	1.13	1.37	-0.204	1.178	8.90E-01	4.27E-01	-99	-99	-7.13	0.69	-99
14.89732	-0.0015	1.25	1.49	-0.1	1.185	8.94E-01	4.29E-01	-99	-99	-7.13	0.69	-99
14.96633	-0.0015	1.25	1.49	-0.1	1.172	8.98E-01	4.31E-01	-99	-99	-7.13	0.66	-99
15.03395	-0.0001	1.25	1.49	-0.006	1.162	9.02E-01	4.33E-01	-99	-99	-7.13	0.64	-99
15.10226	0.003	1.38	1.62	0.185	1.182	9.06E-01	4.35E-01	1	-99	0.03	0.66	78.53
15.17128	0.0053	1.25	1.49	0.359	1.156	9.10E-01	4.37E-01	1	-99	0.02	0.62	87.3
15.27306	0.0021	1.38	1.58	0.132	1.013	9.16E-01	4.40E-01	1	-99	0.03	0.44	77.14
15.34556	0	1.5	1.73	-0.002	1.091	9.21E-01	4.42E-01	-99	-99	-7.13	0.52	-99
15.41736	-0.0053	1.38	1.61	-0.332	1.149	9.25E-01	4.44E-01	-99	-99	-7.13	0.59	-99
15.48916	-0.0073	1.38	1.63	-0.447	1.246	9.29E-01	4.46E-01	-99	-99	-7.13	0.71	-99
15.56166	-0.0108	1.38	1.63	-0.662	1.256	9.34E-01	4.48E-01	-99	-99	-7.13	0.71	-99
15.63416	-0.0106	1.38	1.64	-0.644	1.308	9.38E-01	4.50E-01	-99	-99	-7.13	0.77	-99
15.70666	-0.0066	1.38	1.64	-0.405	1.279	9.42E-01	4.52E-01	-99	-99	-7.13	0.73	-99
15.77916	-0.0015	1.38	1.63	-0.092	1.246	9.47E-01	4.54E-01	-99	-99	-7.13	0.68	-99

15.85166	-0.0012	1.5	1.75	-0.07	1.23	9.51E-01	4.57E-01	-99	-99	-7.13	0.65	-99
15.92346	0.0007	1.5	1.74	0.038	1.185	9.55E-01	4.59E-01	1	-99	-7.13	0.59	70.49
15.99457	0.0022	1.5	1.75	0.128	1.198	9.60E-01	4.61E-01	1	-99	0.04	0.6	73.68
16.06568	0.0022	1.5	1.75	0.127	1.233	9.64E-01	4.63E-01	1	-99	0.04	0.63	73.52
16.13539	0.0019	1.5	1.76	0.108	1.259	9.68E-01	4.65E-01	1	-99	0.04	0.66	72.6
16.2058	0.0004	1.5	1.76	0.021	1.279	9.72E-01	4.67E-01	1	-99	-7.13	0.68	70.8
16.2776	0.0004	1.5	1.76	0.021	1.272	9.77E-01	4.69E-01	1	-99	-7.13	0.66	70.82
16.34592	0.0004	1.63	1.89	0.02	1.279	9.81E-01	4.71E-01	1	-99	-7.13	0.66	68.77
16.41632	0.0004	1.63	1.89	0.02	1.282	9.85E-01	4.73E-01	1	-99	-7.13	0.66	68.76
16.48673	0.0007	1.76	2.01	0.037	1.269	9.89E-01	4.75E-01	1	-99	-7.13	0.64	65.97
16.55714	0.0022	1.76	2.01	0.111	1.259	9.93E-01	4.77E-01	1	-99	0.05	0.62	68.47
16.62755	0.0026	1.76	2.02	0.128	1.298	9.98E-01	4.79E-01	1	-99	0.05	0.66	69.05
16.69796	0.0045	1.88	2.14	0.208	1.301	1.00E+00	4.81E-01	1	-99	0.06	0.66	70.14
16.76697	0.0056	1.88	2.14	0.263	1.295	1.01E+00	4.83E-01	1	-99	0.06	0.64	71.99
16.83668	0.0038	1.88	2.15	0.177	1.308	1.01E+00	4.85E-01	1	-99	0.06	0.65	69
16.90779	0.0019	1.88	2.14	0.089	1.256	1.01E+00	4.87E-01	1	-99	0.06	0.58	65.72
16.9782	-0.0007	1.88	2.12	-0.032	1.198	1.02E+00	4.89E-01	-99	-99	-7.13	0.51	-99
17.04861	-0.0056	1.76	1.99	-0.283	1.182	1.02E+00	4.91E-01	-99	-99	-7.13	0.49	-99
17.11901	-0.0081	1.63	1.87	-0.433	1.204	1.03E+00	4.93E-01	-99	-99	-7.13	0.51	-99
17.18942	-0.0108	1.63	1.87	-0.577	1.207	1.03E+00	4.95E-01	-99	-99	-7.13	0.51	-99
17.25914	-0.012	1.63	1.87	-0.643	1.201	1.04E+00	4.97E-01	-99	-99	-7.13	0.5	-99
17.32745	-0.0146	1.63	1.87	-0.779	1.178	1.04E+00	4.99E-01	-99	-99	-7.13	0.47	-99
17.39437	-0.0151	1.63	1.87	-0.808	1.204	1.04E+00	5.01E-01	-99	-99	-7.13	0.49	-99
17.462	-0.017	1.5	1.75	-0.971	1.217	1.05E+00	5.03E-01	-99	-99	-7.13	0.5	-99
17.53031	-0.0183	1.63	1.87	-0.975	1.211	1.05E+00	5.05E-01	-99	-99	-7.13	0.49	-99
17.59933	-0.0176	1.63	1.87	-0.942	1.195	1.06E+00	5.07E-01	-99	-99	-7.13	0.47	-99
17.66694	-0.0158	1.76	2	-0.789	1.204	1.06E+00	5.09E-01	-99	-99	-7.13	0.47	-99
17.73457	-0.0146	1.63	1.88	-0.776	1.214	1.06E+00	5.11E-01	-99	-99	-7.13	0.48	-99
17.80288	-0.0139	1.63	1.87	-0.74	1.204	1.07E+00	5.13E-01	-99	-99	-7.13	0.46	-99
17.8698	-0.0127	1.76	2	-0.634	1.211	1.07E+00	5.15E-01	-99	-99	-7.13	0.46	-99
17.93743	-0.012	1.76	2.01	-0.599	1.237	1.08E+00	5.17E-01	-99	-99	-7.13	0.48	-99
18.00435	-0.0108	1.88	2.13	-0.508	1.233	1.08E+00	5.19E-01	-99	-99	-7.13	0.48	-99
18.07197	-0.0102	1.88	2.13	-0.477	1.224	1.08E+00	5.21E-01	-99	-99	-7.13	0.46	-99
18.13889	-0.012	2.01	2.26	-0.534	1.23	1.09E+00	5.22E-01	-99	-99	-7.13	0.46	-99
18.20651	-0.0111	2.01	2.25	-0.492	1.201	1.09E+00	5.24E-01	-99	-99	-7.13	0.43	-99
18.27413	-0.0079	2.01	2.25	-0.349	1.195	1.10E+00	5.26E-01	-99	-99	-7.13	0.42	-99
18.34175	-0.0071	1.88	2.13	-0.334	1.214	1.10E+00	5.28E-01	-99	-99	-7.13	0.43	-99
18.40937	-0.0071	1.88	2.13	-0.333	1.22	1.11E+00	5.30E-01	-99	-99	-7.13	0.44	-99
18.46584	-0.0071	1.5	1.75	-0.405	1.217	1.11E+00	5.32E-01	-99	-99	-7.13	0.43	-99
18.51394	-0.0077	2.26	2.48	-0.309	1.084	1.11E+00	5.33E-01	-99	-99	-7.13	0.31	-99
18.60526	-0.009	2.26	2.49	-0.36	1.136	1.12E+00	5.36E-01	-99	-99	-7.13	0.35	-99
18.69449	-0.0113	2.13	2.37	-0.478	1.188	1.12E+00	5.38E-01	-99	-99	-7.13	0.39	-99
18.78163	-0.0127	2.13	2.38	-0.533	1.22	1.13E+00	5.41E-01	-99	-99	-7.13	0.41	-99
18.86877	-0.0108	2.13	2.37	-0.457	1.195	1.13E+00	5.43E-01	-99	-99	-7.13	0.39	-99
18.94267	-0.0126	2.26	2.5	-0.505	1.185	1.14E+00	5.46E-01	-99	-99	-7.13	0.37	-99
19.01447	-0.0107	2.26	2.49	-0.432	1.146	1.14E+00	5.48E-01	-99	-99	-7.13	0.33	-99
19.08767	-0.009	2.26	2.49	-0.359	1.172	1.15E+00	5.50E-01	-99	-99	-7.13	0.35	-99
19.16156	-0.0088	2.38	2.64	-0.335	1.256	1.15E+00	5.52E-01	-99	-99	-7.13	0.42	-99
19.23336	-0.0071	2.38	2.65	-0.268	1.317	1.15E+00	5.54E-01	-99	-99	-7.13	0.48	-99
19.30516	-0.0071	2.38	2.66	-0.267	1.373	1.16E+00	5.56E-01	-99	-99	-7.13	0.52	-99
19.37697	-0.007	2.63	2.92	-0.241	1.398	1.16E+00	5.58E-01	-99	-99	-7.13	0.54	-99
19.45016	-0.0053	2.51	2.78	-0.189	1.363	1.17E+00	5.60E-01	-99	-99	-7.13	0.51	-99
19.52267	-0.0071	2.51	2.78	-0.255	1.334	1.17E+00	5.62E-01	-99	-99	-7.13	0.47	-99
19.59656	-0.0052	2.63	2.91	-0.18	1.376	1.18E+00	5.64E-01	-99	-99	-7.13	0.51	-99
19.66836	-0.0052	2.63	2.92	-0.179	1.395	1.18E+00	5.66E-01	-99	-99	-7.13	0.52	-99
19.74295	-0.0052	2.63	2.92	-0.179	1.405	1.19E+00	5.69E-01	-99	-99	-7.13	0.53	-99
19.81685	-0.0052	2.63	2.91	-0.179	1.382	1.19E+00	5.71E-01	-99	-99	-7.13	0.5	-99
19.89074	-0.0052	2.76	3.04	-0.172	1.389	1.19E+00	5.73E-01	-99	-99	-7.13	0.5	-99
19.96394	-0.0017	2.63	2.92	-0.058	1.408	1.20E+00	5.75E-01	-99	-99	-7.13	0.51	-99
20.03713	-0.0015	2.88	3.17	-0.047	1.395	1.20E+00	5.77E-01	-99	-99	-7.13	0.5	-99
20.11242	-0.0033	2.88	3.16	-0.103	1.382	1.21E+00	5.79E-01	-99	-99	-7.13	0.48	-99
20.18701	-0.0034	2.76	3.05	-0.11	1.437	1.21E+00	5.81E-01	-99	-99	-7.13	0.53	-99
20.2616	-0.0034	2.76	3.06	-0.11	1.476	1.22E+00	5.84E-01	-99	-99	-7.13	0.56	-99
20.3355	-0.0052	2.88	3.19	-0.162	1.515	1.22E+00	5.86E-01	-99	-99	-7.13	0.59	-99
20.41009	-0.0089	2.88	3.2	-0.279	1.544	1.23E+00	5.88E-01	-99	-99	-7.13	0.61	-99
20.48468	-0.0071	3.01	3.32	-0.214	1.538	1.23E+00	5.90E-01	-99	-99	-7.13	0.6	-99

20.55857	-0.0071	3.01	3.32	-0.214	1.538	1.23E+00	5.92E-01	-99	-99	-7.13	0.59	-99
20.63107	-0.0054	3.01	3.32	-0.162	1.528	1.24E+00	5.94E-01	-99	-99	-7.13	0.58	-99
20.70288	-0.0052	2.88	3.17	-0.165	1.395	1.24E+00	5.96E-01	-99	-99	-7.13	0.46	-99
20.77747	-0.0052	2.88	3.18	-0.164	1.483	1.25E+00	5.98E-01	-99	-99	-7.13	0.53	-99
20.85555	-0.0036	3.01	3.33	-0.108	1.583	1.25E+00	6.01E-01	-99	-99	-7.13	0.62	-99
20.93153	-0.0051	3.01	3.34	-0.154	1.644	1.26E+00	6.03E-01	-99	-99	-7.13	0.67	-99
21.00821	-0.0071	2.88	3.22	-0.221	1.648	1.26E+00	6.05E-01	-99	-99	-7.13	0.67	-99
21.0835	-0.0063	2.88	3.2	-0.195	1.576	1.27E+00	6.07E-01	-99	-99	-7.13	0.59	-99
21.15879	0.0016	3.01	3.32	0.049	1.531	1.27E+00	6.09E-01	2	-99	-7.13	0.55	51.92
21.2285	0.0081	3.13	3.44	0.235	1.518	1.27E+00	6.11E-01	2	-99	0.12	0.53	57.22
21.29821	0.0099	3.26	3.55	0.278	1.415	1.28E+00	6.13E-01	2	-99	0.13	0.44	57.67
21.36932	0.0122	3.38	3.67	0.334	1.385	1.28E+00	6.15E-01	2	-99	0.14	0.41	58.26
21.44042	0.0189	3.26	3.57	0.529	1.512	1.29E+00	6.18E-01	2	-99	0.13	0.51	63.43
21.51223	0.0256	3.38	3.72	0.687	1.664	1.29E+00	6.20E-01	2	-99	0.14	0.64	65.17
21.58542	0.0324	3.38	3.73	0.868	1.709	1.30E+00	6.22E-01	2	-99	0.14	0.68	68.02
21.65583	0.0433	3.64	3.98	1.088	1.69	1.30E+00	6.24E-01	2	-99	0.16	0.66	69.24
21.91586	0.0775	4.01	4.32	1.793	1.534	1.32E+00	6.31E-01	2	-99	0.18	0.5	74.53
21.98347	0.0793	4.01	4.36	1.821	1.699	1.32E+00	6.33E-01	2	-99	0.18	0.64	74.57
22.05179	0.0801	4.01	4.38	1.829	1.803	1.32E+00	6.35E-01	2	-99	0.18	0.73	74.5
22.11802	0.0787	4.14	4.52	1.743	1.871	1.33E+00	6.37E-01	2	-99	0.19	0.79	72.79
22.18634	0.079	4.26	4.65	1.698	1.913	1.33E+00	6.39E-01	3	-99	0.2	0.83	71.53
22.25326	0.0824	4.26	4.67	1.765	1.997	1.34E+00	6.41E-01	3	-99	0.2	0.9	72.06
22.32506	0.0789	4.26	4.69	1.685	2.091	1.34E+00	6.43E-01	3	-99	0.19	0.99	71.18
22.40035	0.0787	4.26	4.69	1.677	2.133	1.34E+00	6.45E-01	3	-99	0.19	1.03	71.06
22.47494	0.0823	4.39	4.83	1.705	2.178	1.35E+00	6.47E-01	3	-99	0.2	1.06	70.52
22.54814	0.0877	4.51	4.98	1.76	2.318	1.35E+00	6.49E-01	3	-99	0.21	1.2	70.17
22.62342	0.0863	4.64	5.1	1.69	2.295	1.36E+00	6.52E-01	3	-99	0.22	1.17	68.85
22.69732	0.0897	4.76	5.24	1.714	2.337	1.36E+00	6.54E-01	3	-99	0.23	1.21	68.36
22.77121	0.0952	4.89	5.39	1.765	2.479	1.37E+00	6.56E-01	4	-99	0.23	1.35	68.04
22.8465	0.1026	5.14	5.71	1.797	2.806	1.37E+00	6.58E-01	4	-99	0.25	1.71	66.79
22.92039	0.1083	5.52	6.15	1.761	3.117	1.38E+00	6.60E-01	4	-99	0.28	2.07	64.51
22.99429	0.1233	5.64	6.31	1.952	3.314	1.38E+00	6.62E-01	4	-99	0.28	2.3	65.46
23.06958	0.1245	5.89	6.61	1.882	3.567	1.38E+00	6.64E-01	5	-99	0.3	2.61	63.67
23.14417	0.1363	6.02	6.82	1.999	3.962	1.39E+00	6.67E-01	5	-99	0.31	3.12	63.84
23.21806	0.2314	6.52	7.38	3.136	4.243	1.39E+00	6.69E-01	8	-99	0.34	3.49	69.61
23.28917	0.4166	15.29	16.26	2.562	4.758	1.40E+00	6.71E-01	9	31.63	0.93	4.21	48.26
23.35609	0.7538	34.22	35.06	2.15	4.117	1.40E+00	6.73E-01	16	36.81	2.19	3.28	32.99
23.42023	1.0645	53.66	54.09	1.968	2.152	1.41E+00	6.75E-01	21	39.43	3.48	0.95	26.36
23.47599	1.3614	78.6	78.9	1.725	1.453	1.41E+00	6.76E-01	31	41.5	5.15	0.36	20.99
23.5241	1.6352	102.42	102.5	1.595	0.392	1.41E+00	6.78E-01	40	42.87	-7.13	-99	17.91
23.56453	1.87	112.2	112.34	1.665	0.677	1.41E+00	6.79E-01	44	43.32	-7.13	-99	17.53
23.60705	2.1421	116.71	116.87	1.833	0.774	1.42E+00	6.80E-01	46	43.51	-7.13	0.01	18.07
23.65166	2.4263	114.71	114.98	2.11	1.353	1.42E+00	6.81E-01	45	43.41	-7.13	0.29	19.53
23.69698	2.6866	115.09	115.2	2.332	0.56	1.42E+00	6.83E-01	45	43.42	7.58	-99	20.51
23.74299	2.9032	116.71	116.84	2.485	0.638	1.43E+00	6.84E-01	45	43.48	7.69	-99	21.04
23.7876	3.0699	116.71	116.94	2.625	1.133	1.43E+00	6.85E-01	45	43.47	7.69	0.15	21.62
23.83013	3.202	119.85	120.07	2.667	1.078	1.43E+00	6.86E-01	47	43.59	7.89	0.12	21.56
23.87753	3.232	122.23	122.55	2.637	1.596	1.43E+00	6.88E-01	47	43.68	8.05	0.45	21.26
23.92075	3.2747	122.36	122.56	2.672	1.004	1.44E+00	6.89E-01	48	43.68	8.06	0.08	21.4
23.96537	3.3238	122.23	122.45	2.714	1.078	1.44E+00	6.90E-01	47	43.66	8.05	0.12	21.58
24.01068	3.2728	119.35	119.5	2.739	0.751	1.44E+00	6.92E-01	46	43.53	7.86	0	21.89
24.06366	3.2159	116.09	116.45	2.762	1.796	1.44E+00	6.93E-01	45	43.38	7.64	0.59	22.21
24.12431	3.1466	115.21	115.48	2.725	1.337	1.45E+00	6.95E-01	45	43.33	7.58	0.26	22.14
24.19123	3.1625	120.35	120.56	2.623	1.01	1.45E+00	6.97E-01	47	43.54	7.93	0.08	21.35
24.25537	3.0503	111.95	112.18	2.719	1.143	1.46E+00	6.99E-01	43	43.16	7.37	0.14	22.37
24.31671	2.6811	106.18	106.34	2.521	0.758	1.46E+00	7.00E-01	41	42.88	6.98	-99	22.04
24.37667	2.4115	98.16	98.62	2.445	2.262	1.46E+00	7.02E-01	38	42.47	6.45	0.97	22.4
24.43661	2.3151	91.02	91.24	2.537	1.117	1.47E+00	7.04E-01	35	42.06	5.97	0.12	23.55
24.49169	2.2553	84.5	84.81	2.659	1.531	1.47E+00	7.05E-01	39	41.66	5.54	0.37	24.81
24.53979	0	82.99	83.24	0	1.243	1.47E+00	7.07E-01	19	-99	-7.13	0.19	-99
24.58859	0	82.11	82.18	0	0.308	1.48E+00	7.08E-01	19	-99	-7.13	-99	-99
24.63529	0	79.36	79.38	0	0.097	1.48E+00	7.10E-01	23	-99	-7.13	-99	-99
24.6827	0	79.11	79.14	0	0.191	1.48E+00	7.11E-01	23	-99	-7.13	-99	-99
24.72662	0	81.61	81.67	0	0.259	1.48E+00	7.12E-01	19	-99	-7.13	-99	-99
24.76357	0	81.74	81.81	0	0.373	1.49E+00	7.13E-01	19	-99	-7.13	-99	-99
24.79772	0	81.86	81.99	0	0.638	1.49E+00	7.14E-01	19	-99	-7.13	-99	-99

24.82979	0	82.62	82.72	0	0.518	1.49E+00	7.15E-01	19	-99	-7.13	-99	-99



Suelos, PSC.

Soil & Construction Materials Laboratory and Environmental Drilling Services

Test Id: CPT C D Date: 4-Nov-21
Site: DIKE C Cone Id: 3045.123xx
Location: Gurabo
Project: Diques Density 120 PFC
Operator | w: RTH | Nicolas

Depth (ft)	Sleeve Stress (tsf)	TIPStresUNC (tsf)	TIPStresCOR (tsf)	Ratio COR (%)	Pore Pressure (tsf)	Overburden (tsf)	Eff. Overburden (tsf)	SPT N60c (blows/ft)	Friction Angle (deg)	Su (tsf)	OCR ()	FC (%)	
0	0	0	0	0	0	0.00E+00	0.00E+00	-99	0	0	-99	-99	
0.26401	0.0692	2.61	2.61	2.651	0.008	1.58E-02	7.60E-03	4	46.76	-7.13	-99	98.12	
0.42423	0.128	2.98	2.98	4.289	-0.005	2.55E-02	1.22E-02	5	45.21	-7.13	-99	-99	
0.54056	0.1254	2.48	2.48	5.064	-0.034	3.24E-02	1.56E-02	4	43.14	-7.13	-99	-99	
0.64227	0.12	2.23	2.22	5.405	-0.057	3.85E-02	1.85E-02	4	41.7	-7.13	-99	-99	
0.74258	0.1274	2.11	2.09	6.081	-0.057	4.46E-02	2.14E-02	4	40.61	-7.13	-99	-99	
0.79552	0.116	1.48	1.47	7.899	-0.057	4.77E-02	2.29E-02	3	38.23	-7.13	-99	-99	
0.84428	0.1039	1.35	1.34	7.745	-0.06	5.07E-02	2.43E-02	2	-99	0.09	-99	-99	
0.89374	0.0913	1.23	1.22	7.499	-0.057	5.36E-02	2.57E-02	2	-99	0.08	-99	-99	
0.94181	0.0844	1.23	1.22	6.933	-0.057	5.65E-02	2.71E-02	2	-99	0.08	-99	-99	
1.01983	0.0793	1.35	1.34	5.91	-0.057	6.12E-02	2.94E-02	2	-99	0.09	-99	-99	
1.10621	0.0742	1.35	1.34	5.525	-0.053	6.64E-02	3.19E-02	2	-99	0.09	-99	-99	
1.18422	0.0654	1.35	1.34	4.864	-0.05	7.11E-02	3.41E-02	2	-99	0.09	-99	-99	
1.26224	0.0592	1.1	1.09	5.41	-0.05	7.57E-02	3.64E-02	2	-99	0.07	-99	-99	
1.33818	0.0538	0.98	0.97	5.558	-0.053	8.03E-02	3.85E-02	-99	-99	0.06	-99	-99	
1.4148	0.0468	0.98	0.97	4.835	-0.053	8.49E-02	4.08E-02	-99	-99	0.06	-99	-99	
1.49073	0.0451	0.85	0.84	5.363	-0.053	8.94E-02	4.29E-02	-99	-99	0.05	-99	-99	
1.56945	0.0464	1.1	1.09	4.245	-0.05	9.42E-02	4.52E-02	2	-99	0.07	-99	-99	
1.64816	0.0506	0.98	0.97	5.223	-0.044	9.89E-02	4.75E-02	-99	-99	0.06	-99	-99	
1.72548	0.0572	1.35	1.35	4.254	-0.044	1.04E-01	4.97E-02	2	-99	0.08	-99	-99	
1.80629	0.0722	1.73	1.72	4.193	-0.04	1.08E-01	5.20E-02	3	34.15	0.11	-99	-99	
1.88988	0.0842	2.23	2.22	3.783	-0.034	1.13E-01	5.44E-02	4	35.48	0.14	-99	-99	
1.97069	0.0949	2.61	2.6	3.65	-0.037	1.18E-01	5.68E-02	4	36.19	0.17	-99	-99	
2.04941	0.1064	2.61	2.6	4.091	-0.034	1.23E-01	5.90E-02	4	35.95	0.17	-99	-99	
2.12743	0.1118	2.86	2.85	3.919	-0.034	1.28E-01	6.13E-02	5	36.29	0.18	-99	-99	
2.20475	0.1076	2.86	2.85	3.773	-0.034	1.32E-01	6.35E-02	5	36.07	0.18	-99	-99	
2.28137	0.1067	2.98	2.98	3.583	-0.028	1.37E-01	6.57E-02	5	36.12	0.19	-99	99.96	
2.358	0.1052	3.11	3.1	3.388	-0.024	1.42E-01	6.79E-02	5	36.17	0.2	-99	97.28	
2.43184	0.1019	3.11	3.11	3.282	-0.021	1.46E-01	7.00E-02	5	35.98	0.2	-99	96.58	
2.51125	0.1011	3.24	3.23	3.129	-0.015	1.51E-01	7.23E-02	5	36.03	0.21	-99	94.2	
2.58858	0.1072	3.36	3.36	3.193	-0.011	1.55E-01	7.46E-02	6	36.07	0.21	-99	93.34	
2.6652	0.1117	3.61	3.61	3.093	-0.005	1.60E-01	7.68E-02	6	36.34	0.23	-99	90.28	
2.74183	0.1123	3.74	3.74	3.005	0.002	1.65E-01	7.90E-02	6	36.37	0.24	-99	88.57	
2.81845	0.1185	3.74	3.74	3.171	0.005	1.69E-01	8.12E-02	6	36.2	0.24	-99	89.67	
2.89648	0.1182	3.61	3.61	3.272	0.008	1.74E-01	8.34E-02	6	35.82	0.23	-99	91.43	
2.9724	0.1194	3.49	3.49	3.424	0.011	1.78E-01	8.56E-02	6	35.44	0.22	-99	93.56	
3.04903	0.1198	3.49	3.49	3.433	0.015	1.83E-01	8.78E-02	6	35.28	0.22	-99	93.61	
3.12496	0.1183	3.24	3.24	3.654	0.018	1.88E-01	9.00E-02	5	34.65	0.2	-99	97.49	
3.20298	0.1193	2.98	2.99	3.993	0.021	1.92E-01	9.23E-02	5	33.97	0.19	-99	-99	
3.281	0.117	2.86	2.86	4.085	0.021	1.97E-01	9.45E-02	5	33.53	0.18	-99	-99	
3.35902	0.1133	2.73	2.74	4.135	0.028	2.02E-01	9.67E-02	5	-99	0.17	-99	-99	
3.43634	0.1082	2.86	2.87	3.776	0.031	2.06E-01	9.90E-02	5	33.23	0.18	-99	-99	
3.51575	0.104	2.86	2.87	3.629	0.034	2.11E-01	1.01E-01	5	33.08	0.18	-99	-99	
3.59447	0.1004	2.86	2.87	3.502	0.037	2.16E-01	1.04E-01	5	32.93	0.18	-99	-99	
3.67319	0.1005	2.73	2.74	3.665	0.04	2.20E-01	1.06E-01	5	32.48	0.17	-99	-99	
3.75051	0.0953	2.61	2.62	3.642	0.04	2.25E-01	1.08E-01	4	-99	0.16	-99	-99	
3.83201	0.0882	2.48	2.49	3.541	0.044	2.30E-01	1.10E-01	4	-99	0.15	-99	-99	
3.91282	0.0828	2.36	2.37	3.498	0.04	2.35E-01	1.13E-01	4	-99	0.14	-99	-99	
3.99432	0.0772	2.23	2.24	3.442	0.047	2.40E-01	1.15E-01	4	-99	0.13	-99	-99	
4.07443	0.0727	2.23	2.24	3.244	0.05	2.45E-01	1.17E-01	4	-99	0.13	-99	-99	

4.15524	0.0713	1.98	1.99	3.578	0.05	2.49E-01	1.20E-01	3	-99	0.12	-99	-99
4.23883	0.0677	2.11	2.12	3.197	0.053	2.54E-01	1.22E-01	4	-99	0.12	-99	-99
4.31894	0.0645	1.86	1.87	3.457	0.053	2.59E-01	1.24E-01	3	-99	0.11	-99	-99
4.39974	0.0616	1.98	1.99	3.09	0.057	2.64E-01	1.27E-01	3	-99	0.11	-99	-99
4.47985	0.0567	1.86	1.87	3.038	0.06	2.69E-01	1.29E-01	3	-99	0.11	-99	-99
4.56205	0.0511	1.98	1.99	2.563	0.063	2.74E-01	1.31E-01	3	-99	0.11	-99	-99
4.64495	0.0465	1.86	1.87	2.486	0.066	2.79E-01	1.34E-01	3	-99	0.11	-99	-99
4.72645	0.0438	1.86	1.88	2.336	0.095	2.84E-01	1.36E-01	2	-99	0.1	-99	-99
4.80586	0.0405	1.86	1.88	2.157	0.099	2.88E-01	1.38E-01	2	-99	0.1	-99	-99
4.88876	0.0365	1.73	1.75	2.087	0.102	2.93E-01	1.41E-01	1	-99	0.1	-99	-99
4.96608	0.033	1.61	1.63	2.027	0.105	2.98E-01	1.43E-01	1	-99	0.09	-99	-99
5.04131	0.0296	1.48	1.5	1.97	0.108	3.03E-01	1.45E-01	1	-99	0.08	-99	-99
5.11864	0.023	1.48	1.5	1.53	0.112	3.07E-01	1.47E-01	1	-99	0.08	-99	-99
5.19805	0.0144	1.35	1.38	1.049	0.118	3.12E-01	1.50E-01	1	24.86	0.07	-99	-99
5.27885	0.006	1.35	1.38	0.433	0.121	3.17E-01	1.52E-01	1	24.74	0.07	-99	92.19
5.36245	0.0047	1.23	1.26	0.372	0.128	3.22E-01	1.54E-01	1	-99	0.06	-99	94.02
5.57073	-0.0052	1.23	1.28	-0.41	0.231	3.34E-01	1.60E-01	-99	-99	-7.13	0.08	-99
5.63412	-0.0071	1.1	1.15	-0.615	0.238	3.38E-01	1.62E-01	-99	-99	-7.13	0.08	-99
5.69751	-0.0062	0.98	1.03	-0.607	0.244	3.42E-01	1.64E-01	-99	-99	-7.13	0.09	-99
5.7623	-0.0044	1.1	1.15	-0.381	0.248	3.46E-01	1.66E-01	-99	-99	-7.13	0.09	-99
5.81733	-0.004	0.98	1.03	-0.389	0.254	3.49E-01	1.68E-01	-99	-99	-7.13	0.1	-99
5.86679	-0.0065	0.98	1.03	-0.627	0.257	3.52E-01	1.69E-01	-99	-99	-7.13	0.1	-99
5.91625	-0.0089	0.98	1.03	-0.864	0.264	3.55E-01	1.70E-01	-99	-99	-7.13	0.11	-99
5.96501	-0.0113	0.98	1.03	-1.098	0.267	3.58E-01	1.72E-01	-99	-99	-7.13	0.11	-99
6.02283	-0.0142	0.85	0.91	-1.566	0.277	3.61E-01	1.74E-01	-99	-99	-7.13	0.13	-99
6.09806	-0.018	0.85	0.91	-1.972	0.286	3.66E-01	1.76E-01	-99	-99	-7.13	0.14	-99
6.17329	-0.0183	0.73	0.79	-2.326	0.29	3.70E-01	1.78E-01	-99	-99	-7.13	0.14	-99
6.24853	-0.0216	0.73	0.79	-2.748	0.296	3.75E-01	1.80E-01	-99	-99	-7.13	0.15	-99
6.32306	-0.0252	0.73	0.79	-3.203	0.299	3.79E-01	1.82E-01	-99	-99	-7.13	0.15	-99
6.3983	-0.0242	0.6	0.66	-3.644	0.306	3.84E-01	1.84E-01	-99	-99	-7.13	0.15	-99
6.47423	-0.0239	0.6	0.67	-3.591	0.312	3.89E-01	1.87E-01	-99	-99	-7.13	0.16	-99
6.55015	-0.0268	0.6	0.67	-4.023	0.319	3.93E-01	1.89E-01	-99	-99	-7.13	0.16	-99
6.62748	-0.0262	0.6	0.67	-3.919	0.325	3.98E-01	1.91E-01	-99	-99	-7.13	0.17	-99
6.7048	-0.0272	0.6	0.67	-4.065	0.329	4.02E-01	1.93E-01	-99	-99	-7.13	0.17	-99
6.78282	-0.0276	0.48	0.54	-5.075	0.335	4.07E-01	1.95E-01	-99	-99	-7.13	0.17	-99
6.86084	-0.0276	0.35	0.42	-6.577	0.338	4.12E-01	1.98E-01	-99	-99	-7.13	0.17	-99
6.93886	-0.0289	0.48	0.55	-5.294	0.345	4.16E-01	2.00E-01	-99	-99	-7.13	0.18	-99
7.01758	-0.0308	0.48	0.55	-5.618	0.351	4.21E-01	2.02E-01	-99	-99	-7.13	0.18	-99
7.0949	-0.0313	0.35	0.42	-7.395	0.358	4.26E-01	2.04E-01	-99	-99	-7.13	0.19	-99
7.1771	-0.0313	0.35	0.43	-7.372	0.364	4.31E-01	2.07E-01	-99	-99	-7.13	0.19	-99
7.25721	-0.0326	0.35	0.43	-7.652	0.367	4.35E-01	2.09E-01	-99	-99	-7.13	0.19	-99
7.33662	-0.0332	0.48	0.55	-6.016	0.374	4.40E-01	2.11E-01	-99	-99	-7.13	0.19	-99
7.41743	-0.0319	0.35	0.43	-7.458	0.38	4.45E-01	2.14E-01	-99	-99	-7.13	0.2	-99
7.49823	-0.0313	0.48	0.55	-5.651	0.387	4.50E-01	2.16E-01	-99	-99	-7.13	0.2	-99
7.57764	-0.0313	0.48	0.56	-5.637	0.393	4.55E-01	2.18E-01	-99	-99	-7.13	0.21	-99
7.65776	-0.0313	0.35	0.43	-7.249	0.4	4.60E-01	2.21E-01	-99	-99	-7.13	0.21	-99
7.73717	-0.0313	0.48	0.56	-5.618	0.403	4.64E-01	2.23E-01	-99	-99	-7.13	0.21	-99
7.81937	-0.0337	0.48	0.56	-6.019	0.413	4.69E-01	2.25E-01	-99	-99	-7.13	0.22	-99
7.90157	-0.0339	0.48	0.56	-6.036	0.419	4.74E-01	2.28E-01	-99	-99	-7.13	0.22	-99
7.98237	-0.0332	0.48	0.56	-5.904	0.426	4.79E-01	2.30E-01	-99	-99	-7.13	0.23	-99
8.06178	-0.0346	0.48	0.56	-6.146	0.432	4.84E-01	2.32E-01	-99	-99	-7.13	0.23	-99
8.14329	-0.0335	0.35	0.44	-7.6	0.439	4.89E-01	2.35E-01	-99	-99	-7.13	0.23	-99
8.22409	-0.0349	0.35	0.44	-7.905	0.445	4.93E-01	2.37E-01	-99	-99	-7.13	0.24	-99
8.29863	-0.0351	0.48	0.57	-6.178	0.452	4.98E-01	2.39E-01	-99	-99	-7.13	0.24	-99
8.37247	-0.0358	0.35	0.44	-8.05	0.458	5.02E-01	2.41E-01	-99	-99	-7.13	0.25	-99
8.44701	-0.0365	0.35	0.45	-8.19	0.468	5.07E-01	2.43E-01	-99	-99	-7.13	0.26	-99
8.52502	-0.0369	0.35	0.45	-8.256	0.474	5.12E-01	2.46E-01	-99	-99	-7.13	0.26	-99
8.60165	-0.0369	0.48	0.57	-6.44	0.481	5.16E-01	2.48E-01	-99	-99	-7.13	0.27	-99
8.77928	-0.0332	0.73	0.84	-3.952	0.558	5.27E-01	2.53E-01	-99	-99	-7.13	0.39	-99
8.86009	-0.0332	0.6	0.72	-4.637	0.565	5.32E-01	2.55E-01	-99	-99	-7.13	0.39	-99
8.9402	-0.0332	0.6	0.72	-4.624	0.575	5.36E-01	2.58E-01	-99	-99	-7.13	0.4	-99
9.02031	-0.0357	0.6	0.72	-4.967	0.581	5.41E-01	2.60E-01	-99	-99	-7.13	0.4	-99
9.09972	-0.0369	0.6	0.72	-5.125	0.588	5.46E-01	2.62E-01	-99	-99	-7.13	0.41	-99
9.17983	-0.0369	0.6	0.72	-5.111	0.597	5.51E-01	2.64E-01	-99	-99	-7.13	0.42	-99
9.25994	-0.0369	0.6	0.72	-5.097	0.607	5.56E-01	2.67E-01	-99	-99	-7.13	0.42	-99
9.34005	-0.0369	0.73	0.85	-4.335	0.617	5.60E-01	2.69E-01	-99	-99	-7.13	0.43	-99

9.41946	-0.0369	0.73	0.85	-4.325	0.626	5.65E-01	2.71E-01	-99	-99	-7.13	0.44	-99
9.49887	-0.0356	0.6	0.73	-4.877	0.636	5.70E-01	2.74E-01	-99	-99	-7.13	0.45	-99
9.57829	-0.0351	0.73	0.86	-4.091	0.643	5.75E-01	2.76E-01	-99	-99	-7.13	0.45	-99
9.65631	-0.0351	0.73	0.86	-4.081	0.652	5.79E-01	2.78E-01	-99	-99	-7.13	0.46	-99
9.73642	-0.0351	0.6	0.74	-4.771	0.659	5.84E-01	2.80E-01	-99	-99	-7.13	0.46	-99
9.81652	-0.0338	0.6	0.74	-4.585	0.665	5.89E-01	2.83E-01	-99	-99	-7.13	0.46	-99
9.89733	-0.0332	0.6	0.74	-4.497	0.675	5.94E-01	2.85E-01	-99	-99	-7.13	0.47	-99
9.97674	-0.0332	0.6	0.74	-4.489	0.681	5.99E-01	2.87E-01	-99	-99	-7.13	0.47	-99
10.05476	-0.0332	0.6	0.74	-4.477	0.691	6.03E-01	2.90E-01	-99	-99	-7.13	0.48	-99
10.13418	-0.0332	0.73	0.87	-3.823	0.698	6.08E-01	2.92E-01	-99	-99	-7.13	0.48	-99
10.21429	-0.0318	0.73	0.87	-3.658	0.707	6.13E-01	2.94E-01	-99	-99	-7.13	0.49	-99
10.293	-0.0313	0.73	0.87	-3.595	0.714	6.18E-01	2.96E-01	-99	-99	-7.13	0.49	-99
10.37033	-0.03	0.73	0.87	-3.438	0.72	6.22E-01	2.99E-01	-99	-99	-7.13	0.49	-99
10.44974	-0.0295	0.85	1	-2.946	0.73	6.27E-01	3.01E-01	-99	-99	-7.13	0.5	-99
10.52985	-0.0295	0.85	1	-2.943	0.736	6.32E-01	3.03E-01	-99	-99	-7.13	0.5	-99
10.60856	-0.0295	0.85	1	-2.941	0.74	6.37E-01	3.06E-01	-99	-99	-7.13	0.5	-99
10.68658	-0.0295	0.85	1	-2.937	0.746	6.41E-01	3.08E-01	-99	-99	-7.13	0.5	-99
10.76599	-0.0295	0.73	0.88	-3.351	0.753	6.46E-01	3.10E-01	-99	-99	-7.13	0.5	-99
10.84402	-0.0295	0.73	0.88	-3.346	0.759	6.51E-01	3.12E-01	-99	-99	-7.13	0.5	-99
10.92273	-0.0295	0.73	0.88	-3.341	0.766	6.55E-01	3.15E-01	-99	-99	-7.13	0.51	-99
11.00005	-0.0307	0.85	1.01	-3.046	0.772	6.60E-01	3.17E-01	-99	-99	-7.13	0.51	-99
11.08086	-0.0326	0.98	1.14	-2.872	0.779	6.65E-01	3.19E-01	-99	-99	-7.13	0.51	-99
11.16097	-0.0358	0.98	1.14	-3.147	0.788	6.70E-01	3.21E-01	-99	-99	-7.13	0.52	-99
11.24038	-0.0369	0.85	1.01	-3.642	0.798	6.74E-01	3.24E-01	-99	-99	-7.13	0.52	-99
11.31979	-0.0369	0.85	1.02	-3.635	0.808	6.79E-01	3.26E-01	-99	-99	-7.13	0.53	-99
11.39991	-0.0384	0.85	1.02	-3.77	0.817	6.84E-01	3.28E-01	-99	-99	-7.13	0.54	-99
11.47862	-0.0374	0.98	1.15	-3.265	0.824	6.89E-01	3.31E-01	-99	-99	-7.13	0.54	-99
11.55594	-0.0369	0.98	1.15	-3.219	0.837	6.93E-01	3.33E-01	-99	-99	-7.13	0.55	-99
11.63327	-0.0369	0.98	1.15	-3.21	0.853	6.98E-01	3.35E-01	-99	-99	-7.13	0.57	-99
11.71129	-0.0369	0.98	1.15	-3.206	0.859	7.03E-01	3.37E-01	-99	-99	-7.13	0.57	-99
11.79139	-0.0369	1.1	1.28	-2.888	0.866	7.08E-01	3.40E-01	-99	-99	-7.13	0.57	-99
11.87081	-0.0353	1.1	1.28	-2.753	0.872	7.12E-01	3.42E-01	-99	-99	-7.13	0.57	-99
12.12785	-0.0302	1.23	1.41	-2.146	0.876	7.28E-01	3.49E-01	-99	-99	-7.13	0.54	-99
12.20935	-0.0295	1.1	1.28	-2.299	0.882	7.33E-01	3.52E-01	-99	-99	-7.13	0.55	-99
12.29016	-0.0295	1.1	1.28	-2.298	0.885	7.37E-01	3.54E-01	-99	-99	-7.13	0.54	-99
12.37096	-0.0295	1.1	1.28	-2.297	0.889	7.42E-01	3.56E-01	-99	-99	-7.13	0.54	-99
12.45247	-0.0295	1.1	1.29	-2.294	0.895	7.47E-01	3.59E-01	-99	-99	-7.13	0.54	-99
12.53327	-0.0295	1.23	1.41	-2.087	0.905	7.52E-01	3.61E-01	-99	-99	-7.13	0.54	-99
12.61338	-0.0283	1.23	1.41	-2.002	0.911	7.57E-01	3.63E-01	-99	-99	-7.13	0.55	-99
12.69558	-0.0276	1.35	1.54	-1.793	0.918	7.62E-01	3.66E-01	-99	-99	-7.13	0.55	-99
12.77569	-0.0288	1.23	1.42	-2.034	0.924	7.67E-01	3.68E-01	-99	-99	-7.13	0.55	-99
12.8558	-0.0271	1.23	1.42	-1.914	0.931	7.71E-01	3.70E-01	-99	-99	-7.13	0.55	-99
12.9373	-0.0257	1.23	1.42	-1.815	0.934	7.76E-01	3.73E-01	-99	-99	-7.13	0.54	-99
13.01811	-0.0257	1.23	1.42	-1.813	0.944	7.81E-01	3.75E-01	-99	-99	-7.13	0.55	-99
13.09891	-0.0246	1.35	1.55	-1.588	0.95	7.86E-01	3.77E-01	-99	-99	-7.13	0.55	-99
13.17972	-0.0239	1.35	1.55	-1.543	0.953	7.91E-01	3.80E-01	-99	-99	-7.13	0.55	-99
13.25774	-0.0239	1.35	1.55	-1.542	0.963	7.96E-01	3.82E-01	-99	-99	-7.13	0.55	-99
13.34133	-0.0239	1.35	1.55	-1.54	0.97	8.01E-01	3.84E-01	-99	-99	-7.13	0.55	-99
13.42214	-0.0239	1.48	1.68	-1.424	0.976	8.05E-01	3.87E-01	-99	-99	-7.13	0.55	-99
13.50364	-0.0239	1.48	1.68	-1.423	0.982	8.10E-01	3.89E-01	-99	-99	-7.13	0.56	-99
13.58236	-0.0239	1.48	1.68	-1.422	0.989	8.15E-01	3.91E-01	-99	-99	-7.13	0.56	-99
13.66177	-0.0239	1.48	1.68	-1.421	0.992	8.20E-01	3.94E-01	-99	-99	-7.13	0.55	-99
13.74327	-0.0239	1.48	1.68	-1.419	1.002	8.25E-01	3.96E-01	-99	-99	-7.13	0.56	-99
13.82477	-0.0239	1.48	1.68	-1.418	1.012	8.30E-01	3.98E-01	-99	-99	-7.13	0.56	-99
13.9028	-0.0239	1.48	1.69	-1.416	1.021	8.34E-01	4.00E-01	-99	-99	-7.13	0.57	-99
13.98221	-0.0239	1.48	1.69	-1.414	1.034	8.39E-01	4.03E-01	-99	-99	-7.13	0.58	-99
14.06301	-0.0251	1.48	1.69	-1.487	1.041	8.44E-01	4.05E-01	-99	-99	-7.13	0.58	-99
14.14452	-0.027	1.48	1.69	-1.597	1.047	8.49E-01	4.07E-01	-99	-99	-7.13	0.58	-99
14.22323	-0.0276	1.48	1.69	-1.63	1.06	8.53E-01	4.10E-01	-99	-99	-7.13	0.59	-99
14.30264	-0.0276	1.48	1.7	-1.627	1.073	8.58E-01	4.12E-01	-99	-99	-7.13	0.6	-99
14.38345	-0.0264	1.61	1.83	-1.448	1.086	8.63E-01	4.14E-01	-99	-99	-7.13	0.61	-99
14.46426	-0.0246	1.48	1.7	-1.445	1.093	8.68E-01	4.17E-01	-99	-99	-7.13	0.61	-99
14.54436	-0.0228	1.61	1.83	-1.247	1.093	8.73E-01	4.19E-01	-99	-99	-7.13	0.6	-99
14.62517	-0.0201	1.61	1.83	-1.097	1.102	8.78E-01	4.21E-01	-99	-99	-7.13	0.61	-99
14.70667	-0.0191	1.61	1.83	-1.043	1.109	8.82E-01	4.24E-01	-99	-99	-7.13	0.61	-99
14.78887	-0.0195	1.61	1.83	-1.067	1.115	8.87E-01	4.26E-01	-99	-99	-7.13	0.61	-99

14.87247	-0.0188	1.61	1.83	-1.026	1.118	8.92E-01	4.28E-01	-99	-99	-7.13	0.6	-99
14.96163	-0.0208	1.73	1.96	-1.064	1.128	8.98E-01	4.31E-01	-99	-99	-7.13	0.61	-99
15.05289	-0.0229	1.73	1.96	-1.17	1.138	9.03E-01	4.34E-01	-99	-99	-7.13	0.61	-99
15.14414	-0.0239	1.86	2.09	-1.143	1.148	9.09E-01	4.36E-01	-99	-99	-7.13	0.61	-99
15.38725	-0.0201	1.86	2.08	-0.97	1.086	9.23E-01	4.43E-01	-99	-99	-7.13	0.51	-99
15.45552	-0.0201	1.98	2.21	-0.913	1.109	9.27E-01	4.45E-01	-99	-99	-7.13	0.54	-99
15.52379	-0.0201	1.86	2.08	-0.967	1.125	9.31E-01	4.47E-01	-99	-99	-7.13	0.55	-99
15.59484	-0.0201	1.98	2.21	-0.911	1.138	9.36E-01	4.49E-01	-99	-99	-7.13	0.56	-99
15.6645	-0.0201	1.98	2.22	-0.909	1.154	9.40E-01	4.51E-01	-99	-99	-7.13	0.57	-99
15.73416	-0.0198	1.98	2.22	-0.894	1.167	9.44E-01	4.53E-01	-99	-99	-7.13	0.58	-99
15.80521	-0.0183	1.98	2.22	-0.823	1.183	9.48E-01	4.55E-01	-99	-99	-7.13	0.6	-99
15.87348	-0.0183	1.98	2.22	-0.822	1.199	9.52E-01	4.57E-01	-99	-99	-7.13	0.61	-99
15.94384	-0.0181	1.98	2.23	-0.812	1.209	9.57E-01	4.59E-01	-99	-99	-7.13	0.61	-99
16.01559	-0.0164	1.98	2.23	-0.737	1.212	9.61E-01	4.61E-01	-99	-99	-7.13	0.61	-99
16.08595	-0.0163	2.11	2.35	-0.694	1.216	9.65E-01	4.63E-01	-99	-99	-7.13	0.61	-99
16.1577	-0.0146	2.11	2.35	-0.621	1.219	9.70E-01	4.65E-01	-99	-99	-7.13	0.61	-99
16.23014	-0.0164	2.11	2.35	-0.695	1.225	9.74E-01	4.67E-01	-99	-99	-7.13	0.61	-99
16.30329	-0.0146	2.11	2.36	-0.618	1.235	9.78E-01	4.70E-01	-99	-99	-7.13	0.61	-99
16.37573	-0.0145	2.11	2.36	-0.614	1.245	9.83E-01	4.72E-01	-99	-99	-7.13	0.62	-99
16.44888	-0.0127	2.23	2.49	-0.51	1.254	9.87E-01	4.74E-01	-99	-99	-7.13	0.62	-99
16.52202	-0.0126	2.11	2.36	-0.534	1.261	9.91E-01	4.76E-01	-99	-99	-7.13	0.62	-99
16.59377	-0.0108	2.11	2.36	-0.458	1.274	9.96E-01	4.78E-01	-99	-99	-7.13	0.63	-99
16.66691	-0.0108	2.23	2.49	-0.434	1.287	1.00E+00	4.80E-01	-99	-99	-7.13	0.64	-99
16.74145	-0.011	2.23	2.5	-0.44	1.3	1.00E+00	4.82E-01	-99	-99	-7.13	0.65	-99
16.8132	-0.0125	2.23	2.5	-0.499	1.313	1.01E+00	4.84E-01	-99	-99	-7.13	0.66	-99
16.88425	-0.0091	2.23	2.5	-0.362	1.322	1.01E+00	4.86E-01	-99	-99	-7.13	0.66	-99
16.9567	-0.0108	2.23	2.5	-0.433	1.332	1.02E+00	4.88E-01	-99	-99	-7.13	0.67	-99
17.02915	-0.0109	2.23	2.5	-0.435	1.345	1.02E+00	4.90E-01	-99	-99	-7.13	0.68	-99
17.10299	-0.0128	2.23	2.5	-0.511	1.342	1.03E+00	4.93E-01	-99	-99	-7.13	0.67	-99
17.17404	-0.0145	2.23	2.51	-0.577	1.351	1.03E+00	4.95E-01	-99	-99	-7.13	0.67	-99
17.24648	-0.0125	2.23	2.51	-0.499	1.358	1.04E+00	4.97E-01	-99	-99	-7.13	0.67	-99
17.31963	-0.0108	2.36	2.64	-0.411	1.374	1.04E+00	4.99E-01	-99	-99	-7.13	0.68	-99
17.39277	-0.0106	2.36	2.64	-0.402	1.384	1.04E+00	5.01E-01	-99	-99	-7.13	0.69	-99
17.46452	-0.009	2.48	2.76	-0.324	1.39	1.05E+00	5.03E-01	-99	-99	-7.13	0.69	-99
17.53349	-0.009	2.48	2.77	-0.324	1.4	1.05E+00	5.05E-01	-99	-99	-7.13	0.69	-99
17.60524	-0.009	2.48	2.77	-0.323	1.41	1.06E+00	5.07E-01	-99	-99	-7.13	0.7	-99
17.67768	-0.009	2.61	2.9	-0.309	1.432	1.06E+00	5.09E-01	-99	-99	-7.13	0.72	-99
17.75013	-0.0088	2.61	2.9	-0.302	1.449	1.07E+00	5.11E-01	-99	-99	-7.13	0.73	-99
17.82188	-0.0073	2.61	2.91	-0.251	1.465	1.07E+00	5.13E-01	-99	-99	-7.13	0.74	-99
17.89293	-0.0091	2.61	2.91	-0.313	1.468	1.07E+00	5.15E-01	-99	-99	-7.13	0.74	-99
17.96399	-0.0108	2.61	2.91	-0.372	1.471	1.08E+00	5.17E-01	-99	-99	-7.13	0.74	-99
18.03643	-0.0108	2.61	2.91	-0.372	1.465	1.08E+00	5.19E-01	-99	-99	-7.13	0.72	-99
18.10749	-0.0141	2.61	2.91	-0.484	1.468	1.09E+00	5.22E-01	-99	-99	-7.13	0.72	-99
18.18133	-0.0162	2.61	2.91	-0.556	1.487	1.09E+00	5.24E-01	-99	-99	-7.13	0.73	-99
18.25517	-0.0181	2.61	2.91	-0.62	1.497	1.10E+00	5.26E-01	-99	-99	-7.13	0.74	-99
18.33388	-0.0201	2.48	2.79	-0.719	1.504	1.10E+00	5.28E-01	-99	-99	-7.13	0.74	-99
18.41121	-0.0163	2.61	2.91	-0.56	1.513	1.11E+00	5.30E-01	-99	-99	-7.13	0.74	-99
18.63133	-0.0108	2.86	3.14	-0.344	1.39	1.12E+00	5.37E-01	-99	-99	-7.13	0.59	-99
18.70378	-0.0071	2.86	3.15	-0.227	1.416	1.12E+00	5.39E-01	-99	-99	-7.13	0.61	-99
18.77832	-0.0071	2.86	3.15	-0.225	1.439	1.13E+00	5.41E-01	-99	-99	-7.13	0.63	-99
18.85146	-0.0071	2.73	3.03	-0.234	1.474	1.13E+00	5.43E-01	-99	-99	-7.13	0.66	-99
18.9246	-0.0071	2.86	3.16	-0.224	1.494	1.14E+00	5.45E-01	-99	-99	-7.13	0.68	-99
18.99844	-0.0054	2.86	3.17	-0.171	1.517	1.14E+00	5.47E-01	-99	-99	-7.13	0.69	-99
19.07298	-0.0052	2.98	3.3	-0.158	1.552	1.14E+00	5.49E-01	-99	-99	-7.13	0.73	-99
19.14821	-0.0052	2.98	3.31	-0.158	1.585	1.15E+00	5.52E-01	-99	-99	-7.13	0.75	-99
19.22414	-0.0036	3.11	3.44	-0.106	1.61	1.15E+00	5.54E-01	-99	-99	-7.13	0.78	-99
19.30007	-0.0018	3.11	3.44	-0.053	1.633	1.16E+00	5.56E-01	-99	-99	-7.13	0.79	-99
19.3767	0	3.11	3.45	0	1.656	1.16E+00	5.58E-01	-99	-99	-7.13	0.81	-99
19.45263	-0.0025	3.11	3.45	-0.073	1.678	1.17E+00	5.60E-01	-99	-99	-7.13	0.83	-99
19.52925	-0.0048	3.11	3.45	-0.138	1.701	1.17E+00	5.62E-01	-99	-99	-7.13	0.85	-99
19.60728	-0.0039	3.11	3.46	-0.111	1.727	1.18E+00	5.65E-01	-99	-99	-7.13	0.87	-99
19.68669	-0.0034	3.24	3.59	-0.094	1.759	1.18E+00	5.67E-01	-99	-99	-7.13	0.9	-99
19.76401	-0.0021	3.24	3.6	-0.059	1.785	1.19E+00	5.69E-01	-99	-99	-7.13	0.92	-99
19.84203	-0.0003	3.24	3.6	-0.007	1.801	1.19E+00	5.71E-01	-99	-99	-7.13	0.93	-99
19.92214	0.0029	3.36	3.73	0.077	1.814	1.20E+00	5.74E-01	2	-99	0.14	0.93	49.77
20.00434	0.0015	3.24	3.61	0.043	1.827	1.20E+00	5.76E-01	2	-99	-7.13	0.94	49.69

20.08444	0.0016	3.36	3.73	0.044	1.84	1.21E+00	5.78E-01	2	-99	-7.13	0.95	48.83
20.16247	0.0022	3.36	3.74	0.06	1.86	1.21E+00	5.81E-01	2	-99	-7.13	0.96	49.17
20.24257	0.001	3.36	3.74	0.028	1.889	1.22E+00	5.83E-01	2	-99	-7.13	0.98	48.87
20.32338	0.0016	3.49	3.87	0.042	1.912	1.22E+00	5.85E-01	2	-99	-7.13	1	47.9
20.40419	0.0036	3.49	3.88	0.092	1.941	1.22E+00	5.88E-01	2	-99	0.15	1.02	49.31
20.48429	0.0069	3.61	4.01	0.172	1.963	1.23E+00	5.90E-01	2	-99	0.16	1.04	51.27
20.5651	0.0107	3.61	4.02	0.267	1.996	1.23E+00	5.92E-01	2	-99	0.16	1.07	54.09
20.64243	0.013	3.61	4.02	0.322	2.022	1.24E+00	5.95E-01	2	-99	0.16	1.09	55.51
20.72044	0.0161	3.74	4.15	0.388	2.051	1.24E+00	5.97E-01	2	-99	0.17	1.11	56.27
20.79707	0.0197	3.74	4.16	0.475	2.073	1.25E+00	5.99E-01	2	21.91	0.17	1.13	58.14
20.87648	0.0196	3.74	4.17	0.471	2.112	1.25E+00	6.01E-01	2	-99	0.17	1.16	58.01
20.95659	0.0203	3.86	4.3	0.473	2.145	1.26E+00	6.04E-01	2	22.11	0.17	1.19	57.23
21.0367	0.0222	3.86	4.3	0.516	2.174	1.26E+00	6.06E-01	2	22.08	0.17	1.22	58.07
21.11542	0.0202	3.86	4.31	0.47	2.203	1.27E+00	6.08E-01	2	22.05	0.17	1.24	57.09
21.19553	0.0215	3.86	4.32	0.498	2.238	1.27E+00	6.10E-01	2	22.02	0.17	1.27	57.63
21.27563	0.0204	3.99	4.45	0.459	2.281	1.28E+00	6.13E-01	2	22.25	0.18	1.31	56.05
21.35435	0.0211	4.11	4.58	0.461	2.323	1.28E+00	6.15E-01	2	22.47	0.19	1.35	55.32
21.43516	0.0208	4.11	4.59	0.453	2.368	1.29E+00	6.17E-01	2	22.44	0.19	1.39	55.11
21.51736	0.0172	4.24	4.73	0.364	2.426	1.29E+00	6.20E-01	3	-99	0.2	1.45	52.39
21.60095	0.0135	4.36	4.87	0.277	2.488	1.30E+00	6.22E-01	3	-99	0.2	1.51	49.57
21.68524	0.0191	4.49	5.01	0.381	2.556	1.30E+00	6.25E-01	3	-99	0.21	1.58	51.39
21.89631	0.0315	4.87	5.37	0.587	2.501	1.31E+00	6.31E-01	3	23.61	0.24	1.48	53.75
21.97851	0.034	4.87	5.39	0.63	2.595	1.32E+00	6.33E-01	3	23.58	0.24	1.58	54.4
22.06071	0.0359	4.87	5.41	0.664	2.695	1.32E+00	6.35E-01	3	23.56	0.24	1.69	54.88
22.1436	0.0396	4.99	5.55	0.714	2.769	1.33E+00	6.38E-01	3	23.73	0.24	1.77	55.05
22.2258	0.0414	5.12	5.69	0.728	2.847	1.33E+00	6.40E-01	3	23.89	0.25	1.85	54.64
22.31009	0.0432	5.24	5.83	0.741	2.918	1.34E+00	6.43E-01	3	24.06	0.26	1.92	54.25
22.39368	0.0451	5.37	5.97	0.756	2.996	1.34E+00	6.45E-01	3	24.21	0.27	2	53.89
22.47727	0.0451	5.37	5.99	0.754	3.07	1.35E+00	6.47E-01	3	24.18	0.27	2.08	53.8
22.56296	0.047	5.49	6.13	0.767	3.135	1.35E+00	6.50E-01	3	24.33	0.28	2.15	53.44
22.64724	0.048	5.49	6.14	0.782	3.2	1.36E+00	6.52E-01	3	24.31	0.28	2.22	53.61
22.73084	0.0521	5.62	6.28	0.829	3.284	1.36E+00	6.55E-01	3	24.45	0.28	2.31	53.74
22.81513	0.064	5.87	6.56	0.976	3.413	1.37E+00	6.57E-01	3	24.77	0.3	2.46	54.66
22.90011	0.0821	6.24	6.95	1.181	3.488	1.37E+00	6.60E-01	4	25.22	0.32	2.54	55.69
22.98579	0.1209	6.87	7.53	1.605	3.255	1.38E+00	6.62E-01	4	25.93	0.37	2.22	58.02
23.07148	0.1773	7.5	8.09	2.192	2.925	1.38E+00	6.65E-01	6	-99	0.41	1.81	61.07
23.15577	0.2184	7.75	8.31	2.628	2.773	1.39E+00	6.67E-01	6	-99	0.42	1.63	63.43
23.24145	0.2365	7.75	8.25	2.868	2.449	1.39E+00	6.69E-01	6	-99	0.42	1.26	65.15
23.32574	0.2269	7.62	8	2.836	1.853	1.40E+00	6.72E-01	6	-99	0.41	0.69	65.71
23.40863	0.1882	6.75	7.07	2.661	1.604	1.41E+00	6.74E-01	5	-99	0.36	0.48	67.74
23.49222	0.1581	5.99	6.32	2.5	1.63	1.41E+00	6.77E-01	5	-99	0.31	0.49	69.58
23.57651	0.1525	6.12	6.46	2.359	1.688	1.42E+00	6.79E-01	5	-99	0.31	0.53	68.01
23.6615	0.1663	6.5	6.85	2.425	1.772	1.42E+00	6.82E-01	5	-99	0.34	0.6	66.93
23.74439	0.2018	7.5	7.86	2.566	1.808	1.43E+00	6.84E-01	6	-99	0.4	0.62	64.39
23.82868	0.247	7.88	8.24	2.996	1.824	1.43E+00	6.86E-01	6	-99	0.43	0.63	65.93
23.91367	0.2793	8.38	8.74	3.197	1.772	1.44E+00	6.89E-01	7	-99	0.46	0.58	65.66
23.99796	0.292	8.25	8.58	3.404	1.614	1.44E+00	6.91E-01	10	-99	0.45	0.45	67.27
24.07876	0.3026	8.13	8.45	3.582	1.594	1.45E+00	6.94E-01	9	-99	0.45	0.44	68.61
24.16166	0.2891	8.5	8.83	3.274	1.627	1.45E+00	6.96E-01	7	-99	0.47	0.46	65.82
24.24525	0.2471	9.38	9.74	2.537	1.776	1.46E+00	6.98E-01	7	-99	0.53	0.56	59.04
24.32675	0.2044	10.63	11	1.858	1.801	1.46E+00	7.01E-01	6	28.76	0.61	0.58	51.52
24.40686	0.2665	10.63	10.98	2.426	1.733	1.46E+00	7.03E-01	6	-99	0.61	0.52	55.58
24.48767	0.5378	9.88	10.24	5.25	1.785	1.47E+00	7.05E-01	11	-99	0.56	0.56	71.39
24.56917	0.865	15.02	15.46	5.597	2.141	1.47E+00	7.08E-01	17	-99	0.9	0.85	63.02
24.64441	0.9342	38.97	39.46	2.367	2.423	1.48E+00	7.10E-01	18	37.27	2.5	1.1	32.52
24.71546	1.0683	48.13	48.2	2.217	0.342	1.48E+00	7.12E-01	22	38.5	3.11	-99	29.1
24.78442	0.9247	41.48	41.36	2.236	-0.584	1.49E+00	7.14E-01	19	37.61	2.67	-99	31.18
24.85478	0.7782	29.07	28.95	2.688	-0.575	1.49E+00	7.16E-01	13	35.42	1.84	-99	38.78
24.92583	0.6302	27.81	27.71	2.275	-0.516	1.50E+00	7.18E-01	13	35.13	1.75	-99	37.22
24.99619	0.5288	18.66	18.58	2.846	-0.39	1.50E+00	7.20E-01	11	32.5	1.14	-99	47.3
25.22467	0.5265	17.15	17.32	3.04	0.821	1.51E+00	7.27E-01	10	31.87	1.04	0	49.68
25.29433	0.6158	19.41	19.61	3.141	0.96	1.52E+00	7.29E-01	11	32.69	1.19	0.04	47.83
25.3633	0.7161	20.54	20.77	3.448	1.118	1.52E+00	7.31E-01	12	33.05	1.27	0.11	48.25
25.43644	0.8185	21.17	21.41	3.824	1.177	1.53E+00	7.33E-01	16	33.23	1.31	0.13	49.38
25.50819	0.8815	21.42	21.62	4.078	0.986	1.53E+00	7.35E-01	16	33.29	1.33	0.05	50.29
25.58064	0.9094	20.92	21.12	4.305	1.012	1.54E+00	7.37E-01	16	-99	1.29	0.06	51.66

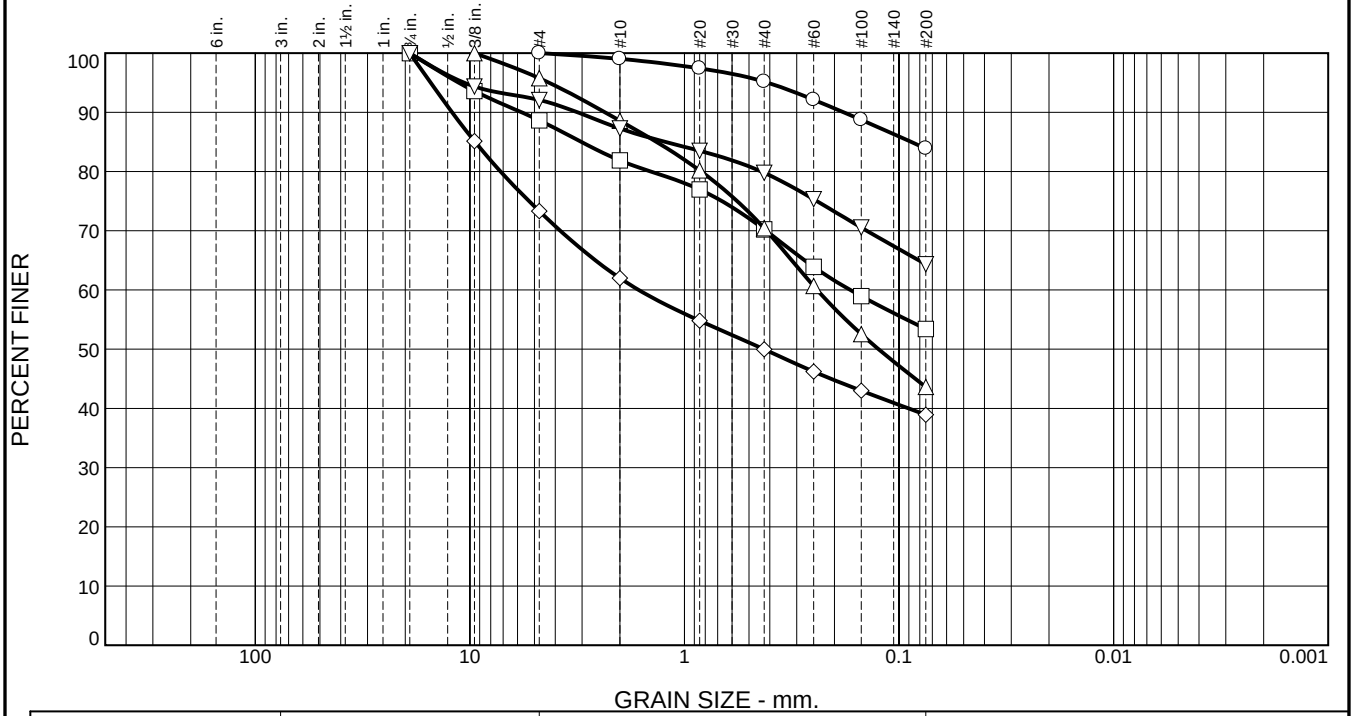
25.6489	0.9146	20.54	20.77	4.404	1.131	1.54E+00	7.39E-01	23	-99	1.27	0.11	52.38
25.71508	0.9315	20.54	20.79	4.481	1.222	1.54E+00	7.41E-01	23	-99	1.27	0.15	52.68
25.77777	0.9504	20.79	21.08	4.508	1.436	1.55E+00	7.42E-01	24	-99	1.28	0.26	52.51
25.84117	0.9635	21.54	21.85	4.409	1.539	1.55E+00	7.44E-01	16	-99	1.33	0.32	51.43
25.90386	1.0015	21.92	22.23	4.504	1.555	1.55E+00	7.46E-01	25	-99	1.36	0.33	51.48
25.96655	1.0507	22.67	22.99	4.571	1.552	1.56E+00	7.48E-01	26	-99	1.41	0.33	51.12
26.04597	1.1034	23.42	23.72	4.651	1.478	1.56E+00	7.50E-01	26	-99	1.46	0.28	50.83
26.12817	1.1571	23.42	23.73	4.877	1.494	1.57E+00	7.53E-01	26	-99	1.46	0.29	51.67
26.20827	1.182	23.55	23.84	4.959	1.41	1.57E+00	7.55E-01	27	-99	1.47	0.23	51.89
26.28769	1.1943	23.8	24.12	4.951	1.597	1.58E+00	7.57E-01	27	-99	1.48	0.34	51.64
26.36501	1.2044	24.43	24.76	4.864	1.656	1.58E+00	7.59E-01	27	-99	1.52	0.38	50.83
26.44373	1.2219	24.55	24.95	4.898	1.944	1.59E+00	7.62E-01	28	-99	1.53	0.57	50.82
26.52036	1.2534	25.31	25.7	4.876	1.967	1.59E+00	7.64E-01	28	-99	1.58	0.58	50.2
26.59489	1.2767	25.68	26.1	4.892	2.054	1.60E+00	7.66E-01	29	-99	1.61	0.64	49.98
26.66873	1.2797	25.81	26.23	4.879	2.099	1.60E+00	7.68E-01	29	-99	1.61	0.67	49.84
26.73978	1.2916	25.93	26.33	4.905	1.97	1.60E+00	7.70E-01	29	-99	1.62	0.57	49.87
26.81084	1.3093	25.68	26.07	5.021	1.944	1.61E+00	7.72E-01	29	-99	1.6	0.55	50.46
26.88328	1.2978	25.56	26.01	4.99	2.225	1.61E+00	7.74E-01	28	-99	1.6	0.75	50.4
26.95294	1.2676	25.68	26.16	4.847	2.342	1.62E+00	7.76E-01	29	-99	1.6	0.84	49.77
27.02191	1.2423	25.56	26.02	4.774	2.293	1.62E+00	7.78E-01	28	-99	1.6	0.8	49.6
27.08948	1.2055	25.31	25.81	4.67	2.514	1.63E+00	7.80E-01	28	-99	1.58	0.97	49.36
27.15774	1.1752	25.05	25.64	4.583	2.899	1.63E+00	7.82E-01	28	-99	1.56	1.3	49.15
27.22462	1.1812	25.56	26.21	4.507	3.216	1.63E+00	7.84E-01	19	-99	1.59	1.58	48.48
27.28941	1.1823	26.56	27.24	4.34	3.368	1.64E+00	7.86E-01	20	34.25	1.66	1.72	47.15
27.35001	1.1463	27.81	28.79	3.982	4.822	1.64E+00	7.88E-01	21	34.54	1.74	3.28	44.78
27.40922	1.1028	27.94	28.79	3.831	4.197	1.65E+00	7.89E-01	15	34.55	1.75	2.56	44.16
27.47261	1.07	27.19	27.46	3.896	1.361	1.65E+00	7.91E-01	20	34.36	1.7	0.17	45.23
27.53461	1.0595	25.81	26.03	4.07	1.105	1.65E+00	7.93E-01	19	34.01	1.61	0.06	46.87
27.598	1.0657	24.8	25.07	4.251	1.332	1.66E+00	7.95E-01	18	33.74	1.54	0.16	48.27
27.66139	1.0757	24.3	24.65	4.364	1.711	1.66E+00	7.97E-01	18	-99	1.51	0.36	49.02
27.72338	1.1	24.05	24.47	4.496	2.06	1.66E+00	7.98E-01	18	-99	1.49	0.59	49.67
27.78539	1.1526	23.8	24.3	4.743	2.462	1.67E+00	8.00E-01	26	-99	1.48	0.88	50.74
27.84947	1.2048	23.17	23.64	5.096	2.316	1.67E+00	8.02E-01	25	-99	1.43	0.76	52.54
27.91286	1.2475	22.92	23.43	5.324	2.517	1.68E+00	8.04E-01	25	-99	1.42	0.91	53.51
27.97625	1.2718	22.8	23.28	5.463	2.397	1.68E+00	8.06E-01	25	-99	1.41	0.82	54.11
28.04104	1.2675	22.17	22.59	5.612	2.054	1.68E+00	8.08E-01	24	-99	1.37	0.56	55.21
28.10652	1.2561	21.67	22.05	5.697	1.882	1.69E+00	8.10E-01	24	-99	1.33	0.45	55.96
28.17409	1.2444	21.04	21.38	5.819	1.685	1.69E+00	8.11E-01	23	-99	1.29	0.33	56.98
28.23957	1.2364	20.29	20.63	5.992	1.695	1.69E+00	8.13E-01	22	-99	1.24	0.33	58.27
28.30435	1.2272	20.16	20.5	5.987	1.649	1.70E+00	8.15E-01	22	-99	1.23	0.3	58.38
28.49731	1.1134	19.16	19.51	5.707	1.714	1.71E+00	8.21E-01	21	-99	1.16	0.33	58.45
28.54468	1.0928	19.29	19.66	5.559	1.837	1.71E+00	8.22E-01	21	-99	1.17	0.4	57.78
28.59414	1.0773	19.29	19.7	5.47	2.028	1.72E+00	8.24E-01	21	-99	1.17	0.52	57.43
28.6436	1.0696	19.41	19.84	5.392	2.096	1.72E+00	8.25E-01	21	-99	1.18	0.56	57.02
28.69375	1.0725	19.03	19.42	5.522	1.912	1.72E+00	8.26E-01	21	-99	1.15	0.44	57.9
28.746	1.0877	18.78	19.15	5.68	1.801	1.73E+00	8.28E-01	20	-99	1.14	0.37	58.74
28.79964	1.1103	18.41	18.75	5.921	1.695	1.73E+00	8.29E-01	20	-99	1.11	0.31	60
28.85467	1.1245	17.91	18.21	6.175	1.504	1.73E+00	8.31E-01	19	-99	1.08	0.21	61.45
28.9104	1.1159	17.91	18.2	6.13	1.458	1.74E+00	8.33E-01	19	-99	1.08	0.19	61.32
28.96822	1.0907	18.16	18.45	5.912	1.439	1.74E+00	8.34E-01	20	-99	1.09	0.18	60.31
29.02743	1.0847	18.66	18.98	5.714	1.591	1.74E+00	8.36E-01	20	-99	1.13	0.25	59.04
29.09848	1.0658	19.91	20.33	5.243	2.047	1.75E+00	8.38E-01	21	-99	1.21	0.51	55.99
29.1751	1.0836	20.41	20.97	5.168	2.718	1.75E+00	8.40E-01	22	-99	1.24	0.98	55.11
29.25034	1.1131	21.04	21.48	5.182	2.164	1.76E+00	8.42E-01	23	-99	1.29	0.58	54.68
29.32418	1.1178	20.16	20.67	5.407	2.51	1.76E+00	8.45E-01	22	-99	1.23	0.81	56.24
29.39941	1.177	19.66	20.19	5.829	2.62	1.76E+00	8.47E-01	21	-99	1.19	0.89	58.16
29.47186	1.1794	19.29	19.79	5.96	2.484	1.77E+00	8.49E-01	21	-99	1.17	0.79	59.01
29.54709	1.1463	19.03	19.54	5.868	2.472	1.77E+00	8.51E-01	20	-99	1.15	0.77	58.97
29.62093	1.1139	18.91	19.4	5.743	2.4	1.78E+00	8.53E-01	20	-99	1.14	0.72	58.69
29.69407	1.0848	18.91	19.35	5.606	2.177	1.78E+00	8.55E-01	20	-99	1.14	0.57	58.27
29.76931	1.0946	18.41	18.74	5.841	1.64	1.79E+00	8.57E-01	20	-99	1.11	0.25	59.74
29.84175	1.1087	18.16	18.48	5.998	1.617	1.79E+00	8.59E-01	19	-99	1.09	0.24	60.55
29.91002	1.1065	18.03	18.37	6.023	1.669	1.80E+00	8.61E-01	19	-99	1.08	0.26	60.77
29.9748	1.1184	17.66	17.96	6.226	1.517	1.80E+00	8.63E-01	19	-99	1.06	0.19	61.91
30.04098	1.1132	18.91	19.2	5.798	1.429	1.80E+00	8.65E-01	20	-99	1.14	0.15	59.09
30.10367	1.0883	16.9	17.08	6.373	0.85	1.81E+00	8.67E-01	18	-99	1.01	-99	63.48

30.16776	1.0594	16.9	17.09	6.201	0.898	1.81E+00	8.69E-01	18	-99	1.01	-99	62.91
30.23115	1.0289	16.78	17	6.053	1.083	1.81E+00	8.71E-01	18	-99	1	0.02	62.53
30.29245	1.0002	16.78	17.04	5.871	1.271	1.82E+00	8.72E-01	18	-99	1	0.08	61.86
30.35236	0.9892	17.4	17.69	5.592	1.41	1.82E+00	8.74E-01	18	-99	1.04	0.13	60.08
30.41297	0.9909	17.91	18.23	5.435	1.61	1.83E+00	8.76E-01	19	-99	1.07	0.22	58.89
30.47288	0.9966	18.41	18.76	5.314	1.717	1.83E+00	8.78E-01	19	-99	1.11	0.27	57.87
30.53348	1.0138	19.16	19.53	5.191	1.824	1.83E+00	8.79E-01	20	-99	1.16	0.33	56.61
30.5899	1.0363	19.91	20.31	5.102	1.973	1.84E+00	8.81E-01	21	-99	1.21	0.41	55.49
30.64215	1.0655	20.41	20.81	5.12	1.95	1.84E+00	8.83E-01	22	-99	1.24	0.39	55.08
30.69161	1.1105	21.17	21.62	5.137	2.222	1.84E+00	8.84E-01	22	-99	1.29	0.55	54.4
30.74246	1.1598	22.04	22.52	5.15	2.349	1.85E+00	8.85E-01	23	-99	1.35	0.63	53.65
30.79262	1.2106	22.67	23.18	5.223	2.494	1.85E+00	8.87E-01	24	-99	1.39	0.72	53.37
30.83929	1.2585	23.3	23.87	5.273	2.805	1.85E+00	8.88E-01	25	-99	1.43	0.93	52.99
30.89223	1.3101	24.55	25.15	5.209	2.954	1.85E+00	8.90E-01	26	-99	1.51	1.04	51.78
30.94587	1.3154	25.43	25.95	5.07	2.539	1.86E+00	8.91E-01	27	-99	1.57	0.74	50.72
30.99672	1.3294	25.93	26.45	5.025	2.582	1.86E+00	8.93E-01	27	-99	1.6	0.77	50.21
31.0413	1.3178	25.93	26.48	4.977	2.705	1.86E+00	8.94E-01	27	-99	1.6	0.85	50.02
31.09076	1.2959	26.06	26.69	4.856	3.103	1.87E+00	8.95E-01	27	-99	1.61	1.13	49.45
31.14161	1.2462	27.69	28.38	4.392	3.404	1.87E+00	8.97E-01	19	-99	1.72	1.36	46.64
31.1848	1.2581	36.59	37.48	3.357	4.394	1.87E+00	8.98E-01	19	35.44	2.31	2.2	37.97
31.2266	1.4824	40.73	41.34	3.586	3.002	1.87E+00	8.99E-01	21	36.1	2.59	1.05	37.5
31.27118	1.444	39.47	39.74	3.634	1.306	1.88E+00	9.01E-01	21	35.9	2.51	0.08	38.27
31.31716	1.3735	38.85	39.08	3.514	1.151	1.88E+00	9.02E-01	20	35.79	2.46	0.03	38.02
31.35895	1.3081	40.23	40.38	3.239	0.762	1.88E+00	9.03E-01	21	36	2.56	-99	36.37
31.40145	1.2342	43.11	43.12	2.862	0.063	1.88E+00	9.04E-01	18	36.42	2.75	-99	33.75
31.44115	1.1652	42.48	42.45	2.745	-0.163	1.89E+00	9.06E-01	18	36.32	2.71	-99	33.42
31.48574	1.0876	31.57	31.65	3.436	0.397	1.89E+00	9.07E-01	16	34.45	1.98	-99	40.92
31.53032	1.0568	27.69	28.02	3.771	1.646	1.89E+00	9.08E-01	14	33.58	1.72	0.21	44.36
31.57699	1.1122	27.94	28.61	3.887	3.323	1.90E+00	9.09E-01	19	33.63	1.74	1.26	44.5
31.62157	1.1565	28.44	29.33	3.943	4.411	1.90E+00	9.11E-01	20	33.74	1.77	2.16	44.3
31.80826	1.264	31.95	33.17	3.81	6.036	1.91E+00	9.16E-01	17	34.46	2	3.72	41.76
31.86748	1.3324	32.45	33.75	3.948	6.392	1.91E+00	9.18E-01	17	34.54	2.04	4.08	42.04
31.9044	1.3961	33.08	34.14	4.09	5.217	1.91E+00	9.19E-01	23	34.66	2.08	2.88	42.41
31.93992	1.4557	32.83	33.77	4.311	4.621	1.92E+00	9.20E-01	23	34.6	2.06	2.31	43.44
31.97963	1.545	31.83	32.41	4.767	2.879	1.92E+00	9.21E-01	33	-99	1.99	0.91	45.77
32.02212	1.6466	32.45	33.07	4.979	3.041	1.92E+00	9.22E-01	34	-99	2.04	1.02	46.18
32.0667	1.7532	33.2	33.47	5.238	1.319	1.92E+00	9.24E-01	34	-99	2.09	0.07	46.86
32.1085	1.8532	32.7	33.13	5.594	2.086	1.93E+00	9.25E-01	34	-99	2.05	0.41	48.19
32.14194	1.9331	32.58	33.08	5.844	2.475	1.93E+00	9.26E-01	34	-99	2.04	0.64	49.01
32.20463	1.9722	33.71	34.08	5.787	1.847	1.93E+00	9.28E-01	35	-99	2.12	0.29	48.32
32.24155	1.9914	34.08	34.47	5.778	1.905	1.93E+00	9.29E-01	35	-99	2.14	0.32	48.1
32.46238	0	38.47	39.14	0	3.316	1.95E+00	9.35E-01	10	-99	-7.13	1.19	-99
32.49303	0	38.1	38.62	0	2.611	1.95E+00	9.36E-01	10	-99	-7.13	0.7	-99
32.52577	0	38.6	39.22	0	3.077	1.95E+00	9.37E-01	10	-99	-7.13	1.01	-99
32.61075	0	42.48	43.46	0	4.828	1.96E+00	9.39E-01	11	-99	-7.13	2.41	-99
32.64558	0	43.24	44.23	0	4.896	1.96E+00	9.40E-01	11	-99	-7.13	2.47	-99
32.71594	0	47.37	48.33	0	4.731	1.96E+00	9.42E-01	12	-99	-7.13	2.31	-99

CLASSIFICATION TESTS

Suelos, PSC
Calle Chile 258, San Juan, P.R. 00917-2103
Tel. (787) 753-0147. Email: suelosinc@gmail.com

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	1.0	3.8	11.3	83.9	
□	0.0	0.0	11.4	6.7	11.7	16.8	53.4	
△	0.0	0.0	4.2	7.2	18.2	26.8	43.6	
◇	0.0	0.0	26.7	11.3	12.0	11.1	38.9	
▽	0.0	0.0	7.9	4.8	7.5	15.5	64.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	60	24	0.0877							
□	35	20	3.0247	0.1688						
△	29	17	1.3499	0.2408	0.1246					
◇	40	18	9.4567	1.6324	0.4269					
▽	48	20	1.2253							

Material Description	USCS	AASHTO
○ fat clay with sand	CH	A-7-6(33)
□ sandy lean clay	CL	A-6(5)
△ clayey sand	SC	A-6(2)
◇ clayey sand with gravel	SC	A-6(4)
▽ sandy lean clay	CL	A-7-6(16)

Project No. 5068 **Client:**

Project: Dike C, Gurabo PR

○ **Source of Sample:** C-2 **Depth:** 4-5.5' **Sample Number:** S-3

□ **Source of Sample:** C-2 **Depth:** 9-10.5' **Sample Number:** S-5

△ **Source of Sample:** C-2 **Depth:** 19-20.5' **Sample Number:** S-7

◇ **Source of Sample:** C-2 **Depth:** 29-30.5' **Sample Number:** S-9

▽ **Source of Sample:** C-2 **Depth:** 39-40.5' **Sample Number:** S-11

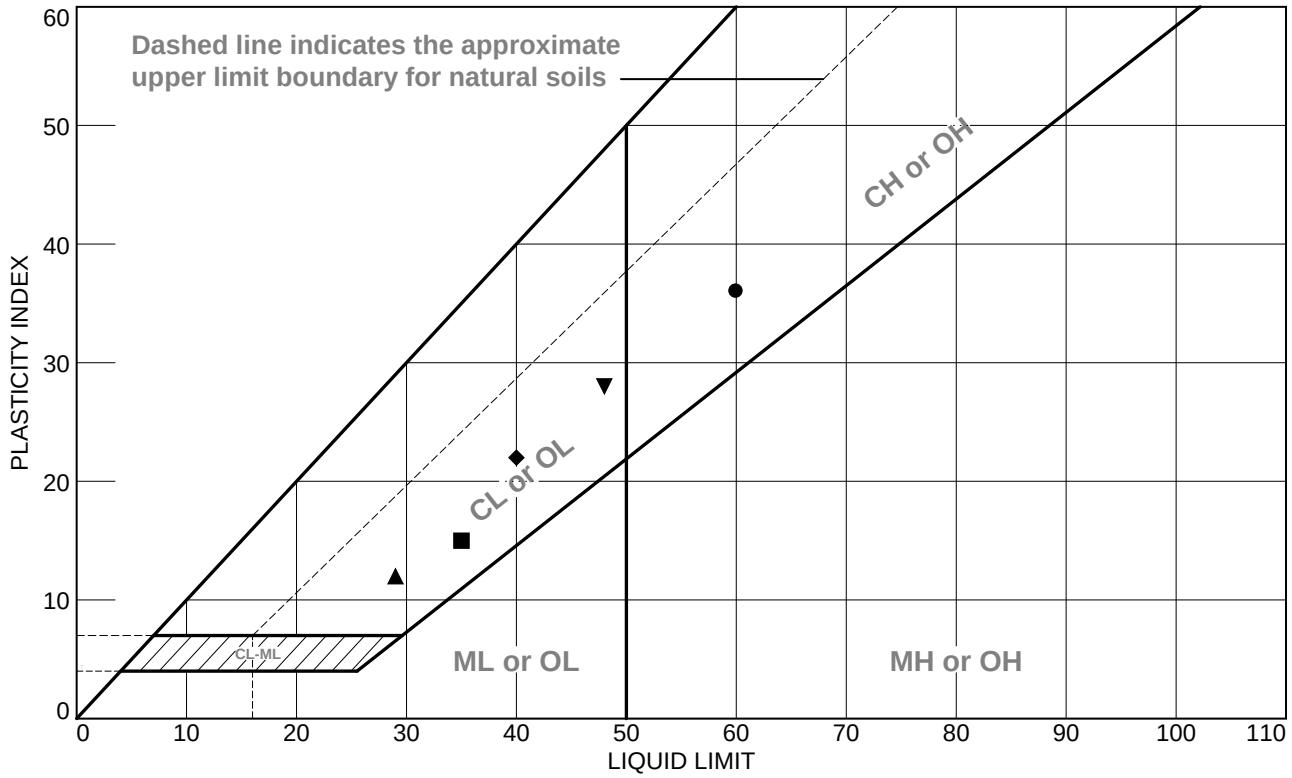
SUELOS, INC.

San Juan, Puerto Rico

Remarks:

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	C-2	S-3	4-5.5'		24	60	36		CH
■	C-2	S-5	9-10.5'		20	35	15		CL
▲	C-2	S-7	19-20.5'		17	29	12		SC
◆	C-2	S-9	29-30.5'		18	40	22		SC
▼	C-2	S-11	39-40.5'		20	48	28		CL

SUELOS, INC.

San Juan, Puerto Rico

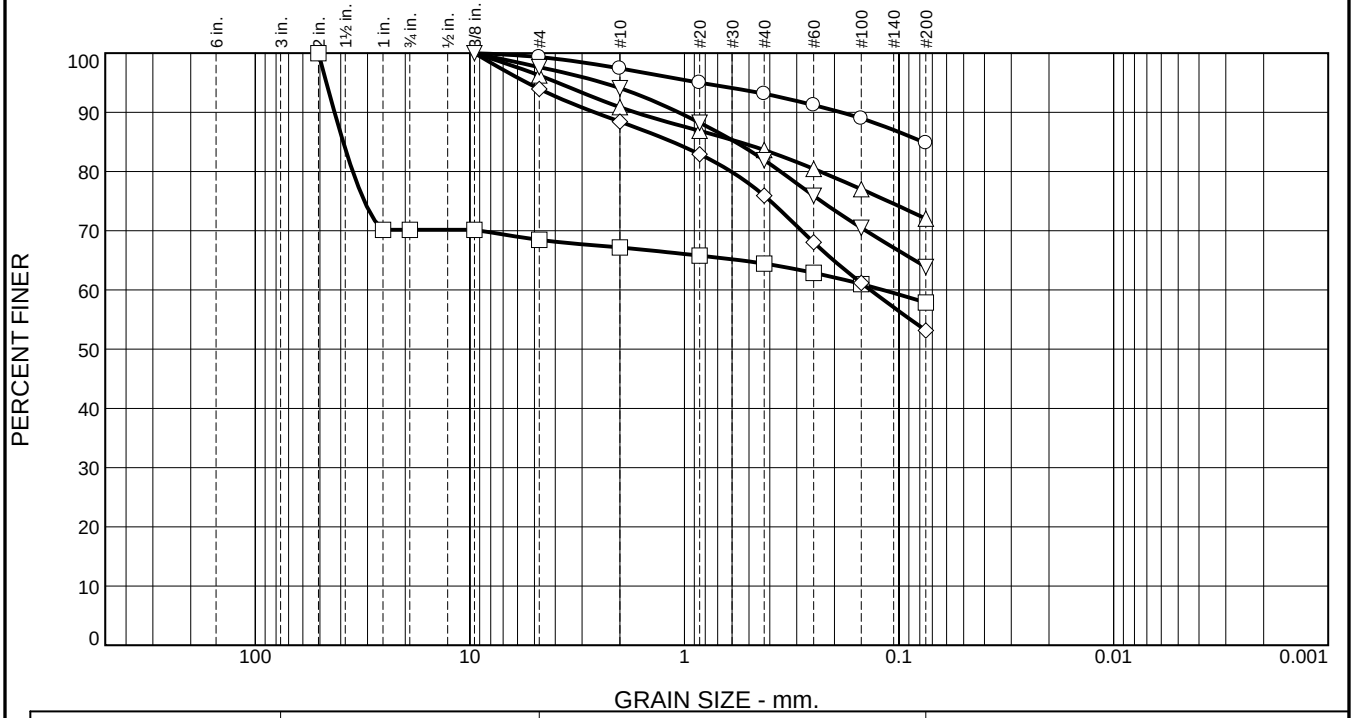
Client:

Project: Dike C, Gurabo PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.7	1.9	4.3	8.3	84.8	
□	0.0	29.8	1.7	1.3	2.8	6.5	57.9	
△	0.0	0.0	3.8	5.3	7.3	11.5	72.1	
◇	0.0	0.0	6.0	5.6	12.5	22.7	53.2	
▽	0.0	0.0	2.4	3.5	12.2	18.0	63.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	64	18	0.0770							
□	55	18	38.9185	0.1189						
△	38	17	0.5567							
◇	35	21	1.1360	0.1360						
▽	38	18	0.5800							

Material Description	USCS	AASHTO
○ fat clay with sand	CH	A-7-6(41)
□ gravelly fat clay	CH	A-7-6(18)
△ lean clay with sand	CL	A-6(13)
◇ sandy lean clay	CL	A-6(5)
▽ sandy lean clay	CL	A-6(10)

Project No. 5068 **Client:**

Project: Dike C, Gurabo PR

○ **Source of Sample:** C-3 **Depth:** 4-5.5' **Sample Number:** S-3

□ **Source of Sample:** C-3 **Depth:** 9-10.5' **Sample Number:** S-5

△ **Source of Sample:** C-3 **Depth:** 19-20.5' **Sample Number:** S-7

◇ **Source of Sample:** C-3 **Depth:** 29-30.5' **Sample Number:** S-9

▽ **Source of Sample:** C-3 **Depth:** 39-40.5' **Sample Number:** S-11

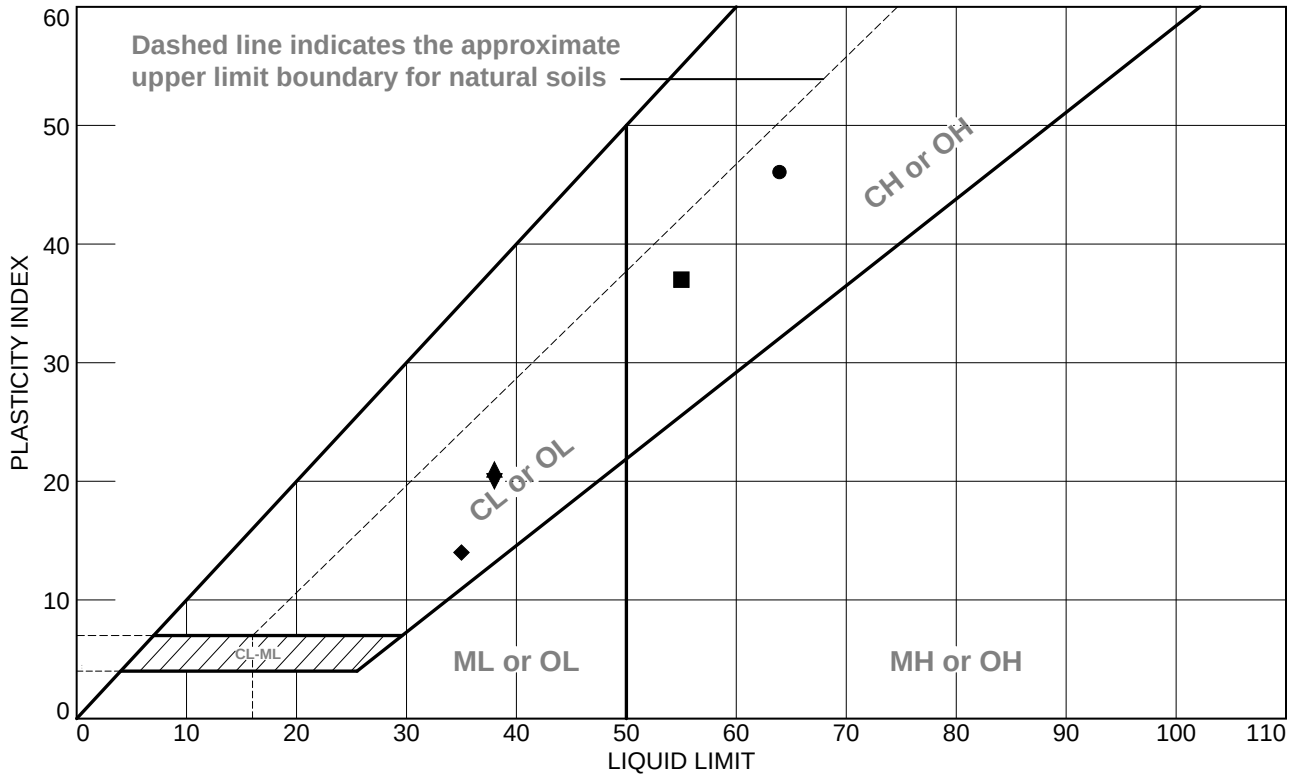
SUELOS, INC.

San Juan, Puerto Rico

Remarks:

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	C-3	S-3	4-5.5'		18	64	46		CH
■	C-3	S-5	9-10.5'		18	55	37		CH
▲	C-3	S-7	19-20.5'		17	38	21		CL
◆	C-3	S-9	29-30.5'		21	35	14		CL
▼	C-3	S-11	39-40.5'		18	38	20		CL

SUELOS, INC.

San Juan, Puerto Rico

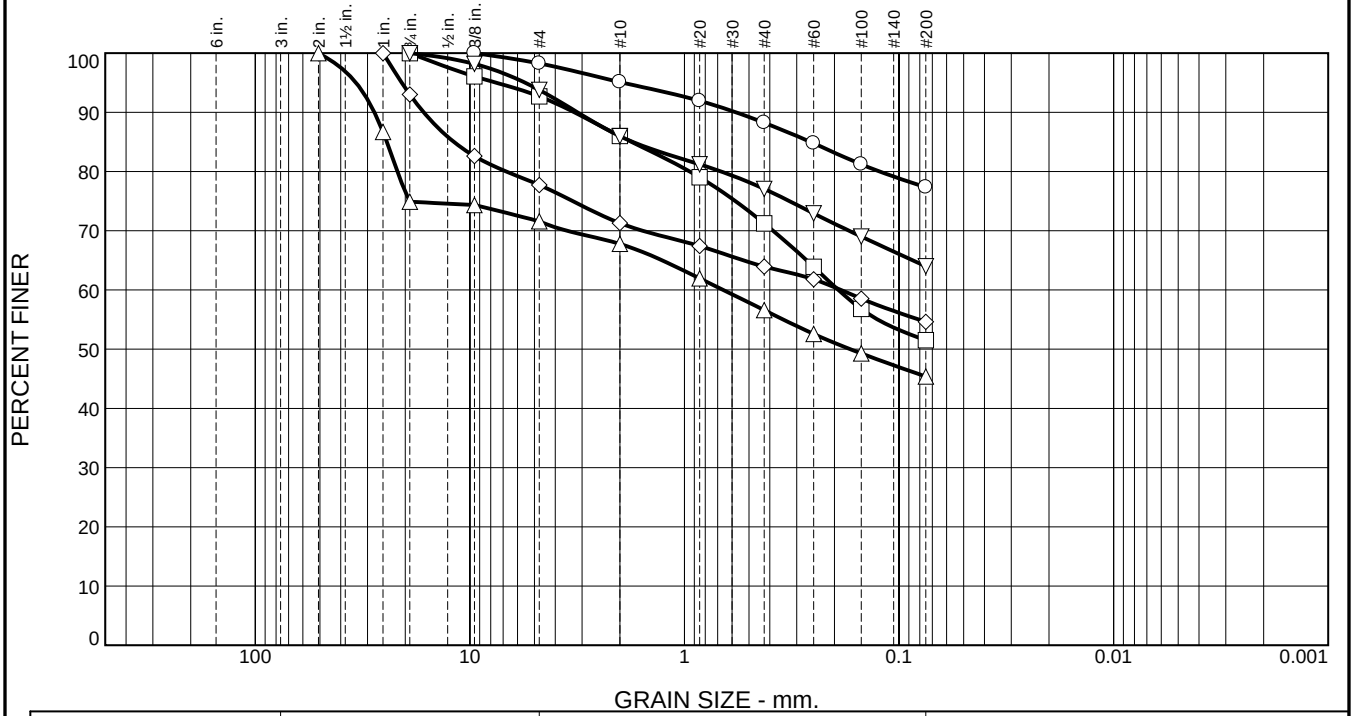
Client:

Project: Dike C, Gurabo PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.7	3.2	6.9	10.9	77.3	
□	0.0	0.0	7.3	6.7	14.8	19.7	51.5	
△	0.0	25.1	3.3	3.8	11.2	11.2	45.4	
◇	0.0	7.0	15.3	6.4	7.3	9.4	54.6	
▽	0.0	0.0	6.2	7.8	8.9	13.1	64.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	55	25	0.2585							
□	34	18	1.7619	0.1917						
△	43	19	24.3797	0.6599	0.1687					
◇	46	20	11.8662	0.1863						
▽	43	22	1.7409							

Material Description	USCS	AASHTO
○ fat clay with sand	CH	A-7-6(24)
□ sandy lean clay	CL	A-6(5)
△ clayey gravel with sand	GC	A-7-6(6)
◇ sandy lean clay with gravel	CL	A-7-6(11)
▽ sandy lean clay	CL	A-7-6(12)

Project No. 5068 **Client:**

Project: Dike C, Gurabo PR

○ **Source of Sample:** C-5 **Depth:** 4-5.5' **Sample Number:** S-3

□ **Source of Sample:** C-5 **Depth:** 9-10.5' **Sample Number:** S-5

△ **Source of Sample:** C-5 **Depth:** 19-20.5' **Sample Number:** S-7

◇ **Source of Sample:** C-5 **Depth:** 29-30.5' **Sample Number:** S-9

▽ **Source of Sample:** C-5 **Depth:** 39-40.5' **Sample Number:** S-11

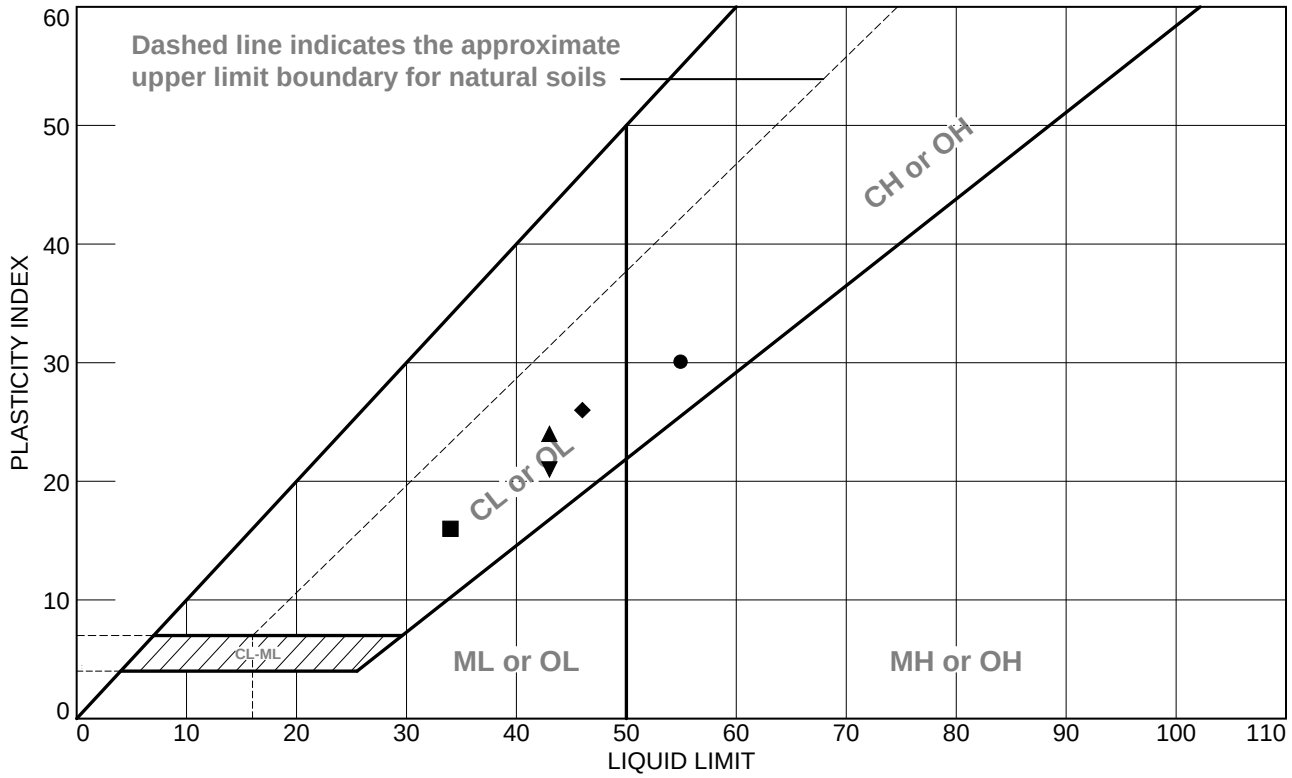
SUELOS, INC.

San Juan, Puerto Rico

Remarks:

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	C-5	S-3	4-5.5'		25	55	30		CH
■	C-5	S-5	9-10.5'		18	34	16		CL
▲	C-5	S-7	19-20.5'		19	43	24		GC
◆	C-5	S-9	29-30.5'		20	46	26		CL
▼	C-5	S-11	39-40.5'		22	43	21		CL

SUELOS, INC.

San Juan, Puerto Rico

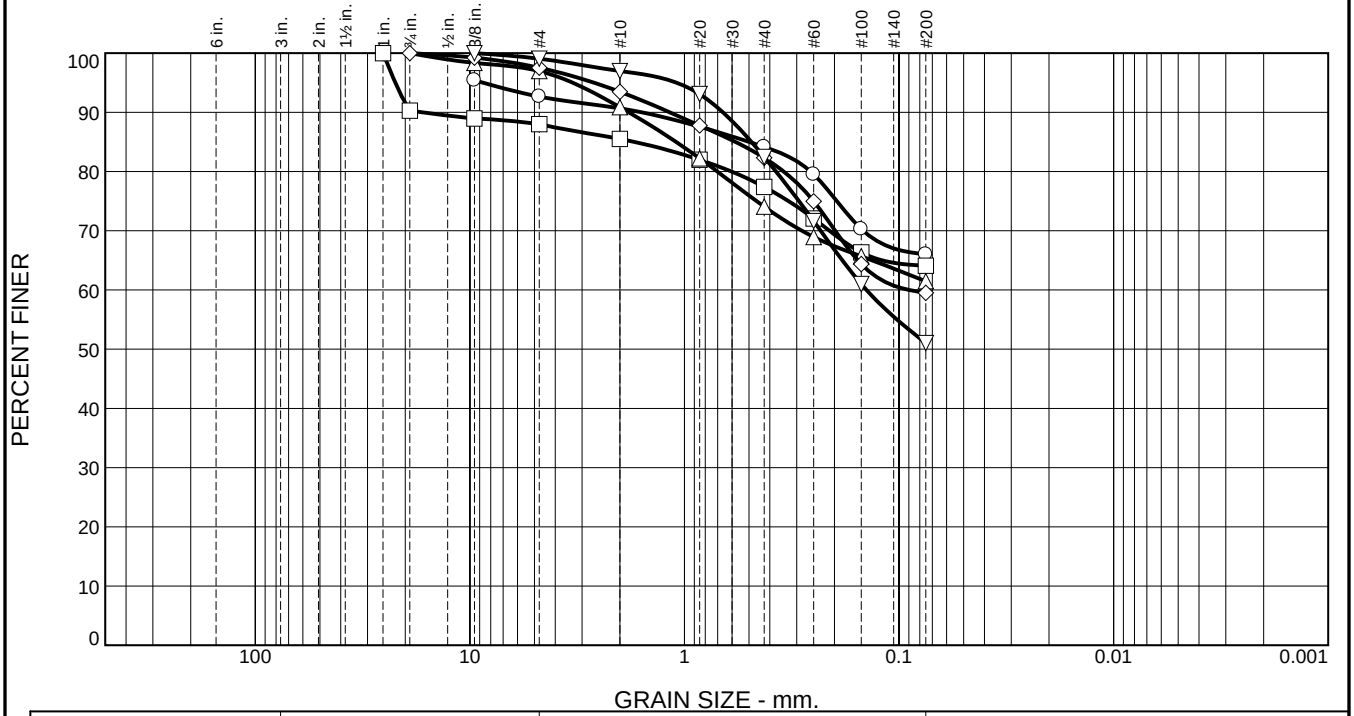
Client:

Project: Dike C, Gurabo PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○				2.0	6.5	18.2	66.0	
□	0.0	9.7	2.3	2.5	8.1	13.3	64.1	
△	0.0	0.0	3.0	6.1	16.8	12.6	61.5	
◇	0.0	0.0	2.5	4.0	11.2	22.8	59.5	
▽	0.0	0.0	0.9	2.1	14.5	31.5	51.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	45	20	0.4990							
□	47	20	1.7094							
△	51	21	1.0936							
◇	35	20	0.5778	0.0898						
▽	38	21	0.4874	0.1418						

Material Description	USCS	AASHTO
○ sandy lean clay	CL	A-7-6(15)
□ sandy lean clay	CL	A-7-6(15)
△ sandy fat clay	CH	A-7-6(16)
◇ sandy lean clay	CL	A-6(7)
▽ sandy lean clay	CL	A-6(6)

Project No. 5068 **Client:**

Project: Dike C, Gurabo PR

○ **Source of Sample:** C-8 **Depth:** 4-5.5' **Sample Number:** S-3

□ **Source of Sample:** C-8 **Depth:** 9-10.5' **Sample Number:** S-5

△ **Source of Sample:** C-8 **Depth:** 19-20.5' **Sample Number:** S-7

◇ **Source of Sample:** C-8 **Depth:** 29-30.5' **Sample Number:** S-9

▽ **Source of Sample:** C-8 **Depth:** 39-40.5' **Sample Number:** S-11

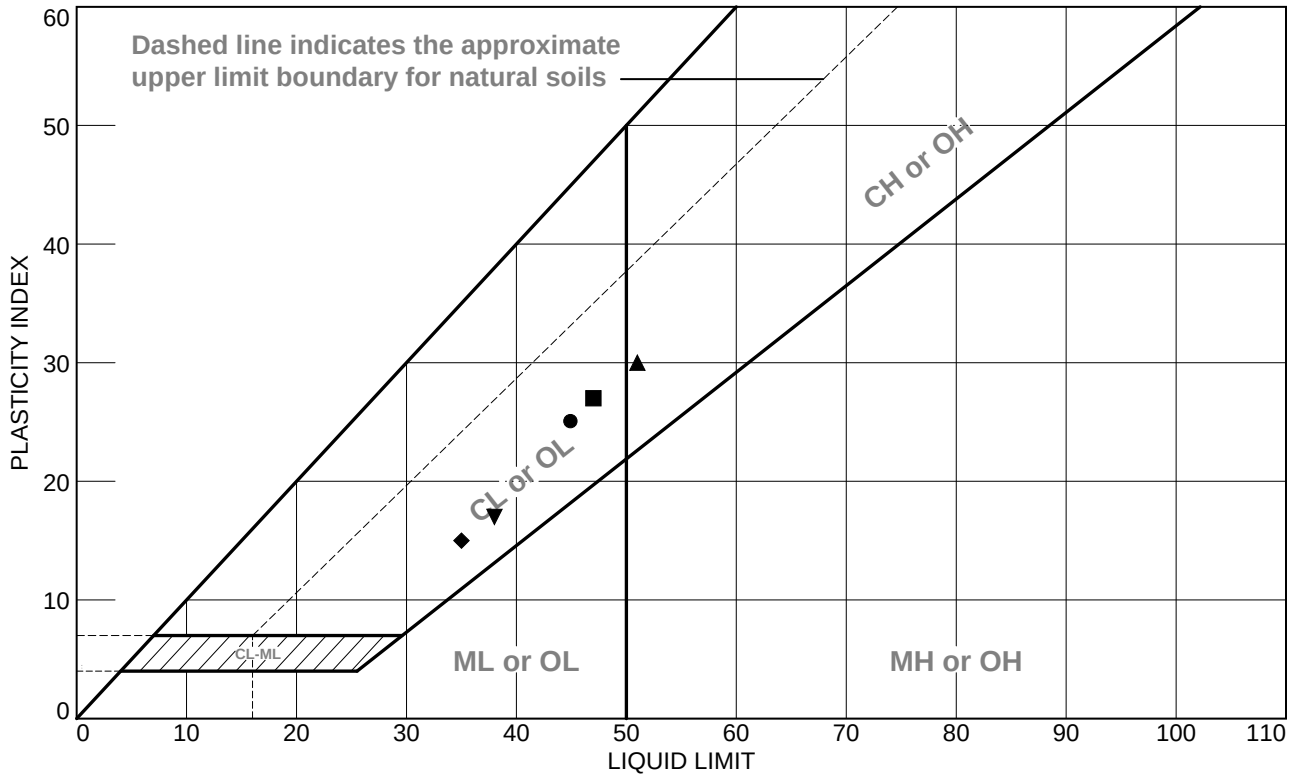
SUELOS, INC.

San Juan, Puerto Rico

Remarks:

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	C-8	S-3	4-5.5'		20	45	25		CL
■	C-8	S-5	9-10.5'		20	47	27		CL
▲	C-8	S-7	19-20.5'		21	51	30		CH
◆	C-8	S-9	29-30.5'		20	35	15		CL
▼	C-8	S-11	39-40.5'		21	38	17		CL

SUELOS, INC.

San Juan, Puerto Rico

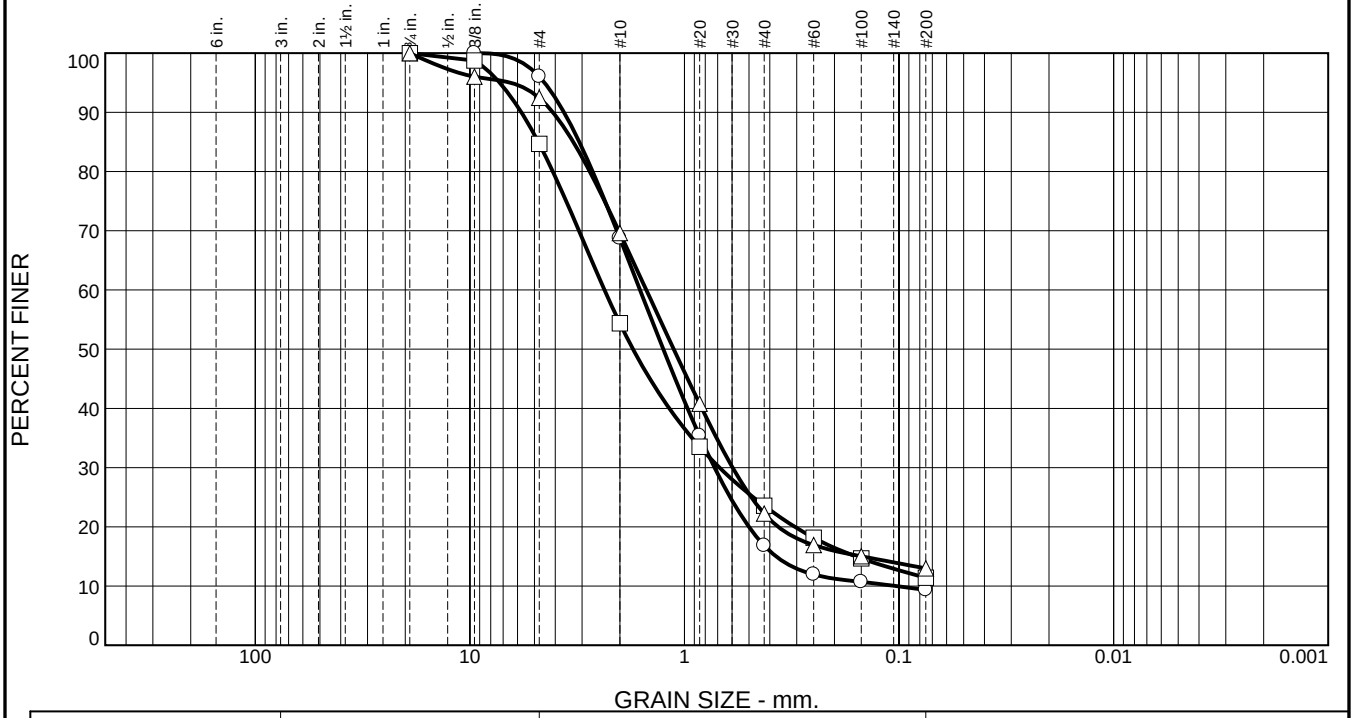
Client:

Project: Dike C, Gurabo PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	4.0	27.3	51.9	7.4	9.4	
□	0.0	0.0	15.3	30.3	30.8	12.2	11.4	
△	0.0	0.0	7.6	22.8	47.4	9.2	13.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	NV	NP	3.0923	1.6102	1.2554	0.7238	0.3742	0.1035	3.14	15.55
□	NV	NP	4.7994	2.3586	1.7363	0.6868	0.1590			
△	NV	NP	3.2976	1.5061	1.1220	0.5967	0.1490			

Material Description	USCS	AASHTO
○ poorly graded sand with silt	SP-SM	A-1-b
□ poorly graded sand with silt and gravel	SP-SM	A-1-b
△ silty sand	SM	A-1-b

Project No. 5068 **Client:**

Project: Dike C, Gurabo PR

○ **Source of Sample:** C-10 **Depth:** 4-5.5' **Sample Number:** S-3

□ **Source of Sample:** C-10 **Depth:** 9-10.5' **Sample Number:** S-5

△ **Source of Sample:** C-10 **Depth:** 19-20.5' **Sample Number:** S-7

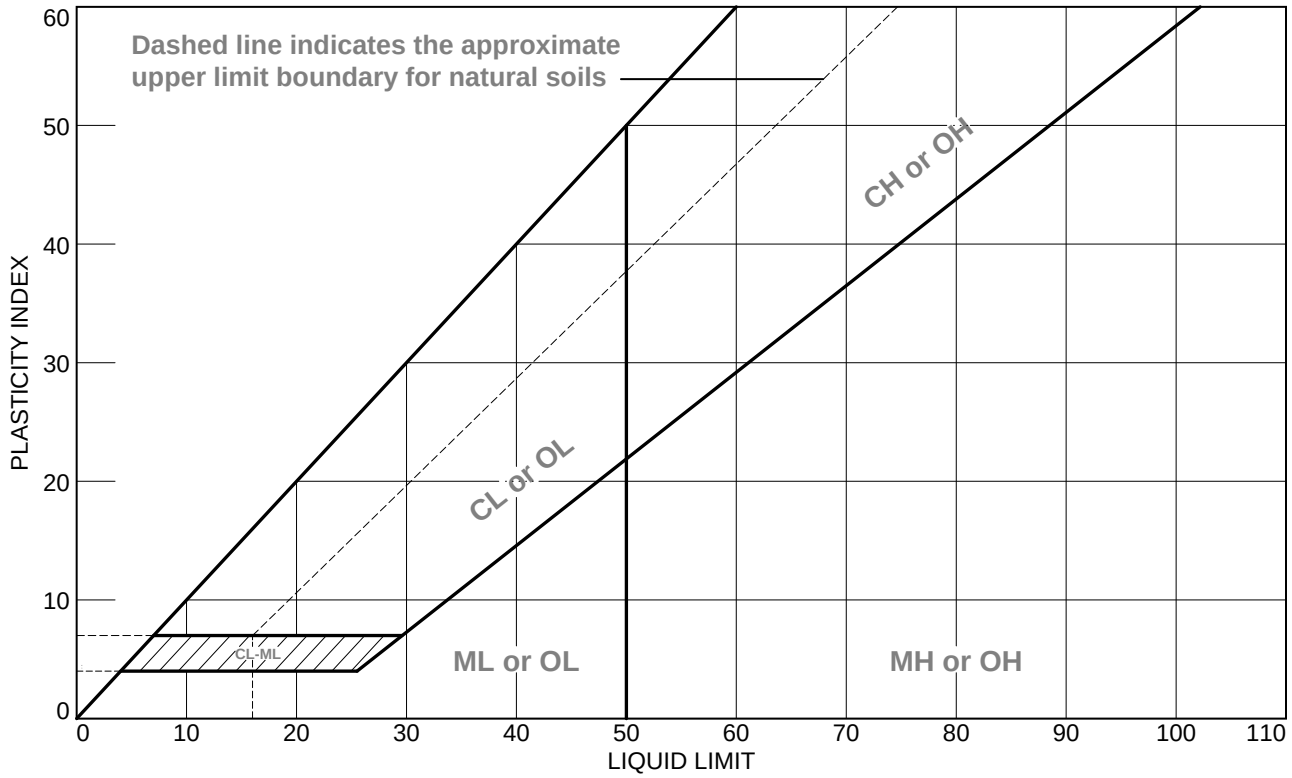
Remarks:

SUELOS, INC.

San Juan, Puerto Rico

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	C-10	S-3	4-5.5'		NP	NV	NP		SP-SM
■	C-10	S-5	9-10.5'		NP	NV	NP		SP-SM
▲	C-10	S-7	19-20.5'		NP	NV	NP		SM

SUELOS, INC.

San Juan, Puerto Rico

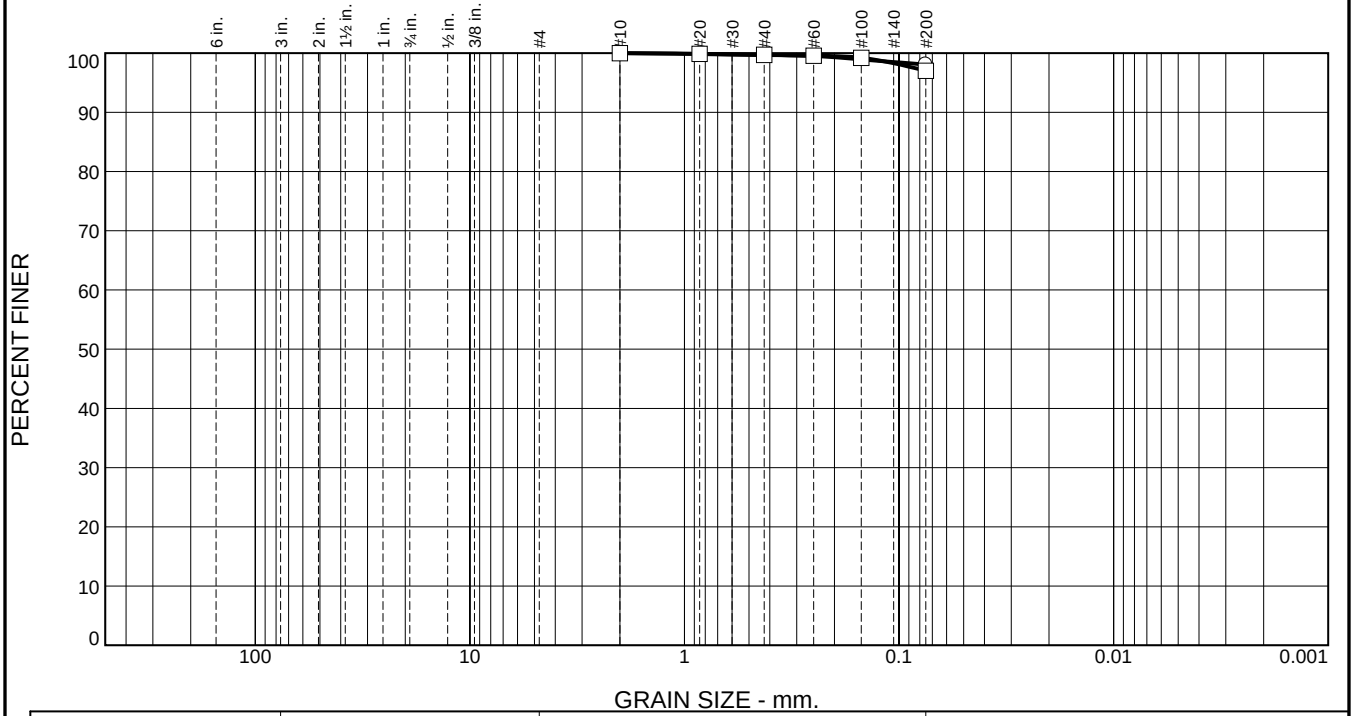
Client:

Project: Dike C, Gurabo PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.3	1.6	98.1	
□	0.0	0.0	0.0	0.0	0.3	2.7	97.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	69	32								
□	62	29								

Material Description	USCS	AASHTO
○ fat clay	CH	A-7-5(44)
□ fat clay	CH	A-7-6(38)

Project No. 5068 **Client:**

Project: Dike C, Gurabo PR

○ **Source of Sample:** C-13 **Depth:** 3.5-5.0' **Sample Number:** S-3

□ **Source of Sample:** C-13 **Depth:** 8.5-10.0' **Sample Number:** S-5

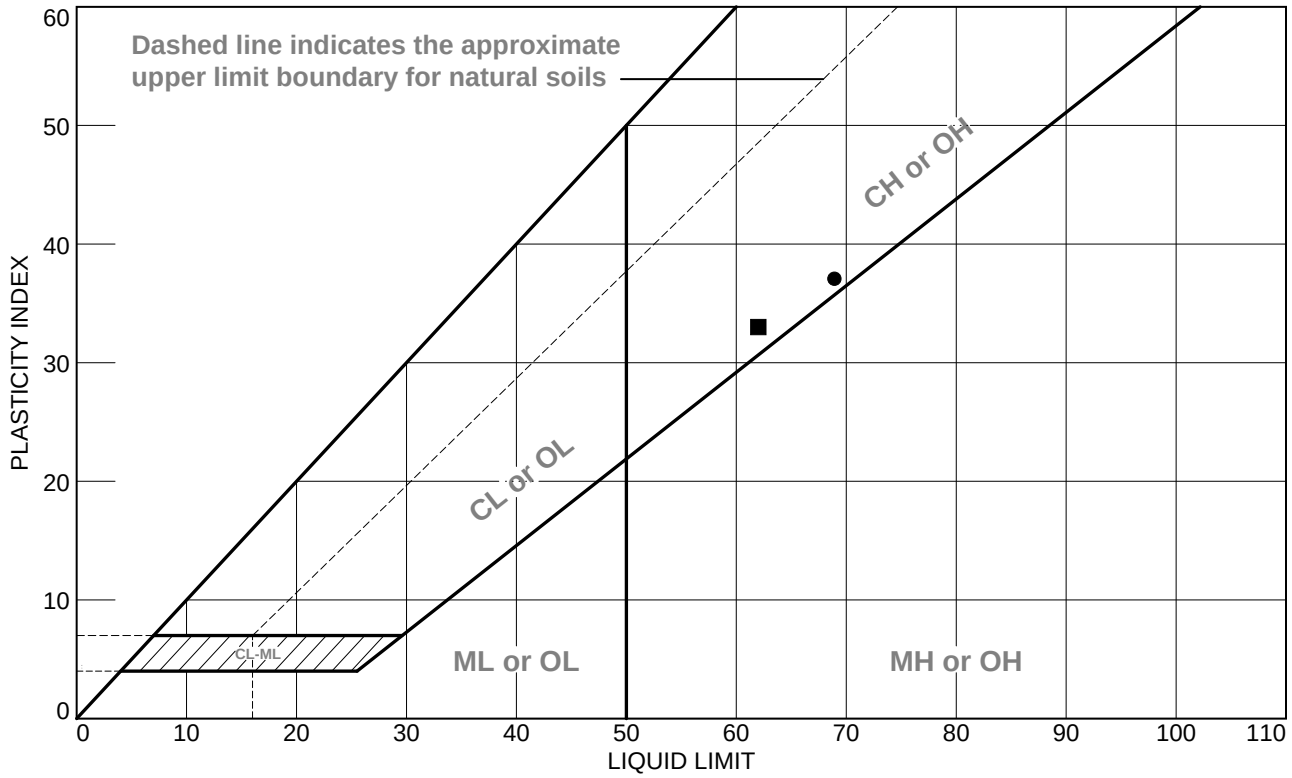
Remarks:

SUELOS, INC.

San Juan, Puerto Rico

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	C-13	S-3	3.5-5.0'		32	69	37		CH
■	C-13	S-5	8.5-10.0'		29	62	33		CH

SUELOS, INC.

San Juan, Puerto Rico

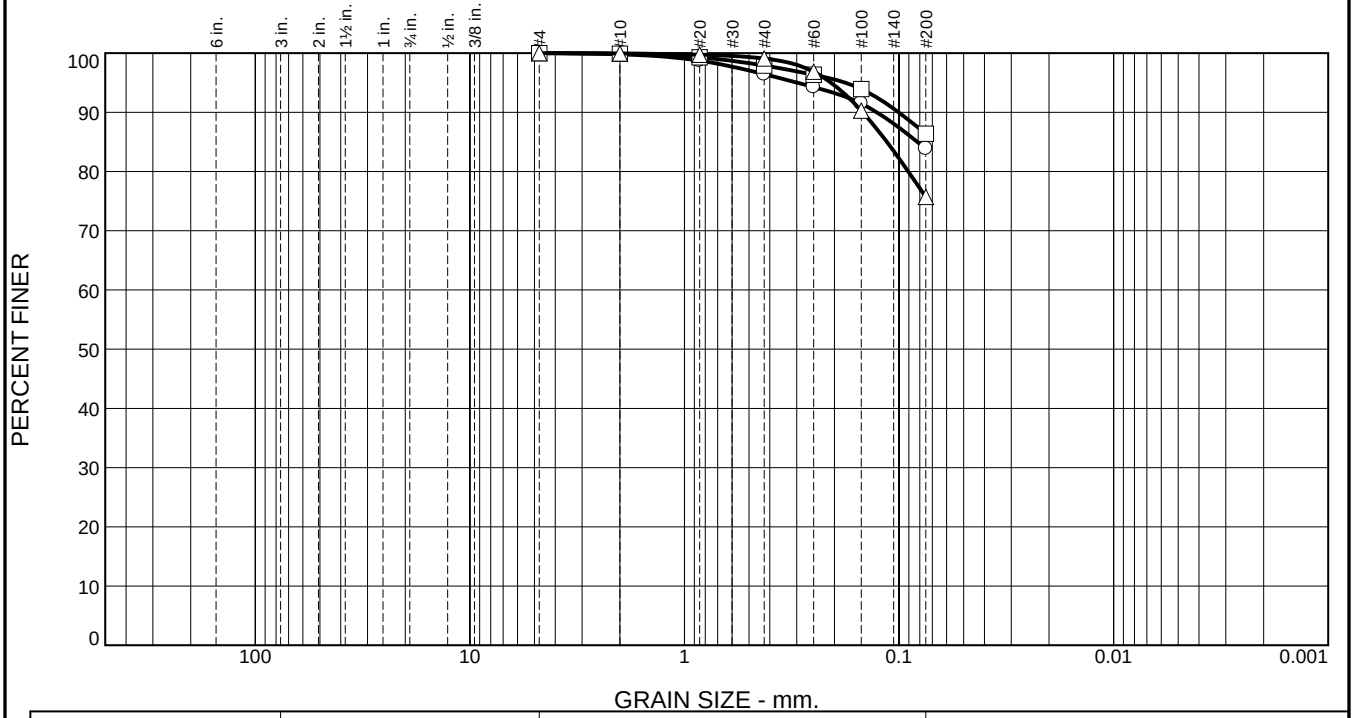
Client:

Project: Dike C, Gurabo PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.2	3.3	12.6	83.9	
□	0.0	0.0	0.0	0.1	2.0	11.5	86.4	
△	0.0	0.0	0.0	0.0	0.9	23.4	75.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	57	26	0.0821							
□	54	27								
△	39	23	0.1139							

Material Description	USCS	AASHTO
○ fat clay with sand	CH	A-7-6(28)
□ fat clay	CH	A-7-6(26)
△	CL	A-6(12)

Project No. 5068 **Client:**

Project: Dike C, Gurabo PR

○ **Source of Sample:** C-14 **Depth:** 3.0-4.5' **Sample Number:** S-3

□ **Source of Sample:** C-14 **Depth:** 9.0-10.5' **Sample Number:** S-5

△ **Source of Sample:** C-14 **Depth:** 14.0-15.5' **Sample Number:** S-6

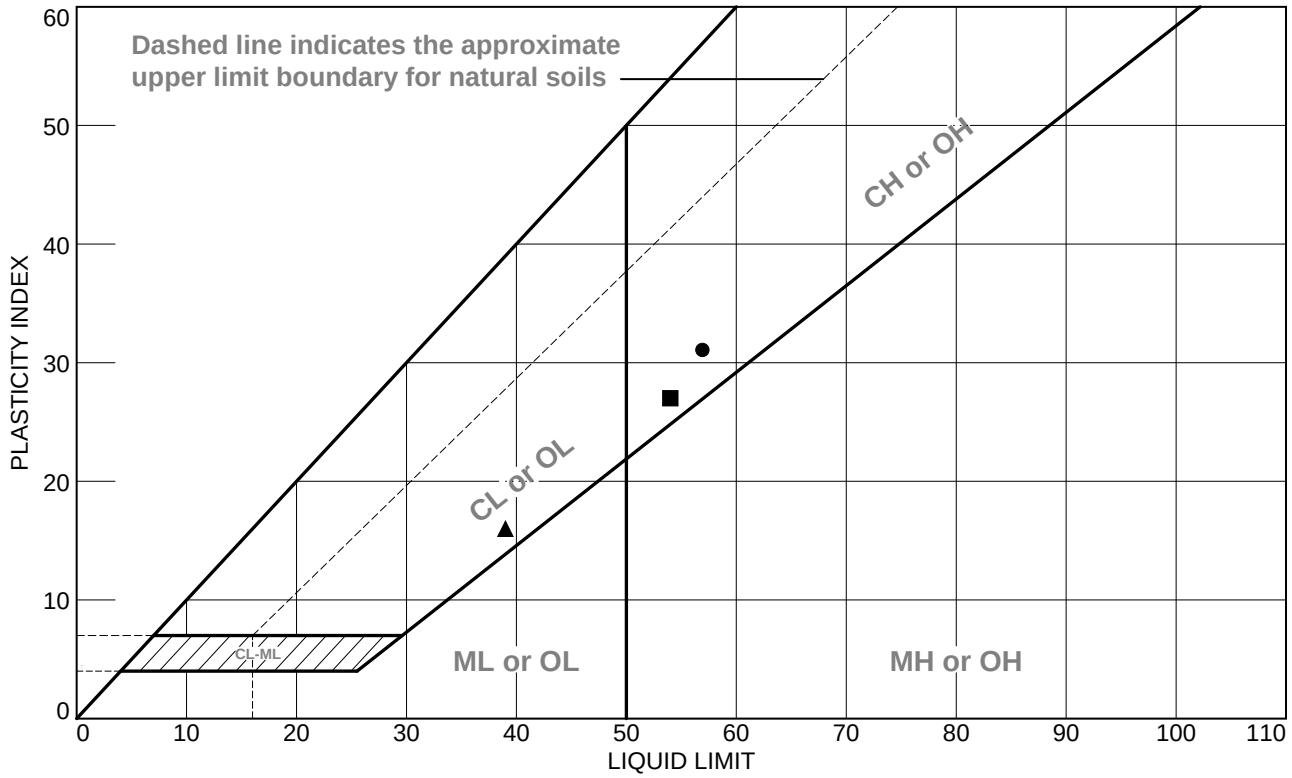
Remarks:

SUELOS, INC.

San Juan, Puerto Rico

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	C-14	S-3	3.0-4.5'		26	57	31		CH
■	C-14	S-5	9.0-10.5'		27	54	27		CH
▲	C-14	S-6	14.0-15.5'		23	39	16		CL

SUELOS, INC.

San Juan, Puerto Rico

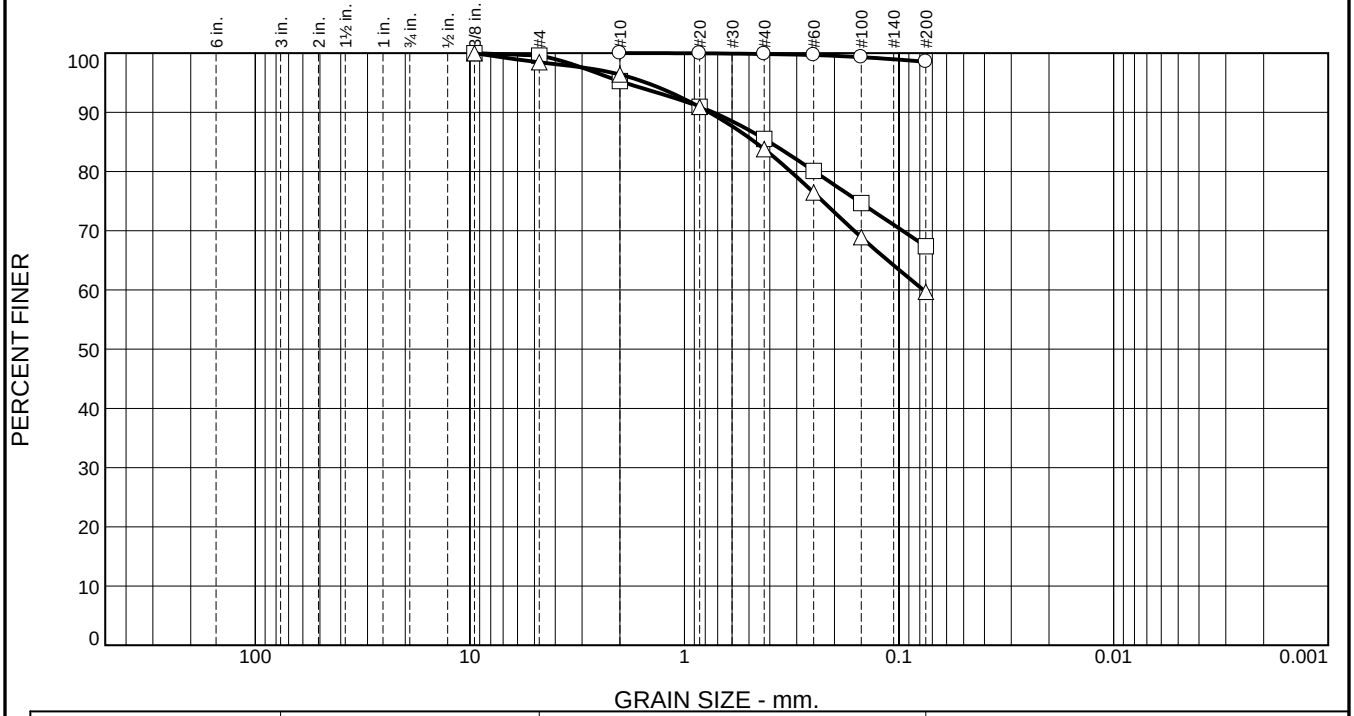
Client:

Project: Dike C, Gurabo PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.1	1.3	98.6	
□	0.0	0.0	0.4	4.3	9.8	18.1	67.4	
△	0.0	0.0	1.5	2.1	12.6	24.1	59.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	60	29								
□	36	21	0.4025							
△	38	17	0.4698	0.0769						

Material Description	USCS	AASHTO
○ fat clay	CH	A-7-6(37)
□ sandy lean clay	CL	A-6(8)
△ sandy lean clay	CL	A-6(10)

Project No. 5068 **Client:**

Project: Dike C, Gurabo PR

○ **Source of Sample:** C-17 **Depth:** 3.5-5.0' **Sample Number:** S-3

□ **Source of Sample:** C-17 **Depth:** 8.5-10.0' **Sample Number:** S-5

△ **Source of Sample:** C-17 **Depth:** 13.5-15.0' **Sample Number:** S-6

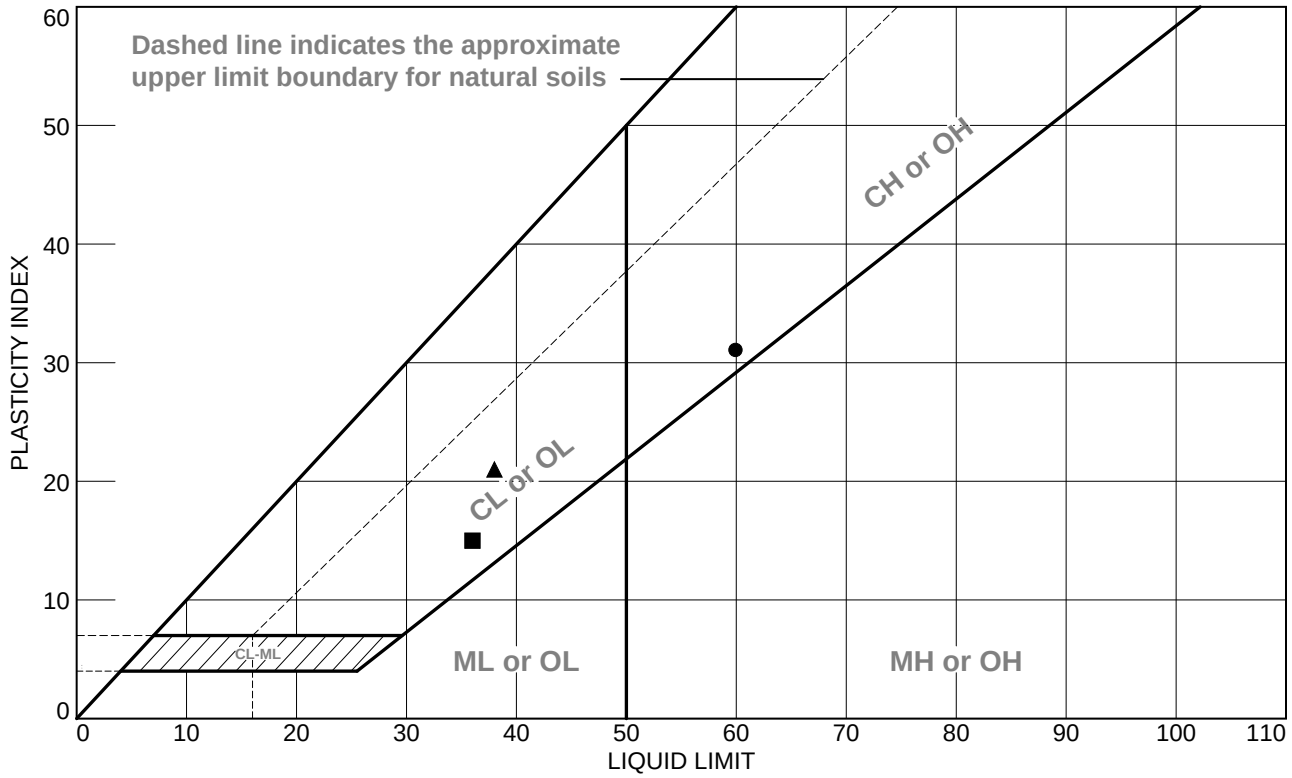
Remarks:

SUELOS, INC.

San Juan, Puerto Rico

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	C-17	S-3	3.5-5.0'		29	60	31		CH
■	C-17	S-5	8.5-10.0'		21	36	15		CL
▲	C-17	S-6	13.5-15.0'		17	38	21		CL

SUELOS, INC.

San Juan, Puerto Rico

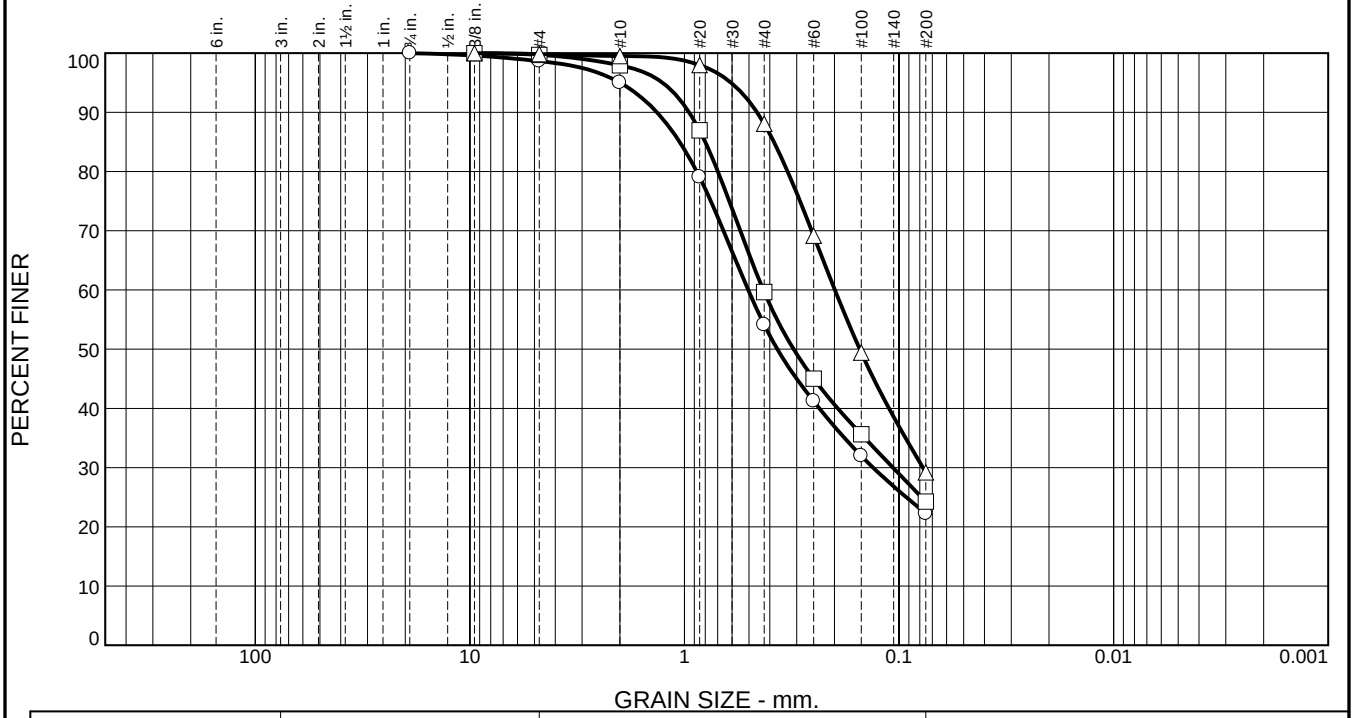
Client:

Project: Dike C, Gurabo PR

Project No.: 5068

Figure

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.3	3.7	40.9	31.9	22.2	
□	0.0	0.0	0.3	1.8	38.3	35.3	24.3	
△	0.0	0.0	0.2	0.3	11.4	58.9	29.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	NV	NP	1.0525	0.5047	0.3690	0.1321				
□	NV	NP	0.7997	0.4291	0.3100	0.1068				
△	NV	NP	0.3827	0.1990	0.1525	0.0773				

	Material Description	USCS	AASHTO
○	silty sand	SM	A-2-4(0)
□	silty sand	SM	A-2-4(0)
△	silty sand	SM	A-2-4(0)

Project No. 5068 **Client:**

Project: Dike C, Gurabo PR

○ **Source of Sample:** C-18 **Depth:** 3.5-5.0' **Sample Number:** S-3

□ **Source of Sample:** C-18 **Depth:** 8.5-10.0' **Sample Number:** S-5

△ **Source of Sample:** C-18 **Depth:** 13.5-15' **Sample Number:** S-6

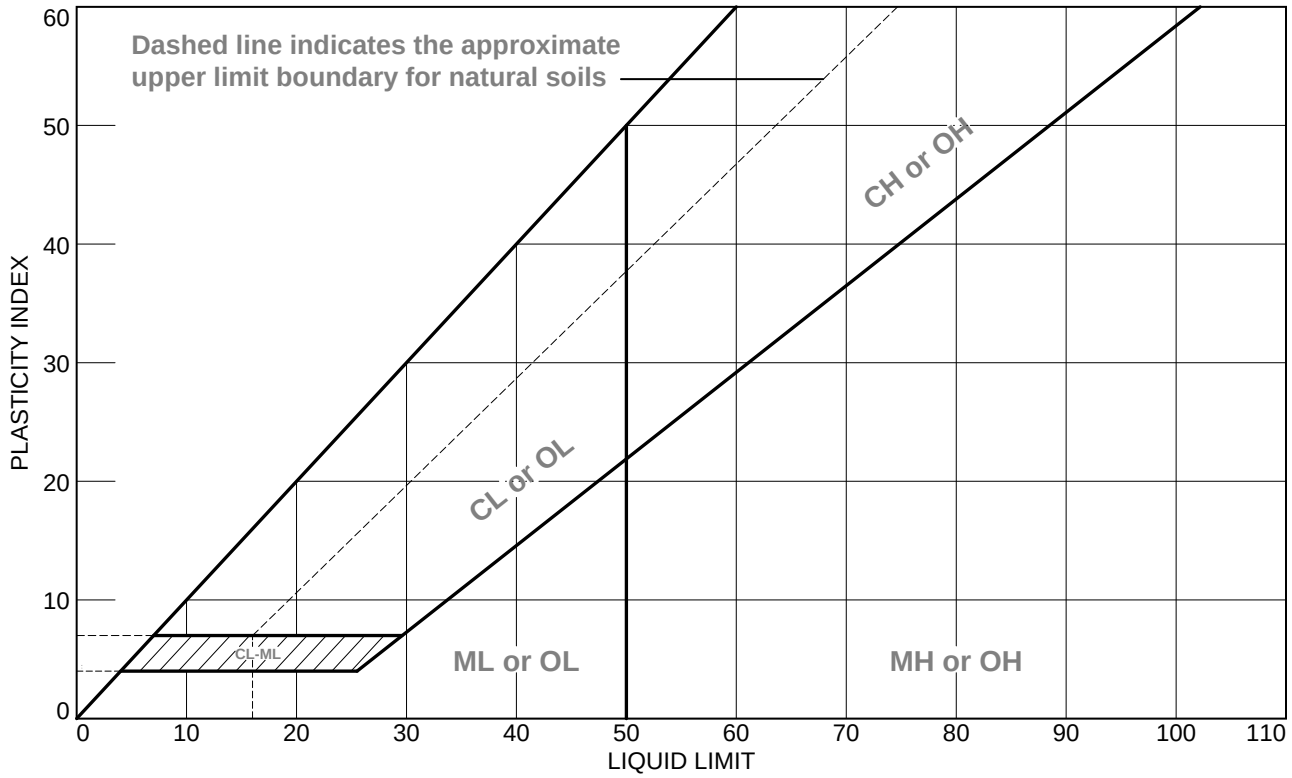
Remarks:

SUELOS, INC.

San Juan, Puerto Rico

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	LIQUIDITY INDEX	USCS
●	C-18	S-3	3.5-5.0'		NP	NV	NP		SM
■	C-18	S-5	8.5-10.0'		NP	NV	NP		SM
▲	C-18	S-6	13.5-15'		NP	NV	NP		SM

SUELOS, INC.

San Juan, Puerto Rico

Client:

Project: Dike C, Gurabo PR

Project No.: 5068

Figure

BORING LOGS

Suelos, PSC
Calle Chile 258, San Juan, P.R. 00917-2103
Tel. (787) 753-0147. Email: suelosinc@gmail.com

BORING LOGS

The description of subsurface profile and results of field and laboratory tests, as enclosed, pertain to conditions actually encountered at the borings location proper and at the depths indicated. Profile tracings between borings, when give, represent a reasonable interpolation of subsoil characteristics and should not be taken to indicate true intermediate conditions.

NOTES:

N	**-**	**Number of blows required to drive the sampling spoon a distance of 12" with a 140 lbs hammer falling 30".**
NW	**-**	**No water.**
WH	**-**	**Weight of hammer.**
WR	**-**	**Weight of Rods.**
W	**-**	**Natural moisture content in % of dry weight.**
qu	**-**	**Unconfined compressive strength in tons/sq ft.**
*****	**-**	**Penetrometer value.**

Suelos, PSC
Calle Chile 258, San Juan, P.R. 00917-2103
Tel. (787) 753-0147. Email: suelosinc@gmail.com

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-1

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 10/05/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 10/05/21	Date : 10/05/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 60.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	44	4-6-7		Topsoil: strong brown/dark brown, silt, some sand roots, trace gravel	13		20
	2	100	12-13-14		Very stiff, yellowish brown silt, some sand, few angular gravel, dry	27		16
5	3	100	13-15-20		-same as above;	35		9
	4	100	10-16-18		-same as above;	34		13
10	5	100	6-11-10		-same as above;	21		15
15	6	100	10-15-25		-same as above;	40		21
20	7	100	7-11-16		-with some clay pockets	27		17
25	8	100	6-7-8		Very stiff, dry, strong brown clay, some sand, trace subangular gravel	15	4.5+*	14
30	9	100	6-6-7		Stiff, silty clay, dark brown, few sand, some angular, small coarse gravel	13	3.5*	23
35	10	100	6-7-13		-strong brown	20	4.5	18
40	11	100	6-8-12		Strong brown silty clay, some fine sand, moist, very stiff	20	2.0*	16

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-1

Job No. 5068

Sheet 2 of 2

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	9-11-13		-same as above;		24	3.25*	15
50	13	100	6-4-4		Stiff, strong brown sandy clay, trace small subangular gravel, wet		8	1.5*	26
55	14	100	7-11-12		Very stiff, strong brown, olive, yellowish brown clay with sand traces, moist		23	4.0*	25
60	15	100	10-11-14		-same as above;		25	3.0*	31
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-2

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 10/06/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 10/06/21	Date : 10/06/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 60.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	5-6-9		Topsoil: strong brown, stiff, silty clay, roots, some sand	15	3.5*	27
	2	100	6-7-8		Yellowish brown, reddish brown silt, some fine sand, trace fine roots, trace small gravel, dry	15		19
5	3	100	8-12-14		Silty clay LL=60, PL=24, CH A-7-6	26		21
	4	100	9-11-10		-same as above;	21		17
10	5	100	13-16-17		Hard, yellowish brown silt, some sand, dry, traces weathered angular gravel LL=35, PL=20, CL A-6	33		18
15	6	100	11-10-12		Very stiff, strong brown clay, small gravel traces, subangular, trace sand, dry	22	4.5+*	22
20	7	100	13-11-10		Very stiff, strong brown clayey sand LL=29, PL=17, SC A-6	21		11
25	8	100	6-13-15		-same as above;	28		14
30	9	100	9-18-19		Hard, dark brown clay and clayey sand, few angular-subrounded gravel, small to coarse LL=40, PL=18, SC A-6	37	4.5*	18
35	10	100	15-17-13		-roots	30	4.0*	19
40	11	100	9-16-15		Hard, strong brown low plasticity clay, some sand, some weathered, angular round gravel, dry LL=48, PL=20, CL A-7-6	31	4.0*	23

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-2

Job No. 5068

Sheet 2 of 2

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	7-9-10		Very stiff, dark brown, strong brown, clay, sand traces, moist		19	3.5*	31
50	13	100	6-9-12		-same as above;		21	2.25*	24
55	14	100	11-14-23		Hard, grayish brown, yellowish brown, clay, sand traces, moist		37	4.0*	24
60	15	100	12-15-18		-black mottled		33	4.0*	23
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-3

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 10/08/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 10/08/21	Date : 10/08/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 60.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	3-5-6		Topsoil: clay, some silt, sand roots traces, dark brown, yellowish brwon	11	2.5*	24
	2	100	5-4-6		Stiff-very stiff clay with little fine coarse sand, trace coarse gravel	10	4.0*	17
5	3	100	7-8-9		-no gravel; LL=64, PL=18, CH A-7-6	17	4.5+*	23
	4	100	6-7-8		-same as above;	15	4.5*	27
10	5	100	6-8-8		-same as above; LL=55, PL=18, CH A-7-6	16	4.0*	24
15	6	100	8-8-11		-same as above; (Levee Fill)	19	4.5*	29
20	7	100	7-8-11		Stiff to hard silty clay; LL=38, PL=17, CL A-6	19	3.0*	19
25	8	100	9-10-12		-no gravel	22	4.0*	16
30	9	100	8-14-15		Medium density, fine-medium gravel sandy silt, yellowish brown LL=35, PL=21, CL A-6	29		25
35	10	100	7-8-15		-same as above; (Levee Fill)	23		19
40	11	100	6-7-9		Strong brown, yellowish brown stiff silty clay, little sand LL=38, PL=18, CL A-6 (Levee Fill)	16	3.5*	21

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-3

Job No. 5068

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	7-8-7		-same as above;		15	3.0*	24
50	13	100	7-10-12		-with trace coarse subangular gravel		22		26
55	14	100	9-10-11		Very stiff, dark brown clay, sand traces (Native Soil)		21	2.5*	19
60	15	100	9-11-14		-same as above;		25	4.0*	21
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-4

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : M. GALVEZ	Date Started : 10/07/21	WATER LEVEL:	N < 100 = 50.5
Hammer: 140#	Method : AUGER	Date Completed: 10/07/21	Date : 10/07/21	N > 100 =
Drop : 30"	Drill Type: AD-II	Total Depth : 50.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	2-2-3		Medium, strong brown silty clay, sand traces, roots (Levee Material)	5	2.5*	33
	2	100	2-3-3			6	2.0*	38
5	3	100	3-3-5		-little sand	8	2.5*	36
	4	100	4-5-4		-with trace coarse subangular gravel	9	3.0*	19
10	5	100	3-8-11		Very stiff, strong brown clay with sand traces, trace small angular gravel (Levee Fill)	19	2.5*	32
15	6	100	10-11-10		Red, yellowish brown silty clay with some sandy lenses	21	3.5	16
20	7	100	4-6-7		Stiff-very stiff, yellowish brown, clay, little sand (Levee Fill)	13	2.0*	27
25	8	100	13-14-12		-same as above;	26	2.0	20
30	9	100	10-11-13		Medium density, clayey sand, fine-coarse, few weathered angular gravel (Levee Base Material)	24		22
35	10	100	12-10-15		-same as above;	25		11
40	11	100	12-13-11		Dark gray medium coarse sand, some angular-subangular gravel, clay pockets traces	24		18

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-4

Job No. 5068

Sheet 2 of 2

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	18-12-11		Sandy clay with some angular, small-coarse gravel, weathered, yellowish brown, gray, moist (Native Soil)		23		27
50	13	100	12-13-14		-same as above;		27	2.0*	23
					END OF TEST HOLE - 50.5 FT				
55									
60									
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-5

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : N. ANDINO	Date Started : 10/27/21	WATER LEVEL:	N < 100 = 50.5
Hammer: 140#	Method : AUGER	Date Completed: 10/27/21	Date : 10/27/21	N > 100 =
Drop : 30"	Drill Type: CME-55	Total Depth : 50.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	3-3-4		Strong brown clay, some angular-subrounded gravel, sand traces roots	7	3.25*	19
	2	100	8-12-15			27		20
5	3	100	10-13-20		-with some fine sand LL=55, PL=25, CH A-7-6	33		16
	4	67	10-14-18		Light brown silty sand with some clay pockets	32		17
10	5	100	11-12-14		Strong brown silty sand and silty clay. trace subrounded gravel LL=34, PL=18, CL A-6	26		14
15	6	100	11-15-23		-same as above; (Levee Fill)	38		12
20	7	89	7-11-16		Brown clayey gravel, LL=43, PL=18, GC A- 7-6	27		17
25	8	100	10-14-16		Silty clay, some sand, few subangular, coarse gravel, strong brown	30	2.75*	20
30	9	100	7-12-16		-same as above; LL=46, PL=20, CL A-7-6	28	3.25*	25
35	10	100	9-12-14		-same as above; (Levee Fill)	26	3.5*	21
40	11	100	9-12-16		-same as above; LL=43, PL=22, CL A-7-6	28	3.5*	21

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-5

Job No. 5068

Sheet 2 of 2

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	8-11-14		-same as above;		25	3.5*	20
50	13	0	12-14-20		-no recovery		34		--
					END OF TEST HOLE - 50.5 FT				
55									
60									
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-6

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : N. ANDINO	Date Started : 10/28/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 10/28/21	Date : 10/28/21	N > 100 =
Drop : 30"	Drill Type: CME-55	Total Depth : 60.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	5-9-12		Yellowish brown silty sand, fine-coarse gravel, some weathered gravel, roots	21		15
	2	100	14-15-14		Yellowish brown, grayish brown, silty clay, some fine-coarse sand, fine roots with few small sub-angular gravel	29	4.5+*	18
5	3	100	11-14-15		-same as above;	29		20
	4	100	10-14-17		Yellowish brown sandy silt, few weathered subangular gravel	31		16
10	5	100	7-9-11		Strong brown silt, some sand, few subangular to subrounded gravel	20		20
15	6	100	9-15-21		-same as above;	36		21
20	7	100	7-11-14		-with some pale olive, clay pockets	25	4.5*	22
25	8	100	6-8-9		-same as above;	17		19
30	9	100	9-11-13		-same as above;	24		24
35	10	44	9-9-10		-strong brown silty clay, some sand, trace weathered gravel	19	4.0*	25
40	11	67	7-9-9		-same as above;	18	4.0*	23

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-6

Job No. 5068

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	8-11-12		Dark brown silty clay with few subangular-subrounded gravel, sand traces, moist		23	3.5*	29
50	13	67	10-10-13		-olive gray colored		23	3.0*	26
55	14	100	8-10-17		-same as above;		27	3.5	27
60	15	100	7-10-11		Dark gray clay, sand traces, few subangular gravel, moist		21	2.75*	25
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-7

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : N. ANDINO	Date Started : 10/29/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 10/29/21	Date : 10/29/21	N > 100 =
Drop : 30"	Drill Type: CME-55	Total Depth : 60.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	4-8-16		Yellowish brown silty sand, some angular gravel, roots	24		17
	2	100	20-15-15		Yellow silty sand, fine grained, dry	30		15
5	3	100	11-22-23		-same as above;	45		16
	4	100	13-17-21		-same as above;	38		7
10	5	100	8-13-32		-with some dark brown clay pockets	45		13
15	6	100	8-11-16		Strong brown, yellowish brown silty clay with little small-coarse subrounded-angular gravel, sand traces	27	3.0*	21
20	7	100	8-11-16		-same as above;	27	4.5+*	21
25	8	100	11-12-14		-same as above;	26	4.5+*	22
30	9	100	9-10-9		-same as above;	19	3.0*	16
35	10	100	7-7-11		-moist	18	2.5*	24
40	11	100	6-6-9		Dark gray clay few fine-grained sand	15	4.5+*	25

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-7

Job No. 5068

Sheet 2 of 2

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	5-7-10		-same as above;		17	3.5*	26
50	13	0	16-18-34		-no recovery		52		--
55	14	78	14-16-20		Small-coarse subangular-subrounded gravel, some silty sand		36		10
60	15	56	13-15-24		-same as above;		39		13
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

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Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-8

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : N. ANDINO	Date Started : 11/01/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 11/01/21	Date : 11/01/21	N > 100 =
Drop : 30"	Drill Type: CME-55	Total Depth : 60.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
		100	7-7-9		Strong brown, yellowish brown silt with some sand, trace subangular small gravel, roots	16		19
	2	100	11-13-18		-same as above;	31		14
5	3	100	14-14-16		Silty clay, strong brown, few sand traces subangular, small gravel, LL=45, PL=20, CL A-7-6	30	4.0*	18
	4	100	10-12-13		-same as above; (Levee Fill)	25	4.0*	17
10	5	100	5-9-11		-sandy; LL=47, PL=20, CL A-7-6	20	4.0*	16
15	6	100	8-5-9		Stiff very stiff, olive, strong brown clay with little sand, trace subangular, gravel (Levee Fill)	14	3.5*	19
20	7	100	8-11-15		-same as above; LL=51, PL=21, CH A-7-6	26	4.5*	18
25	8	100	6-8-13		-sandy clay	21	4.5	19
30	9	100	9-17-24		Yellowish brown, sandy silt, hard LL=35, PL=20, CL A-6 (Native Soil)	41		14
35	10	100	11-13-15		-same as above;	28		14
40	11	100	4-11-16		-moist; LL=38, PL=21, CL A-6	27		17

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-8

Job No. 5068

Sheet 2 of 2

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	9-10-23		-trace subangular gravel		33		20
50	13	100	11-11-15		Yellowish brown, light gray, silty clay with some sand, moist		26	4.0*	23
55	14	78	20-32-44		Yellowish brown, light olive, silty sand fine-coarse gravel, some clay pockets		76		16
60	15	78	18-36-47		-same as above;		83		17
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

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Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-9

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : N. ANDINO	Date Started : 10/08/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 10/08/21	Date : 10/08/21	N > 100 =
Drop : 30"	Drill Type: CME-55	Total Depth : 60.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	7-12-12		Very stiff clay, some sand, trace small-medium subangular gravel, strong brown	24		14
	2	100	10-17-21		Hard, yellowish brown sandy silt, trace roots, dry	38		8
5	3	89	7-12-15		Very stiff-hard, silty clay, some sand, few subrounded, subangular gravel, dry, strong brown	27		8
	4	67	10-14-19		-same as above;	33	4.5*	13
10	5	100	5-8-12		-same as above;	20	4.0*	13
15	6	100	8-10-18		-same as above;	28	4.5+*	16
20	7	78	12-20-28		Strong brown, yellowish brown sandy silt with some coarse subangular gravel	48		8
25	8	56	14-24-32		-same as above;	56		11
30	9	78	14-15-20		-same as above;	35		13
35	10	28	41-50/1"----		Residual soil: gray silty sand with some weathered angular rock fragments, friable	50/1"		4
40	11	22	50/5"------		Strong brown silty sand, small weathered rock fragments	505"		5

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-9

Job No. 5068

Sheet 2 of 2

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	33	401-50/2"---		-same as above;		50/2"		4
50	13	44	36-50/4"---		-same as above;		50/4"		5
55	14	44	32-50/5"---		-same as above;		50/5"		7
60	15	44	40-50/2"---		-same as above;		50/2"		6
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

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Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-10

Job No. 5068

Sheet 1 of 1

Spoon : 1.375"I.D.	Driller : N. ANDINO	Date Started : 10/26/21	WATER LEVEL:	N < 100 = 25.5
Hammer: 140#	Method : AUGER	Date Completed: 10/26/21	Date : 10/26/21	N > 100 =
Drop : 30"	Drill Type: CME-55	Total Depth : 25.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	7-10-12		Yellowish brown, dark brown silty sand, fine-medium grained	22		15
	2	78	12-12-14		Very stiff, yellowish brown, sandy silt, trace clay pockets	26		20
5	3	56	16-32-50/2"		Residual soil/saprolite: Light brown silty sand with some weathered angular small rock fragments Non-plastic (SP-SM) A-1-b	50/2"		4
	4	33	39-50/3"----		-same as above;	50/3"		4
10	5	44	36-50/3"----		-same as above; Non-plastic (SP-SM) A-1-b	50/3"		3
15	6	22	50/4"------		-same as above;	50/4"		3
20	7	11	50/2"------		-same as above; Non-plastic (SM) A-1-b	50/2"		5
25	8	11	50/2"------		-same as above;	50/2"		4
					END OF TEST HOLE - 25.5 FT			
30								
35								
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

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Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-11

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : N. ANDINO	Date Started : 10/07/21	WATER LEVEL:	N < 100 = 50.5
Hammer: 140#	Method : AUGER	Date Completed: 10/07/21	Date : 10/07/21	N > 100 =
Drop : 30"	Drill Type: CME-55	Total Depth : 50.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	2-3-3		Medium strong brown, silty clay	6	2.5*	31
	2	100	2-5-5		-same as above;	10	2.5*	37
	3	100	2-2-3		-same as above;	5	2.75*	32
5								
	4	100	3-4-4		-with sand traces	8	2.0*	29
	5	100	3-5-10		Stiff, strong brown silty clay, some sand, dry	15	4.5+*	22
10								
	6	100	6-9-14		Yellowish brown silty clay, stiff-very stiff	23	4.5+*	23
15								
	7	67	4-6-8		-with sand traces	14	4.0*	21
20								
	8	89	5-11-14		Yellowish brown, very stiff silt with some sand	25		22
25								
	9	100	7-10-15		-same as above;	25		19
30								
	10	78	12-26-36		Very dense, strong brown, yellowish brown sand, fine-coarse grained, silt traces	62		10
35								
	11	72	15-24-32		-same as above;	56		8
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-11

Job No. 5068

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	67	13-21-42		-same as above;		63		8
50	13	44	32-46-50/ 2"		-same as above;		50/2"		11
					END OF TEST HOLE - 50.5 FT				
55									
60									
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

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Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-12

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : N. ANDINO	Date Started : 10/26/21	WATER LEVEL:	N < 100 = 60.5
Hammer: 140#	Method : AUGER	Date Completed: 10/26/21	Date : 10/26/21	N > 100 =
Drop : 30"	Drill Type: CME-55	Total Depth : 60.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	89	3-5-14		Very stiff, yellowish brown silty clay, trace sand, fine roots	19	4.5+*	15
	2	89	15-22-22		Hard, reddish brown yellowish brown silty clay some sand, angular gravel, traces	44	4.5+*	17
5	3	100	8-16-18		Light brown silt, some fine sand, trace weathered gravel, clay pockets	34		15
	4	100	14-17-22		Hard, white, red sandy clay	39	4.5+*	18
10	5	100	12-15-23		Light grayish brown sandy silt with severely weathered rock fragments, trace clay	38		13
15	6	100	9-15-18		Stiff-hard, strong brown clay some sand, dry	33	4.5*	17
20	7	100	7-11-18		-same as above;	29	3.5*	24
25	8	100	7-9-9		-same as above;	18	4.5+*	16
30	9	100	8-8-9		Strong brown silty sand, fine gravel, some clay pockets, few angular gravel	17		16
35	10	89	6-14-10		-same as above;	24		10
40	11	100	4-5-6		Stiff, brown, gray, yellowish brown clay with some sub-rounded, sub-angular gravel, sand traces	11	2.5*	30

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-12

Job No. 5068

Sheet 2 of 2

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	6-7-10		Very stiff, strong brown, grayish brown clay with sand traces		17		34
50	13	100	7-11-13		Very stiff, yellowish brown clay, some angular-subrounded gravel, sand traces		24	3.5*	32
55	14	100	9-11-12		-very stiff, olive gray clay		23	4.0*	26
60	15	89	7-10-13		-silty clay		23	4.5+*	27
					END OF TEST HOLE - 60.5 FT				
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-13

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : N. ANDINO	Date Started : 11/08/21	WATER LEVEL:	N < 100 = 50.5
Hammer: 140#	Method : AUGER	Date Completed: 11/08/21	Date : 11/08/21	N > 100 =
Drop : 30"	Drill Type: CME-55	Total Depth : 50.5	Depth: 1'	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	2-2-2		Soft-medium strong brown, grayish brown clay trace fine roots	4	2.5	43
	2	100	2-1-1		-moist with trace fine sand	2	0.5*	59
	3	56	2-1-1		Soft, gray, grayish brown, fat clay, wet LL=69, PL=32 CH A-7-5	2	0.5	58
5								
	4	44	WH-1-1		-same as above;	2	0.5	71
	5	56	1-WH-1		-same as above; LL=62, PL=29, CH A-7-6	1	0.5	61
10								
	6	67	1-1-1		-same as above;	2	0.5	57
15								
	7	100	1-1-2		-same as above;	3	0.5*	52
20								
	8	100	6-9-11		Very stiff, dark gray, dark brown clay, sand traces, moist	20	3.25*	29
25								
	9	100	7-10-11		Very stiff, yellowish brown, clay with trace sand, trace subrounded, small gravel	21	3.0*	24
30								
	10	78	13-18-18		Hard olive brown, clay, some sand, some small-coarse angular, subrounded gravel	36	4.0*	28
35								
	11	94	10-14-16		Olive brown sandy silt, some small-coarse subangular-subrounded gravel	30	4.0*	24
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-13

Job No. 5068

Sheet 2 of 2

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	12-15-15		-same as above; wet		30	2.0*	26
50	13	67	11-17-20		Strong brown silty clay, some sand, some angular-subrounded small-coarse gravel		37		26
					END OF TEST HOLE - 50.5 FT				
55									
60									
65									
70									
75									
80									
85									

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-14

Job No. 5068

Sheet 1 of 2

Spoon : 1.375"I.D.	Driller : N. ANDINO	Date Started : 11/02/21	WATER LEVEL:	N < 100 = 50.5
Hammer: 140#	Method : AUGER	Date Completed: 11/02/21	Date : 11/02/21	N > 100 =
Drop : 30"	Drill Type: CME-55	Total Depth : 50.5	Depth: 1.5'	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	1-1-WH		Strong brown clay, some silt, roots	WH	1.0*	48
	2	100	1-2-2		-same as above;	4	1.0*	47
5	3	94	1-3-3		Dark gray, brown fat clay, some silt, shell and sand traces LL=57, PL=26, CH A-7-6	6	0.5*	42
	4	100	1-1-2		Soft elastic silt, dark gray, dark brown	3		42
10	5	100	1-1-1		Soft grayish brown fat clay, some elastic silt pockets, trace fine roots LL=54, PL=27, CH A-7-6	2	1.0*	43
15	6	100	1-2-3		Elastic silt, gray, fine sand traces LL=39, PL=23, CH A-6	5		38
20	7	22	1-2-2		-same as above;	4		35
25	8	78	10-32-44		Sand, fine-medium grained, strong brown some clay pockets, plastic pieces	76		17
30	9	78	17-30-40		White, pale brown, sandy silt (residual soil)	70		18
35	10	100	11-24-37		-same as above;	61		12
40	11	100	19-34-46		Strong brown, moist, sandy silt, some clay pockets (residual soil)	80		20

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-14

Job No. 5068

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material		SPT-N values	Qu TSF	Moist Cont%
45	12	100	17-31-46		-same as above;		77		27
50	13	100	21-35-44		-with trace weathered, friable rock fragments		79		23
					END OF TEST HOLE - 50.5 FT				

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-17

Job No. 5068

Sheet 1 of 1

Spoon : 1.375"I.D.	Driller : N. ANDINO	Date Started : 11/08/21	WATER LEVEL:	N < 100 = 20.5
Hammer: 140#	Method : AUGER	Date Completed: 11/08/21	Date : 11/08/21	N > 100 =
Drop : 30"	Drill Type: CME-55	Total Depth : 20.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	1-2-2		Dark grayish brown clay, moist	4	2.0*	34
	2	100	3-3-3		-same as above;	6	2.5*	42
5	3	100	2-3-3		-same as above; LL=60, PL-29, CH A-7-6	6	2.0*	41
	4	100	3-3-3		Dark gray clay, moist, silty	6	0.5*	47
10	5	100	2-3-4		Gray, yellowish brown sandy lean clay, trace small gravel LL=36, PL=21, CL A-6	7	1.0	26
15	6	100	4-9-10		Very stiff, strong brown sandy silt clay, moist LL=38, PL=17, CL A-6	19	2.0*	20
20	7	100	5-7-10		-same as above; black mottled, few coarse, small subangular-angular gravel	17	2.0*	20
					END OF TEST HOLE - 20.5 FT			
25								
30								
35								
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

SUELOS, INC.

Soil and Construction Materials Laboratory

SUBSURFACE EXPLORATION LOG

PROJECT: DIKE C, GURABO, P.R.

BORING NO.: C-18

Job No. 5068

Sheet 1 of 1

Spoon : 1.375"I.D.	Driller : N. ANDINO	Date Started : 11/02/21	WATER LEVEL:	N < 100 = 20.5
Hammer: 140#	Method : AUGER	Date Completed: 11/02/21	Date : 11/02/21	N > 100 =
Drop : 30"	Drill Type: CME-55	Total Depth : 20.5	Depth: N/O	CORE =

Depth ft	Samp No.	Recov %	S.P.T. values	RQD %	Description of material	SPT-N values	Qu TSF	Moist Cont%
	1	100	1-2-3		Loose fine-medium grained silty sand, trace gravel	5		6
	2	100	4-5-5		-same as above;	10		7
5	3	100	5-6-7		-with few clay pockets; non-plastic, SM, A-2-4	13		8
	4	100	5-7-9		-same as above; (old entrance ramp material)	16		13
10	5	100	6-7-7		-same as above; non-plastic, SM A-2-4	14		7
15	6	100	4-4-5		Loose, gray colored, fine grained silty sand, wet non-plastic, SM, A-2-4	9		19
20	7	100	5-6-6		-same as above; with some elastic silt pockets, wet	12		25
					END OF TEST HOLE - 20.5 FT			
25								
30								
35								
40								

"N" values are the number of blows required to drive the sampling spoon a distance of twelve inches with a 140 lbs hammer falling 30 inches. Natural Moisture Content (2) is expressed in percentage of its dry weight. Unconfined Compressive Strength (Qu) values are expressed in tons per square foot. *Pocket penetrometer values are marked with an asterisk.

DRILLING APPENDIX

Suelos, PSC
Calle Chile 258, San Juan, P.R. 00917-2103
Tel. (787) 753-0147. Email: suelosinc@gmail.com

APPENDIX NO. 1

General

Comprised in this report is a description of the project as made know to **SUELOS, PSC**. and details of the project with pertinent recommendations for the design of foundations and other earth related structures. It should be considered that the design recommendations are relative to the project aspects discussed and subject to the limitations imposed by all practical considerations in the determination of subsoil conditions.

The field and laboratory data shown in boring logs represent subsoil conditions encountered at the borehole proper. The analysis and conclusions herein presented and discussed are based on such results and on a reasonable interpolation of subsoil characteristics. Whenever cross-sections with a schematic representation of the interpreted subsoil stratification between borings are included, the same should not be taken to represent true intermediate conditions but are rather given for general comparison purposes only.

Copy of this report should be made available to the Project Designers for their information and guidance, as well as to the Contractor and Resident Engineer, in order to secure maximum protection in the case of possible unexpected variations. Any such variations as well as any changes or modifications to the scope of project described after submittance of this report shall be notified by writing to these Consultants in order to evaluate same and decide upon the need to alter or modify the recommendations given.

APPENDIX NO. 2

Field and Laboratory Work

Field exploration was made by **SUELOS, PSC.**, a private laboratory to the services of these Consultants. The field work consisted of a visual observation of the area and existing structures at the site, if any, and of performance of test borings as indicated.

Test borings were made in accordance to the "Standard Penetration Test and Split-Spoon Sampling of Soils Method", as proposed by the Standards of the American Society for testing and Materials Designation ASTM D-1586, Latest Revision.

The testing hole is bored either by manual and mechanical augers or by driving a 2.5 inch inside diameter casing into the ground which is washed clean internally each time a soil sample is to be secured below its reach. While sampling, the Standard Penetration Test is performed and the "N" values recorded. This is the number of blows required to drive the split-spoon sampler 12 inches into the ground using a 140 lbs. hammer with a free fall of 30 inches.

The value gives an indication of the consistency of cohesive soils and the relative density of granular soils as shown in the following table:

COHESIVE SOILS

"N" Values	Consistency	Unconfined Comp. Strength (TSF)
less than 2	very soft	less than 0.25
2 - 4	soft	0.25 - 0.50
4 - 8	medium	0.50 - 1.00
8 - 15	stiff	1.00 - 2.00
15 - 30	very stiff	2.00 - 4.00
over 30	hard	over 4.00

GRANULAR SOILS

0 - 5	very loose
5 - 10	loose
10 - 30	medium
30 - 50	dense
over 50	very dense

Depth of water surface shown on logs indicate the phreatic level found either prior to use of any casing and water or taken 24 hours after the test borings was completed and the casing, if any, is pulled out. The information given, unless otherwise indicated, is not a adequate for study of deep excavations and is only to be used as an approximate level in the study of a normal foundation of the project. Phreatic or underground water levels may vary with seasonal rainshower variations thus water may appear where none is shown and the reader of this report should be aware of this fact. For excavations where ground water levels are of utmost importance special studies consisting of long range observations on installed wellpoint-type devices should be performed. Where deep excavations are contemplated, as in pumping stations, study of artesian or sub-artesian aquifers should be made by means of deep test borings and pumping tests.

DIAMOND CORE DRILLING

Whenever drilling through rock is necessary the same is made following the "Diamond Core Drilling for Site Investigation" method as proposed by the standards of the American Society for Testing and Materials Designation ASTM D-2113-L.R. In general a double tube core barrel with diamond bit is rotated under pressure into the rock. The drilled rock enters into the barrel using circulating water as cooling agent. At intervals of 2 to 5 feet the barrel is lifted and the core is removed. The length of each core run as well as the length of the core recovered is noted.

LABORATORY WORK

➢Water Contents

The natural moisture content was determined for all samples, except for those with high percentage of gravel or coarse sand.

The tests follow standards of the American Society for Testing and Materials ASTM Designation D-2216, Latest Revision. The water or moisture content of a given soil mass is by definition the ratio of the weight of water to the oven dry weight of the soil, expressed as a percentage.

➢Unconfined Compression Tests

All suitable samples of cohesive soil recovered from the split-spoon sampler were tested in unconfined compression. The ratio of the maximum load required for failure to the corrected cross sectional area of the sample expressed in tons per square foot is defined as the unconfined compressive strength.

➢Examination and Description

Soil samples are classified according to their constituents, the following terminology used to denote the approximate percentage by weight of each component.

Description Term	Percent by Weight
Trace	1 - 10
Little to some	10 - 20
Sandy, silty clayey	20 - 35
and	35 - 50

The examined samples are related into one of the following main groups; boulders, gravel, sand, clay, and silt. On peat, the presence of the decomposed and partly decomposed vegetable matter, is used for identification. The differentiation between a clay and a silt is based on the presence or lack of plasticity, dilatancy and dry strength rather than on grain size. The description of the soil includes: color, odor, minerals, presence of foreign matter, geological history, etc. These descriptions as well as the results of the laboratory testing are used in grouping similar samples into a stratigraphic unit as shown on the final boring logs. Therefore, the data on subsurface exploration logs represent subsoil conditions at the precise locations of the boreholes only.

APPENDIX F PRINCIPLES, REQUIREMENTS, AND GUIDELINES

FEMA Agency Specific Procedures (ASPs) Documentation Template

Project Information

Date: 12/3/2021

Program: Public Assistance **Disaster (if applicable): Hurricane Maria**

Project Title: Carraizo Reservoir Dredging

Project ID: FEMA-4439-DR-PR-GM169882

Project Description: The Puerto Rico Aqueduct and Sewer Authority (PRASA) proposes to dredge the Carraizo Reservoir to remove approximately 2 Mm^3 sediment and place the material into three existing disposal sites. This project would be conducted in a manner similar to the permitted 1999 dredge project. A hydraulic dredge, pipeline and booster pumps would be used to pump the slurry of sediment into the disposal sites. For this project, no changes would be made to the existing dam structure; the reservoir boundaries would not change; all work would be conducted within PRASA's existing property and right-of-way, and existing disposal sites would be used. The project's land-based activities would be performed on the same sites used for the previous dredging project, no new ground disturbance is anticipated. Project components used for the previous dredging project include the staging area and temporary pier and three dredged disposal sites. The temporary pier would be constructed on the site of the previous pier.

Project location (address and/or latitude/longitude)

The Carraizo Reservoir is located approximately 13.5 miles (21.7 Km) upstream from where Río Grande de Loíza flows into the Atlantic Ocean. The 207.7-square mile Carraizo/Lago Loíza basin is located in east-central Puerto Rico, approximately 22 km south-southeast of San Juan. The Carraizo Reservoir and associated rivers are located within the municipalities of Caguas, Gurabo and Trujillo Alto.

Project components GPS:

Carraizo Dam: 18.328037, -66.015666
Disposal Site A: 18.259590, -66.008197
Disposal Site B: 18.270174 -65.989960
Disposal Site C: 18.263986 -65.953448
Staging Area: 18.277555, -66.010800
Pier: 18.277636, -66.009900

Check all PR&G triggers that apply below (must check both for PR&G to apply):

☐ Water Resources Project Scope by purpose, has direct or indirect effect on water quality or quantity

☒ Project cost is ≥ $10,000,000

A. Scope the level of PR&G Analysis (check one):

☐ Scaled Analysis ($10,000,000 ≤ Project Cost < $20,000,000)

☐ Standard Analysis ($10,000,000 ≤ Project Cost < $20,000,000, potential extensive impact to water resource)

☒ Standard Analysis (Project Cost ≥ $20, 000,000)

B. Define the purpose and need. Using a watershed, ecosystem, or systems approach respond to the following questions below, to the extent possible:

Describe the study area. The study area is the geographic area affected by the project in a watershed/ecosystem/systems context.

The Carraizo Reservoir lies within the Lago Loiza Watershed, designated 210100050409. The watershed includes principal rivers Rio Grande de Loíza and Rio Gurabo River and smaller rivers such as a minor tributary of Rio Cañas, Rio Bairoa and Rio Cagüitas which flow into Rio Grande de Loíza south of confluence of Rio Grande de Loíza and Rio Gurabo. The Carraizo Reservoir watershed has an approximate area of 207.7 square miles (3,127.929 km2).

The Carraizo Reservoir and associated rivers are considered impaired waterways. The 2012 305(b) Waterbody report states the impairment included elevated levels of arsenic, copper, dissolved oxygen, fecal coliform, lead, and excess turbidity. The 2016 report describes the overall status of the reservoir as impaired for aquatic life, drinking water, and contact recreation. The causes of the impairment are most likely poorly maintained municipal sewage systems, runoff from agricultural feeding operations, wastewater discharge, and urban stormwater/sewer runoff.

Are there other water resource investments within the project area that could be affected?

Other water resource investments within the watershed include pump stations, stormwater catch basins, and irrigation canals. None will be affected by the project.

State the water resource problems and/or opportunities to be addressed.

The Carraizo Reservoir's history of sedimentation spans decades. The reservoir was constructed to capture and hold water to supply the region with drinking water. Decreased water storage capacity results due to weather events, including too much rain from hurricanes. Reduced storage capacity during droughts affects PRASA's ability to provide drinking water resulting in rationing. Rationing affects not only residential drinking water but all facets of life resulting in tourism and manufacturing business shutdowns, school closures, and reduced hours of operations for government services. Dredging would increase storage capacity allowing PRASA's to meet the needs of the community.

Describe the cause(s) of the problem, and constraints related to the problem.

Natural erosion as well as erosion that results from human activities in the watershed (e.g., urbanization, construction, and agriculture, among others) settle in the reservoirs, reducing the reservoir's storage capacity and accelerating its useful life. Heavy rains and major floods associated with hurricanes and tropical disturbances cause extensive land erosion and contribute to sediment transport that rapidly depletes the storage capacity of reservoirs, including the Carraizo Reservoir. The Carraizo Reservoir had reduced storage capacity and when Hurricane Maria deposited an additional 2.35 Mm^3 of sediment, the water storage capacity was reduced even more.

The reservoir's sedimentation rate has been monitored since the 1970s. Between 1971-1979 3.6 Mm^3 of sediment was deposited and between 1979-1990 the sedimentation rate fell to 1.18 Mm^3. In 1989, PRASA's ability to provide a reliable source of drinking water was first tested when Hurricane Hugo hit the island causing power failures and overtopping of the dam. Damage to the reservoir and dam structure impacted 750,000 people in the Metropolitan area who were without water for eight days. In 1992, in an effort to improve water storage capacity, PRASA submitted a permit application to dredge the reservoir and a Preliminary Environmental Impact Statement (PEIS) was prepared. The final PEIS approved dredging but there was a concern about disposal of the dredged material. The reservoir was not dredged. In 1994 a drought resulted in water rationing due to the lack of water storage capacity. A Supplemental EIS was prepared in 1995 to study the impacts of dredging 6 Mm^3 from the reservoir, focusing on where the dredged material would be placed. A Finding of No Significant Impact (FONSI) and permit were issued to PRASA approving dredging of the reservoir. Since this dredging event, sediment has again built up in the reservoir.

PRASA submitted a proposal to dredge the reservoir to remove 2 Mm^3 of sediment to restore the storage capacity of the reservoir. The restored storage capacity would allow PRASA to meet its obligation to the public to provide a reliable source of drinking water for the Metropolitan area.

C. Formulate a Range of Alternatives.

Document the range of alternatives that address the water resource problem, and achieve the objectives, principles and requirements outlined in the PR&G.

Describe the proposed alternatives.

Alternative 1 Preferred Action Alternative: Dredging to Remove 2 Mm^3 of Sediment

PRASA submitted a proposal to hydraulically dredge the reservoir to remove 2 Mm^3 of sediment over two years. Approximate reservoir storage capacity at the end of two years would be 11.26 Mm^3. The dredged material would be pumped through a pipeline to three existing disposal sites. The preferred alternative was selected by PRASA based on several factors including present worth (construction and O&M costs), environmental impacts, sediment disposal options, length of dredging period, reliability, and land acquisition. Alternative 1 was selected based on its lower cost, higher reliability, lower environmental Impacts, and adequate dredged material disposal capacity therefore land acquisition would not be required.

<u>Preparing for dredging activities required to install dredging equipment:</u>

- Mobilization of equipment and labor for all dredging activities at the staging area
- Construction and maintenance of temporary pier for barges and support vessels
- Installation of floating platforms/rafts for pipelines and booster pumps along the river to support pipelines and/or pipelines and booster pumps placed in the easement along the shoreline.

Preparing Staging and Disposal Sites:

- Clearing, grubbing, and grading of the staging area and disposal areas as appropriate
- Demolition and reconstruction of disposal sites' existing weir outlets for the discharge of decanted water
- Installation of decanting management equipment (geotubes)

Conducting dredging activities includes:

- Implementation of sediment control measures at the dredging, staging and disposal areas
- Pump dredged material from the reservoir to the disposal areas for two years
- Operate and service dredging equipment (fueling dredge and barges, moving staff to dredge, etc.)
- Manage the decanting process at the disposal areas

De-mobilization after dredging:

- Remove all dredging equipment, pipelines and other equipment

Alternative 2 Action Alternative: Dredging to Remove 10 Mm^3 of Sediment

This alternative would hydraulicly dredge the Carraizo Reservoir to remove 10 Mm^3 of sediment over a twenty-year period. The reservoir would be dredged annually, removing 0.5 Mm^3. Approximate reservoir capacity at the end of twenty years would be 19.76 Mm^3. Activities and methods would be the same as Preferred Alternative.

Describe the no action alternative.

Under the No Action Alternative, FEMA would not provide grant funding for dredging activities to remove the accumulated sediments resulting from Hurricane Maria. Under the no action alternative, the government of Puerto Rico and PRASA would be responsible for funding any dredging. Due to budgetary constraints within the Commonwealth, FEMA anticipates this project may go unfunded or deferred indefinitely. The most recent study (2019) shows that the reservoir's water storage capacity is 15.06 Mm^3, much less than its' original capacity of 26.80 Mm^3. If the reservoir is not dredged, it would continue to lose the storage capacity. In approximately 40 years, due to excessive sedimentation, the reservoir would not have the capacity to hold water, ending its useful life. With the no action alternative, PRASA would not be able to provide a steady, reliable source of potable water for the Metropolitan area.

Do any of the proposed alternatives have multiple discrete measures where one or more of them could perform in a beneficial and sustainable manner without the measures?

☐ Yes ☒ No

If yes, does the alternative effectively and efficiently achieve the purpose and need?

Click here to enter text.

D. Identify Existing Conditions

List the ecosystem services that flow from the project area ecosystems and infrastructure. Describe the baseline levels of those ecosystem services, to the extent practicable. Identify which of these services may be meaningfully altered as a result of the proposed action or alternatives.

The Carraizo Reservoir stores water that flows from the 207.7 square mile Carraizo watershed. The watershed consists of steep mountainous areas and narrow alluvial valleys. The upper basin is bounded by the Sierra de Luquillo on the northeast side of the basin and the Sierra de Cayey to the southwest. Land uses in the watershed include grazing, forest, urban development, and cropland. The geologic characteristics of the basin include San Lorenzo batholith, volcanic breccia and tuff, small amounts of thin lava flows, and rare layers of siltstone and sandstone, and alluvial deposits.

Temperature, rainfall, and winds vary based geography and season. Average annual rainfall ranges from approximately 120 inches in the mountainous areas such as the Sierra de Luquillo to approximately 67 inches in the valleys such as Juncos. Winds in the basin are dominated by trade winds from the east-northeast. Rainfall in the Commonwealth is produced by seasonal easterly waves and cold fronts. Puerto Rico experiences easterly waves between May to November and cold fronts between November and April. Rainfall is heaviest between August and October.

To define existing conditions of the ecosystem, FEMA Interagency Guidelines have separated ecosystems into three general types:

Provisioning services – The Carraizo Reservoir watershed supports multiple land uses including grazing, forest, urban development, and cropland. The alluvial areas of the watershed are classified by NRCS as prime farmland and farmland of statewide significance. While classified as prime farmland, most of the land is not currently being farmed. The watershed includes the urban areas of Caguas, Gurabo, Juncos, San Lorenzo, and Las Piedras. Dredging the reservoir will not impact any of these land uses. Dredged sediments would be confined within diked disposal sites and the water, decanted to remove sediment, would be returned to the watershed. The benefits and uses of the ecosystem would not be affected by dredging.

Regulating Services – Dredging the reservoir would not change the ongoing activities to protect and regulate water in the ecosystem. Regulatory activities to protect the water quality of the ecosystem would include monitoring turbidity resulting from dredging. High turbidity reduces the amount of light that penetrates the water affecting fish and other aquatic creatures. High turbidity could also affect PRASA's water treatment plant, potentially increasing the cost of water. To reduce potential impacts, PRASA would follow dredging BMPs including installing turbidity curtains and managing sediment in the disposal sites to prevent unwanted sediment from adversely affecting the ecosystem.

Cultural Services Examples – Carraizo Reservoir is one of the largest lakes in Puerto Rico. In addition to providing a source of water for almost 500,000 people. The water in the reservoir has been classified by EPA was impaired and while it provides opportunities for recreational activities both in the water and adjacent to it such as boat riding, fishing, camping, and hiking, due to poor water quality, these activities are not allowed. Dredging the reservoir could increase turbidity. PRASA would follow dredging BMPs including installing turbidity curtains and managing sediment in the disposal sites to prevent unwanted sediment from adversely affecting the ecosystem.

Provide a visual representation of the interactions among any natural, social, cultural, and economic systems that affect or are directly affected by the action.

See attached figures: Figure 1 Project Location, Figure 2 Project watershed and service area, Figure 3 project components, Figures 4-6 Disposal sites A, B and C.

E. Project Future Conditions of the Study Area using a watershed, ecosystems, or services approach

What is the expected service or operational life of the project? The estimated projected life should be used as the timeframe for analysis under this step.

Alternative 1, the Preferred Action Alternative would be conducted over a two-year period.

Project the future conditions of the study area using a watershed, ecosystem, or systems approach. Include projections of future conditions that account for the expected environmental, social, cultural, and economic changes as a result of climate change.

There are no anticipated changes to the existing watershed or ecosystem with the execution of this project. The only change would be the increased depth of the reservoir and the filling of the three existing disposal sites. All equipment used for the project would be removed after the project is complete. Any damage to the shoreline due to placement of the pipelines would be restored to their previous condition. There would be no long term affects. It is predicted that climate change will increase the intensity of future weather events such as hurricanes. Increased intensity of weather events could increase sedimentation rates of the reservoir. Activities proposed for this project would not affect future conditions of the surrounding environment, social, cultural, or economic conditions due to climate change. Dredging would provide a benefit to future conditions since restored water storage capacity would provide a steady source of water during extreme weather events. Dredging the reservoir and restoring water storage capacity would keep it viable for the future. Extending the reservoir's useful life would eliminate the need to find an alternate potentially more expensive and environmentally damaging water source.

Future maintenance dredging would most likely be required based on annual sedimentation rates and anticipated future storm events. PRASA is considering mitigation options to determine how best to

manage sediment before it reaches the reservoir, however, the sediment management mitigation has not developed and is not part of this project.

Was a Hydrologic and Hydraulics Study performed?

☐ Yes ☒ No

If yes, attach H&H study. If no, provide explanation for not performing and documenting an H&H study in the space below.

Click here to enter text.

At this time, PRASA has not conducted an H&H study. The proposed project would not affect stream or river flows, nor would it change flood elevations or known existing floodways.

List other reasonably foreseeable actions by private and public entities that may affect the water resource.

Click here to enter text.

F. Evaluate Alternatives.

Describe how each alternative meets the goals of the following PR&G Guiding Principles:

Healthy and Resilient Ecosystems

No Action Alternative – There will be no changes to the ecosystem. If there are no dredging activities, sediment would continue to accumulate in the reservoir. If the reservoir is not dredged, it would lose its storage capacity in approximately 40 years, ending its useful life.

Alternative 1 Preferred Action Alternative: Dredging Reservoir to Remove 2 Mm^3 of Sediment – Dredging the reservoir could affect short-term water quality due to increased turbidity resulting from underwater soil composition. Sediment re-suspension could cause the spread of contaminants (if present) which could affect water quality and freshwater habitat. These impacts would be short-term and Best Management Practices (BMPs) such as installing turbidity curtains would be used to reduce potential impacts. No new land impacts would occur. All dredging activities would be within in PRASA land that has been previously disturbed. There would be no long-term effects to the ecosystem due to dredging.

Alternative 2 Dredging Reservoir to Remove 10 Mm^3 of Sediment – There would be no long-term effects to the ecosystem due to dredging. Dredging activities would be like those in the Proposed Action Alternative.

Sustainable Economic Development

No Action Alternative – If there is no dredging, sediment would continue to accumulate affecting the source of drinking water for the residents and businesses in the Metropolitan area. Continued sedimentation long-term would fill the reservoir, ending its useful life and a new source of water would need to be found. Alternatives previously evaluated in two EISs determined that a new source, such as constructing a new reservoir or a desalination plant would be cost prohibitive and would have major environmental impacts.

Alternative 1 Preferred Action Alternative Dredging Reservoir to Remove 2 Mm^3 of Sediment – There would be no adverse impacts to economic development. The proposed project would be an economic benefit, assuring PRASA the ability to provide a reliable source of water for the Metropolitan area.

Alternative 2 Proposed Action Alternative Dredging Reservoir to Remove 10 Mm^3 of Sediment – There would be no adverse impacts to economic development. The proposed project would be an economic benefit, assuring PRASA's ability to provide a reliable source of water for the Metropolitan area.

Floodplains

No Action Alternative – No dredging would occur and there would no impacts to floodplains. Sedimentation of the reservoir would continue.

Alternative 1 Preferred Action Alternative Dredging Reservoir to Remove 2 Mm^3 of Sediment – No adverse impacts to floodplains are anticipated. The proposed project would not change the Base Flood Elevation in the project area.

Alternative 2 Proposed Action Alternative Dredging Reservoir to Remove 10 Mm^3 of Sediment – No adverse impacts to floodplains are anticipated. The proposed project would not change the Base Flood Elevation in the project area.

Public Safety

No Action Alternative – No dredging would occur and therefore would not affect the life safety of the residents and commercial businesses in the project area. Sedimentation of the reservoir would continue.

Alternative 1 Preferred Action Alternative Dredging Reservoir to Remove 2 Mm^3 of Sediment – The proposed project would not affect the life safety of the residents and commercial businesses in the project area.

Alternative 2 Proposed Action Alternative Dredging Reservoir to Remove 10 Mm^3 of Sediment – The proposed project would not affect the life safety of the residents and commercial businesses in the project area.

Environmental Justice

No Action Alternative – No dredging would occur and no disproportionately high and adverse impacts to minority- or low-income populations would occur. Sedimentation of the reservoir would continue.

Alternative 1 Preferred Action Alternative Dredging Reservoir to Remove 2 Mm^3 of Sediment – No disproportionately high or adverse impacts to minority- or low-income populations or to community cohesion are anticipated. The proposed project is expected to benefit those who live, work, or own property in the Metropolitan area by providing a reliable source of drinking water. Preparation for dredging and dredging activities would also create temporary jobs.

Alternative 2 Proposed Action Alternative Dredging Reservoir to Remove 10 Mm^3 of Sediment – The proposed project would have the same impacts as described for dredging and removal of 2 Mm^3 of Sediment.

Watershed Approach

No Action Alternative – No dredging would occur and there would be no effect to the Carraizo watershed. Sedimentation of the reservoir would continue.

Alternative 1 Preferred Action Alternative Dredging Reservoir to Remove 2 Mm^3 of Sediment – The proposed project, dredging the reservoir and placement of dredged material in existing disposal sites, would not affect the Carraizo watershed.

Alternative 2 Proposed Action Alternative Dredging Reservoir to Remove 10 Mm^3 of Sediment – The proposed project, dredging the reservoir and placement of dredged material in existing disposal sites, would not affect the Carraizo watershed.

How do the public benefits compare to the public costs of the alternatives?

No Action Alternative – No dredging would occur and there would be no public benefits. Sedimentation of the reservoir would continue.

Alternative 1 Preferred Action Alternative Dredging Reservoir to Remove 2 Mm^3 of Sediment – The proposed project would create a public benefit by providing a reliable source of drinking water for the Metropolitan area.

Alternative 2 Proposed Action Alternative Dredging Reservoir to Remove 10 Mm^3 of Sediment – The proposed project would create a public benefit by providing a reliable source of drinking water for the Metropolitan area.

Was sea level rise included in the Benefit Cost Analysis?

☐ Yes ☒ No

Were environmental benefits included in the benefit cost analysis?

☐ Yes ☒ No

For each alternative, describe the projected trends of the ecosystem services likely to be meaningfully altered (as identified in D). The future conditions projections should account for expected changes as a result of climate variability and climate change.

No Action Alternative – No dredging would occur and there would be no effect to the Carraizo watershed. Sedimentation of the reservoir would continue.

Alternative 1 Preferred Action Alternative Dredging Reservoir to Remove 2 Mm^3 of Sediment – There would be no long-term impacts to the ecosystem. Short-term impacts associated with placement of the pipeline along the shoreline and water turbidity would occur but after the project, but BMPs

implemented during dredging would reduce any impacts. The ecosystem would return to its natural state.

Alternative 2 Proposed Action Alternative Dredging Reservoir to Remove 10 Mm^3 of Sediment – No disproportionately high or adverse impacts to minority- or low-income populations or to community cohesion are anticipated. The proposed project is expected to benefit those who live, work, or own property in the Metropolitan area by providing a reliable source of drinking water. Preparation for dredging and dredging activities would also create temporary jobs.

G. Display the Effects and Comparison of Alternatives

Display the effects of the alternatives and the comparison of the alternatives for their contributions to the PR&G.

Effects of the proposed alternatives are displayed in the PRINCIPLE, REQUIREMENTS, AND GUIDELINES (PR&G) ANALYSIS MAP attached to Section D above.

Identify the tradeoffs among the economic, environmental, and social goals for the proposed action and alternatives. Identify any effects that are irreversible or that have high end-of-lifecycle costs to reverse.

No Action Alternative – No dredging would occur, and none of the project goals would be achieved. Sedimentation would continue.

Alternative 1 Preferred Action Alternative Dredging Reservoir to Remove 2 Mm^3 of Sediment – The project goals would be achieved by dredging the reservoir, restoring water storage capacity, and ensuring a reliable source of water for the Metropolitan area.

Alternative 2 Proposed Action Alternative Dredging Reservoir to Remove 10 Mm^3 of Sediment – The project goals would be achieved by dredging the reservoir, restoring water storage capacity, and ensuring a reliable source of water for the Metropolitan area.

Explain how the economic, environmental, and social benefits justify the costs of the proposed action

The monetary value of benefits from the proposed action are anticipated to be more than the total cost of the project

Explain how the selected alternative adequately attains the goals outlined in the Guiding Principles

The selected alternative achieves the environmental goals by restoring water storage capacity in the Carraizo Reservoir. No new ground disturbance would occur, all activities would be within PRASA property and rights-of-way, existing disposal sites and the previous staging area would be used. The

project would provide a reliable source of drinking water for the Metropolitan area, supporting economic activities such as tourism, businesses, and manufacturing. It would support social goals by providing a reliable affordable source of drinking water for all Metropolitan residents.



Figure 1. Carraizo Reservoir Project location.



Figure 2. Project watershed (yellow outline) and Project service area (blue outline).



Figure 3. Carraizo Reservoir Project components: dam, reservoir, staging area, and disposal sites.



Figure 4. Disposal Site A



Figure 5. Disposal Site B



Figure 6. Disposal Site C

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