Al Own BCM Joint Venture

1. Overview

- AL OWN BCM is a joint venture between **Al-Own Advanced for contracting (AAC);** which is a Jordanian contracting company incorporated in 1983, with its headquarter in Amman, and **BCM International Company;** which began as "Bayswater Contracting", a family firm in Western Australia in the early 1950s, and then expanded into Ghana in 1990.
- In 2012 Enefit of Estonia worlds largest oil shale developer , in partnership with YTL Power International of Malaysia and Guangdong Yudean Group of China established Attarat Power Company (APCO) to develop a nominal 532 MW (gross)/ 490 MW (net) Oil Shale fired generation project in favor of the National Electric Power Corporation ("NEPCO") of Jordan, the single buyer of power. This is the largest private project financing supported by Sinosure to date with an investment value of USD 2.1 billion.
- APCO oil shale projects are located in the Attarat Um Ghudran oil shale reserve, which is estimated to contain over 3.5 billion tones of Oil Shale.
- The Financial Close and Notice to Proceed (NTP) was issued on the 16th of March 2017.
- This project will supply NEPCO with electricity for 30 years.
- The duration of phase-1 is 12 years, extendable for another 6 years upon completion.
- Phase-1 quantities of overburden 204.1 MBCM and oil shale 63.6 MBCM.
- The power station and oil shale mine are expected to employ approximately 5,500 people during construction and 1,000 during operations.

- “ Oil shale is Jordan's most significant natural resource. According to various estimates, oil shale deposits underlie more than 60% of the Kingdom's territory totaling approximately 40 – 70 billion tones, which would make Jordan the 6th richest country in the world in terms of oil shale deposits ”

- “ Approximately 97% of the country's energy supplies consist of costly fuel imports from foreign countries.

- According to the National Energy Strategy, covering Jordan's energy requirements from 2007-2020, the Kingdom needs to increase its energy supply security and reduce its dependence on external energy sources by leveraging national resources such as renewable energies and oil shale. The energy strategy aims to increase the contribution of local energy sources to 39% by 2020 while reducing foreign sources from their current level of 96% to 61% “.

2. Drilling & Blasting

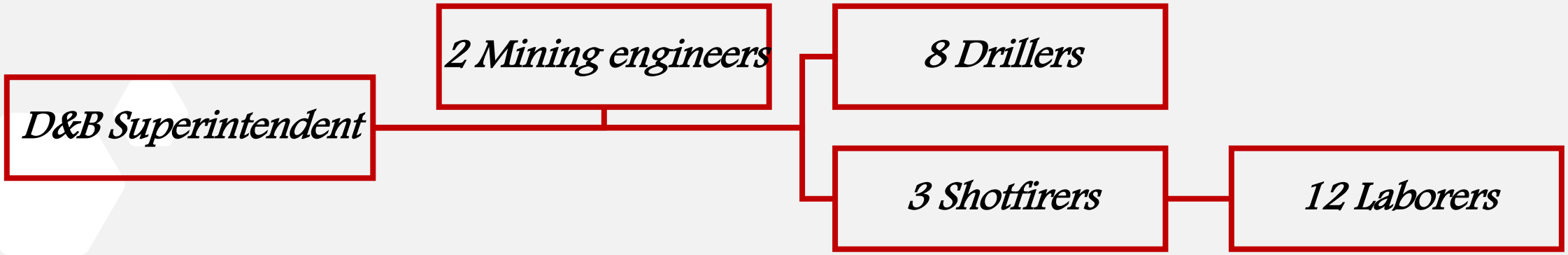
"Overburden & Oil Shale"

BCM
Al Own Advanced

AL OWN BCM
JOINT VENTURE

2.1 Introduction

- **Drilling and blasting** is the controlled use of explosives to break rock for excavation. It is practiced most often in mining, quarrying and civil engineering such as dam, tunnel or road construction. The result of rock blasting is often known as a rock cut.
- Drilling and blasting currently utilizes many different varieties of explosives with different compositions and performance properties. Higher velocity explosives are used for relatively hard rock in order to shatter and break the rock, while low velocity explosives are used in soft rocks to generate more gas pressure and a greater heaving effect.
- Al-Own BCM drill and blast department responsible of deliver the required monthly volumes in BCM (Bank Cubic Meter) of both overburden and oil shale, at each extraction point, properly fragmented for excavators and wheel loaders.
- Al-Own BCM drill and blast department sub-divided to drilling team and blasting team, and following is the department hierarchy structure:

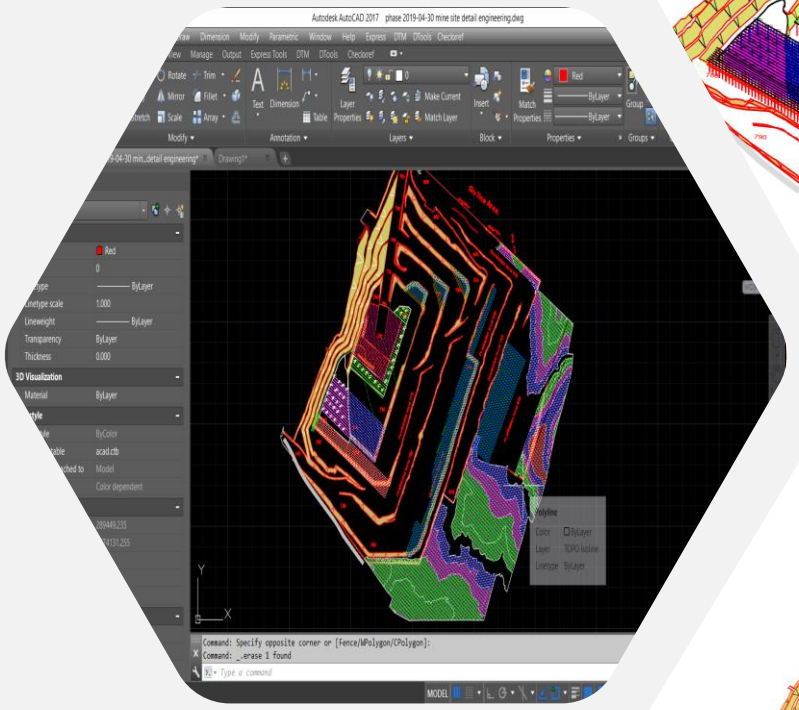


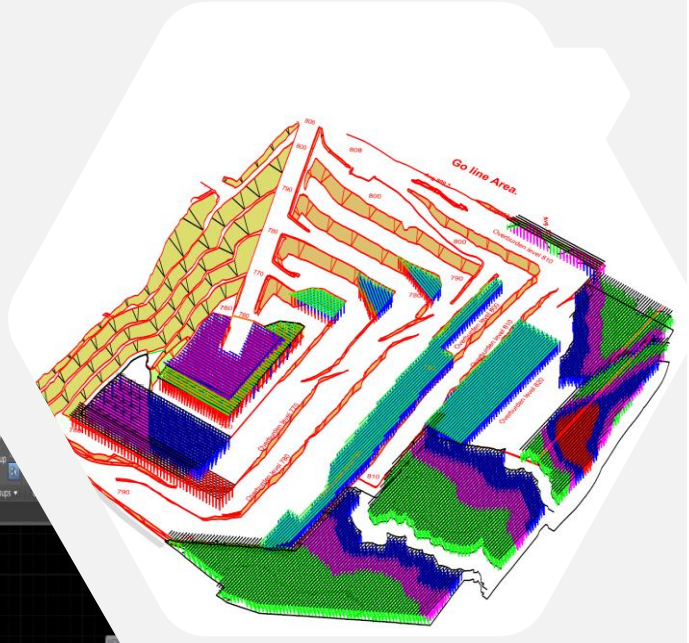
2.2 Drilling and Blasting Scope and Goals

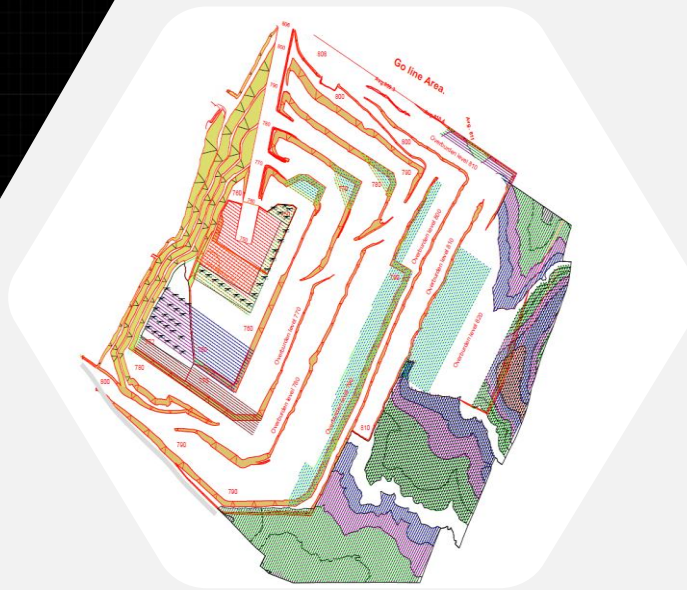
- The activities of drill and blast department starts when the mining instruction been received from the client by a monthly bases, the drilling design in 3D model is created using a software called Auto Plan, the design set to meet the requirements which could include a vary pattern specifications and different depths.

- Each individual drilling hole in the design have its unique coordinates, these coordinates demarcated using high accuracy GPS device by Survey department, those demarked points then drilled to the required depth by the drill rigs.

- Al-Own BCM currently having in its fleet 6 high tech drilling rigs, all capable to drill double rods and achieving 20 meter plus hole depth.





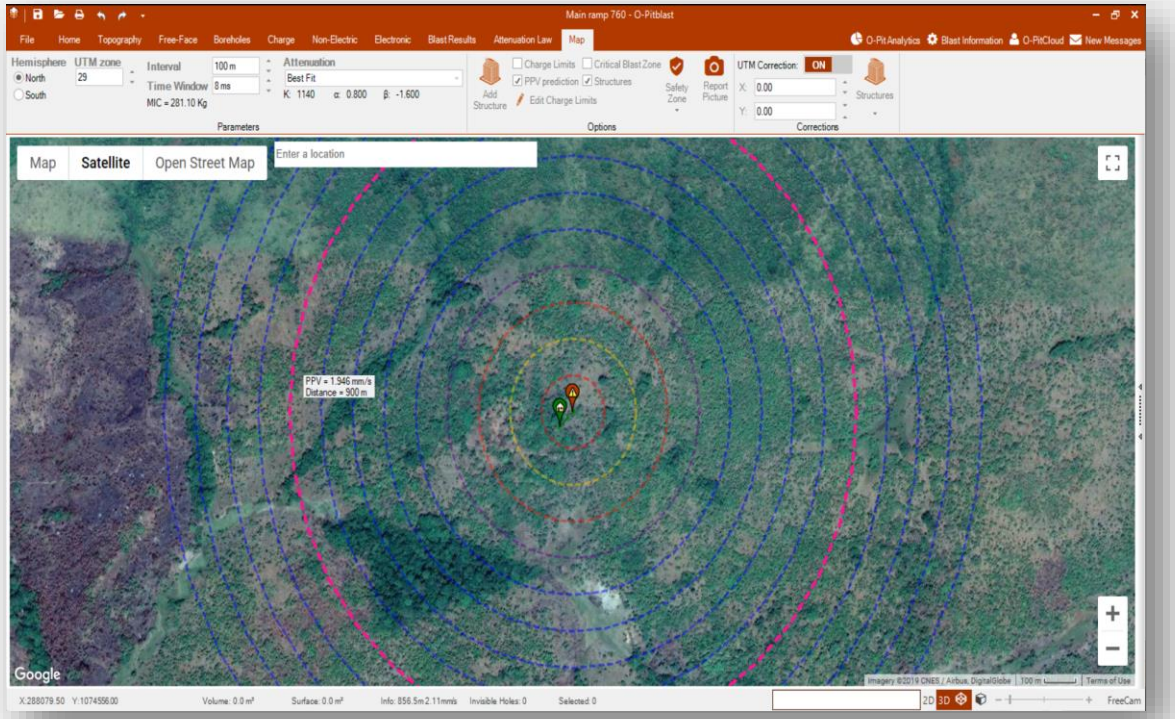


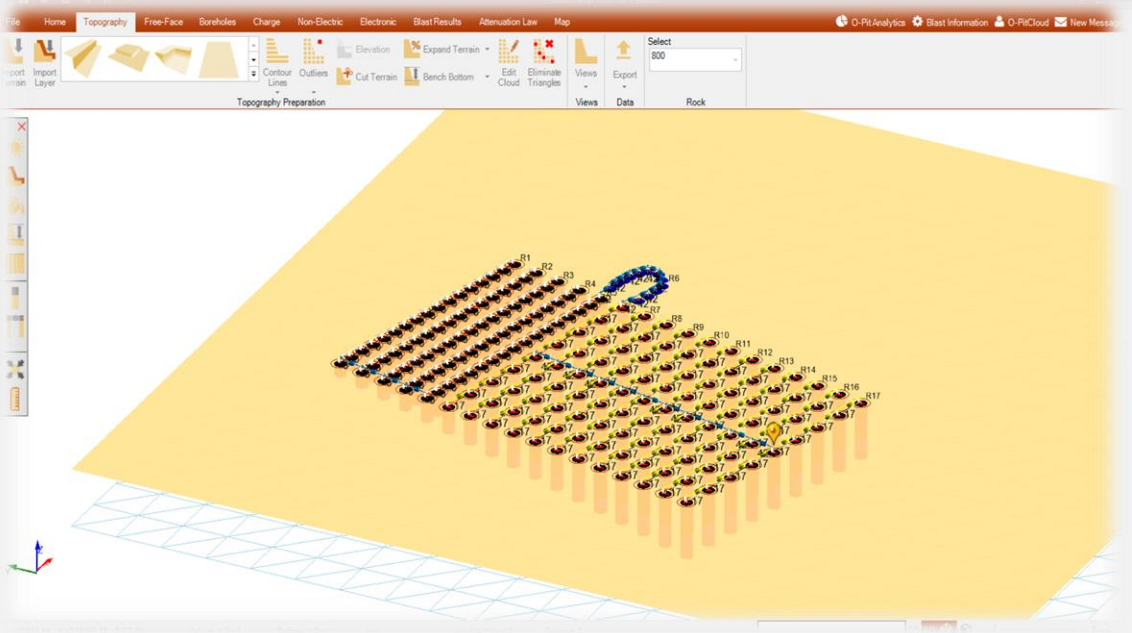
- After drilling the demarked points, drill and blast supervisors curry the QA-QC process to check if the actual are reflecting the designed drilling pattern and the correct depth been achieved.

- Blasting preparation started by counting the drilled holes, the explosive material and its accessories will be ordered depending the required powder factor.

- The pre-blast full design plan then prepared using blasting software called O-Pitblast, that simulate the initiation sequence and provide the predicted fragmentation result and the PPV (peak particle velocity) will generate.

- When the explosive materials received, charging process will start as per the pre-blast design, after the charging completely finished, then start with Tie-in for Nonel surface connector as safety procedure to reduce people exposure to high risk operation.





- After clear the perimeter around the blast round and all pit entrances controlled by patrols, the approval for initiating the round then given to the shout firer.

- The blast round then and after set-off, checked for any miss fire indications by the shot firers, and if any are exist then directly deal with the miss fire with the proper procedure.

- At last, and when the blast round confirmed as clear through the shot firers, blast controller give all clear for other departments to resume their activities inside the pit and the mining could excavate and load the blasted material safely.

2.3 Blasting Videos

- Profile Blasting on Main Ramp (1)
- Profile Blasting on Main Ramp (2)
- Profile Blasting on Final Slope
- Trimming Blast on Bench
- Normal Bench Blasting (1)
- Normal Bench Blasting (2)
- Normal Bench Blasting (3)
- Sequential Box Cut Blasting

3. Mining
"Overburden & Oil Shale"

Al Own BCM
Joint Venture

3.1 Introduction

- The project is a type of surface mining, in specific OPEN CAST MINING to supply mining service, related to mining processing for the oil shale power plant.

- Surface mining is a technique of extracting ore from the earth by their removal from an open pit.

- This is 12 years project designed to remove and extract:
  - 204,000,000 BCM of overburden
  - 63,000,000 BCM of oil shale

  with stripping ratio of 2:1.

- Our mission and goals are to produce the planned quantity of overburden and oil shale as annually, monthly, and daily quantities within the budget, all over maximized the productivity of the equipment, to reduce the operational cost, including maintaining the haulage road in and out of the pit, and high performance with safe procedure.

3.2 Mining procedure and design

- The mine design for this project based on having (10-11) meters mining faces for overburden removal, includes developing the topography area which started from level of 832m (a.s.l), down to level of 760m (a.s.l) as shown in figure (1).
- As shown in figures (2,3, and 4), the overburden that extracted from the pit used to build the following construction items at dumping areas as follows:
  - Ash Pad area. (figure 2)
  - Roads network. (figure 3)
  - Dam bridge (figure 3) from topography to level of 810m (a.s.l); will be explained in mine infrastructure works section.
  - Intermediate stockpile area. (figure 3)
  - Irish Bridges. (figure 4)
  - Protective barriers. (figure 4)

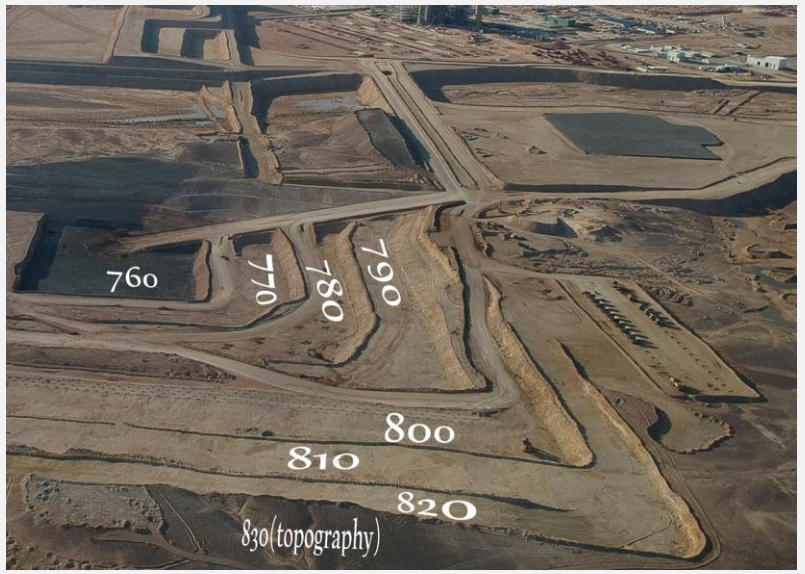


Figure (1): mine benches and it levels

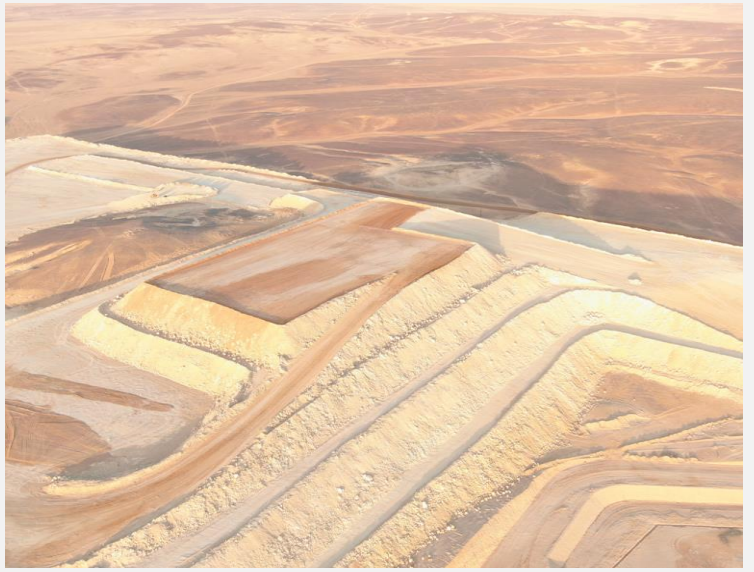


Figure (2): Ash pad south-west dumping area

Figure (3): Dam bridge, Intermediate stockpile (north-east dumping area), and roads network.

Figure (4): Irish bridge and protective barrier

3.3 Mining Machines in this project

- Shovels: Four shovels model (6030FS) are being operated, three of them owned by the JV, and one is rented from Arkan mining company.
- Wheel Loaders: Two types of these loaders are available; (CAT992) and (CAT996). One (CAT992) loader, (992G) model, is being operated mainly for oil shale extraction, in addition to the overburden materials to the west of the mine. Two (CAT996) loaders are mainly used to clean the haul roads from boulders/rocks, create safety berms, clean the areas around the shovels, and distribute the material heaps.
- Excavators: Two (5110 B) model excavators are being used for multi-purposes, such as overburden extraction, semi-final and final slopes trimming, excavation works, any other works that require an excavator to be executed, since these machines have different mechanism capabilities in such a way that they can be easily operated on the edges and work on steep areas.
- Dump Trucks: There are 26 dump trucks (777DT model) available in the project, 23 of them are being used for the extracted materials haulage to the dumping points, three of them are being used as water bowsers to spray the water over the haul roads, and around the shovels, for the dust control.
- Bulldozers: Five of them are available on site. They are being operated for; pushing the dumped materials on the tips and where the materials have to be dumped in layers to control the thicknesses, do ripping to the high spots and doze the ground to maintain the levels, and to open ramps.
- Graders: Four graders are available on site, fixing the mine haulage roads level and anywhere which requires to maintain the levels in accurate way, such as the dumping areas where the materials are being dumped in layers. They are also being used to clean the road and the excavating areas after blasting.


Shovel with dump truck


Excavator with dump truck


777 Dump Truck

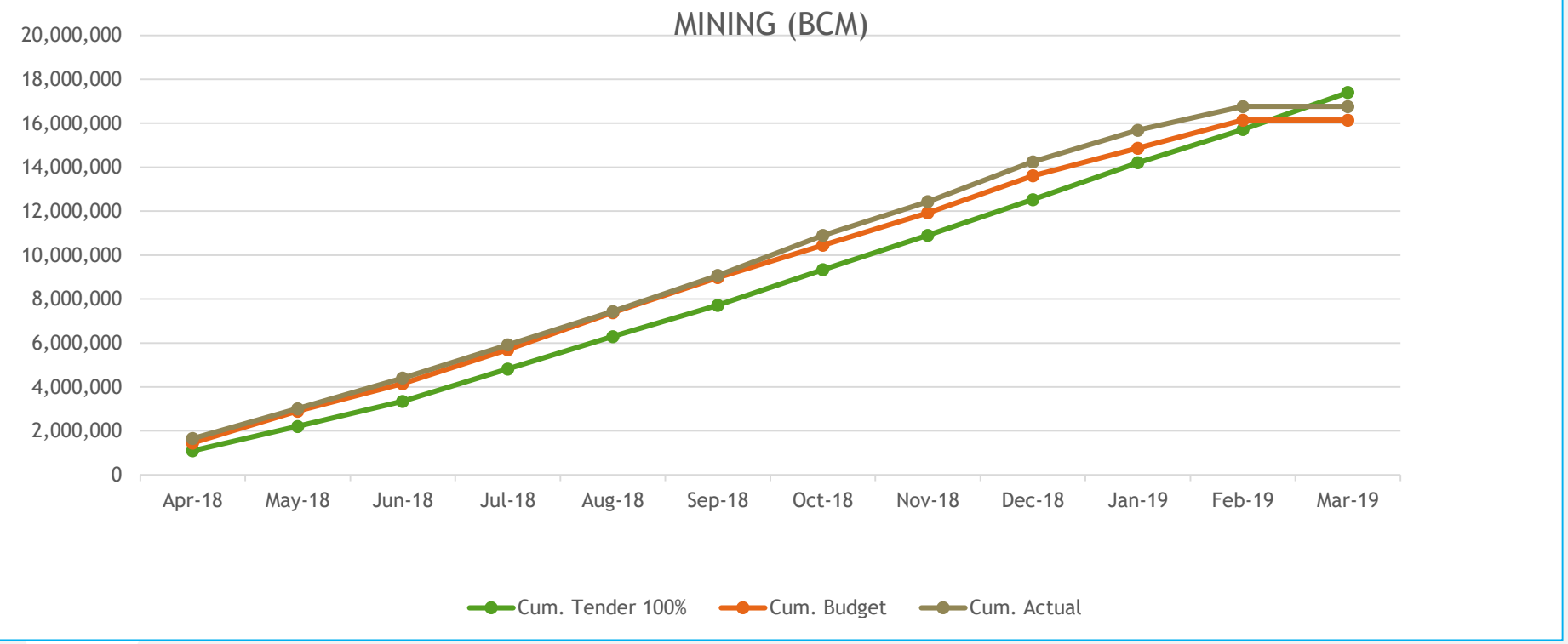

Bulldozer


Grader

3.4 Production & Productivity

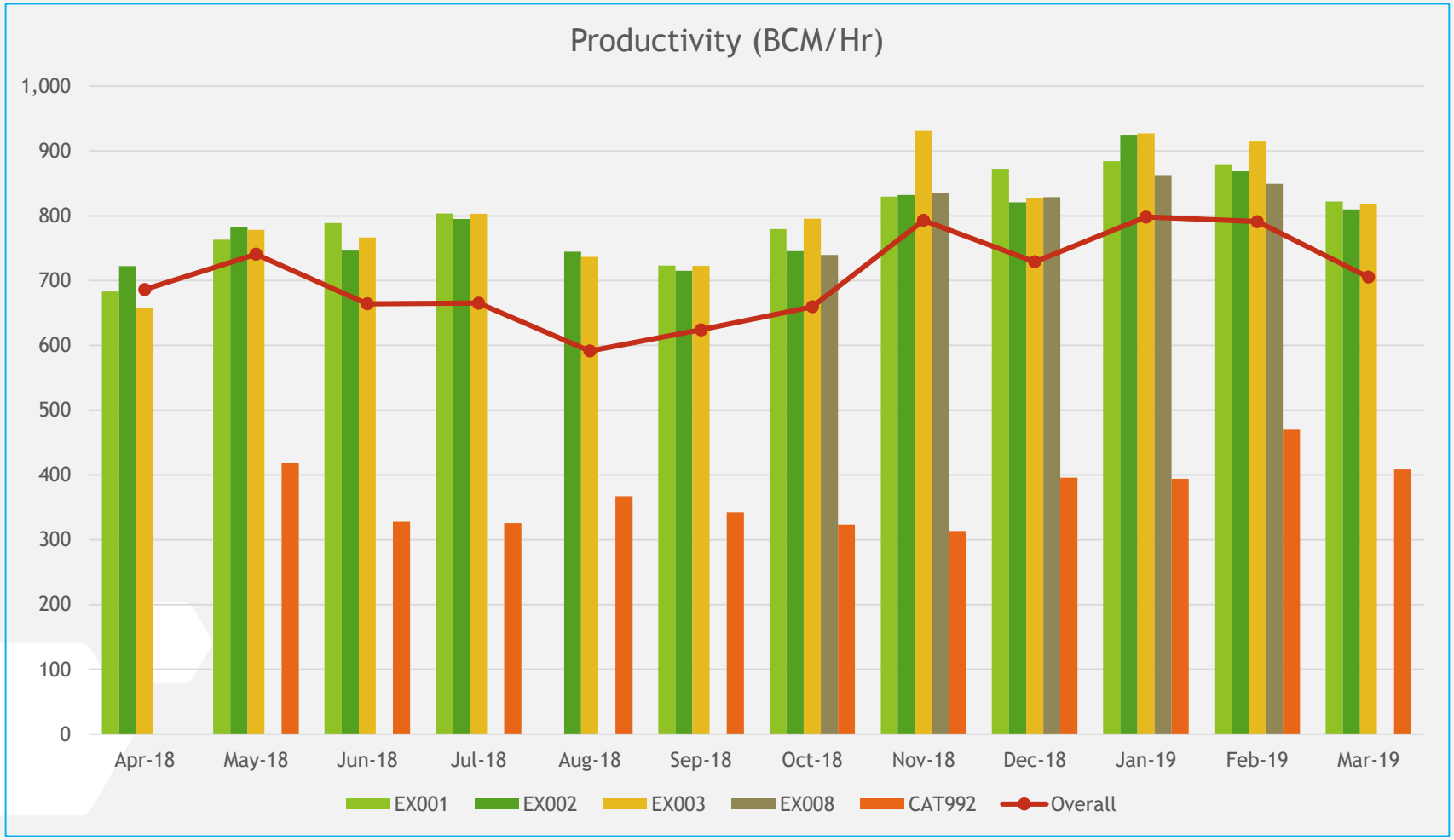
- Below Table explains mining production until March 2019.
- Three face shovels and one 992 loader have been utilized.

Production	Tender	Cum. Tender	Budget	Cum. Budget	Calendar Surveyed	Cum. Actual	Surplus/(Short) vs. Budget CTD
YTD	17 400 000	17 400 000	16 143 000	16 143 000	16 764 960	16 764 960	1 204 622



- Below Table explains primer movers until March 2019.

BCM/Hr	EX001	EX002	EX003	EX008	EXC-Arkan	CAT992	6030FS	Overall
YTD	795	778	795	817	643	366	792	695



- Below Table explains haul trucks productivity.

Dump Trucks	Calendar Surveyed (BCM)	HULAGE DISTANCE HDH(KM)	BCM.km/hr
18-Apr	1,069,891	1.214	289
18-May	1,361,502	1.890	396
18-Jun	1,391,681	2.091	494
18-Jul	1,513,498	1.897	475
18-Aug	1,514,367	1.713	487
18-Sep	1,641,642	2.012	497
18-Oct	1,822,483	1.370	465
18-Nov	1,538,066	1.778	430
18-Dec	1,811,506	1.341	475
19-Jan	1,436,336	1.648	492
19-Feb	1,081,326	2.480	568
19-Mar	1,453,995	1.431	508
FYTD	17,636,293	1.720	468

- Below Table explains Ancillary hours.

Ancillary Hours	Excavator Small (hrs)	Bulldozers (hrs)	Graders (hrs)	Water Trucks (hrs)	Front End Loaders (hrs)	Total Ancillary Hours
Apr-18	362	1,454	848	235	913	3,812
May-18	376	1,561	929	388	1,145	4,399
Jun-18	303	1,573	777	617	1,171	4,441
Jul-18	404	1,887	1,090	700	1,285	5,366
Aug-18	396	1,962	1,045	579	1,228	5,210
Sep-18	499	2,014	1,038	688	1,173	5,412
Oct-18	726	2,100	1,358	566	1,208	5,958
Nov-18	910	1,465	1,390	577	1,092	5,434
Dec-18	771	1,459	1,268	374	1,231	5,103
Jan-19	663	1,399	1,112	475	1,140	4,789
Feb-19	208	979	1,081	491	989	3,748
Mar-19	491	1,271	1,117	542	1,147	4,568
Average	531	1,624	1,105	560	1,156	4,976

- Below Table explains Ancillary productivity.

Ancillary Productivity	Calendar Surveyed (BCM)	Excavator Small (hrs/Mil BCM)	Bulldozers (hrs/Mil BCM)	Graders (hrs/Mil BCM)	Water Trucks (hrs/Mil BCM)	Front End Loaders (hrs/Mil BCM)	Total Ancillary Hour per Mil BCM
Apr-18	1,069,891	338	1,359	793	220	853	3,563
May-18	1,361,502	276	1,147	682	285	841	3,231
Jun-18	1,391,681	218	1,130	558	443	842	3,191
Jul-18	1,513,498	267	1,247	720	463	849	3,545
Aug-18	1,514,367	262	1,296	690	382	811	3,441
Sep-18	1,641,642	304	1,227	632	419	715	3,297
Oct-18	1,822,483	398	1,152	745	311	663	3,269
Nov-18	1,538,066	592	952	904	375	710	3,533
Dec-18	1,811,506	426	805	700	206	680	2,817
Jan-19	1,436,336	462	974	774	331	794	3,334
Feb-19	1,081,326	192	905	1,000	454	915	3,466
Mar-19	1,453,995	338	874	768	373	789	3,142
Average	17,636,293	346	1,084	740	353	778	3,302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4. Construction
"Mine Infrastructure Works"

Al Own BCM
Joint Venture

4.1 Introduction to mine Infrastructure Works

4.1 Introduction to Mine infrastructure works (MIW)

4.1.1 Infrastructure development in mining

- Generally, in any mine project, the ore body has to be identified, then locates the site where the mine is to be developed and then builds the infrastructure needed to set up and operate the mine and evacuate the ore.
- Mineral deposits generally occur in remote and backward areas with poor infrastructural facilities which invariably inhibit their optimum development.

  Lack of infrastructure increases the cost of mining. Therefore, it is important to ensure adequate development of infrastructural facilities.
- The infrastructure needs of the mining sector are classifiable into two categories; infrastructure needed to develop and operate the mine, and infrastructure needed to evacuate the mineral bearing ore to the processing site or port either as raw ore or as a value added product after the raw ore has been processed at or near the pit mouth.
- Infrastructure needed to set up the mine requires access to the mine site by men and mining equipment, in a safe and practical manner.

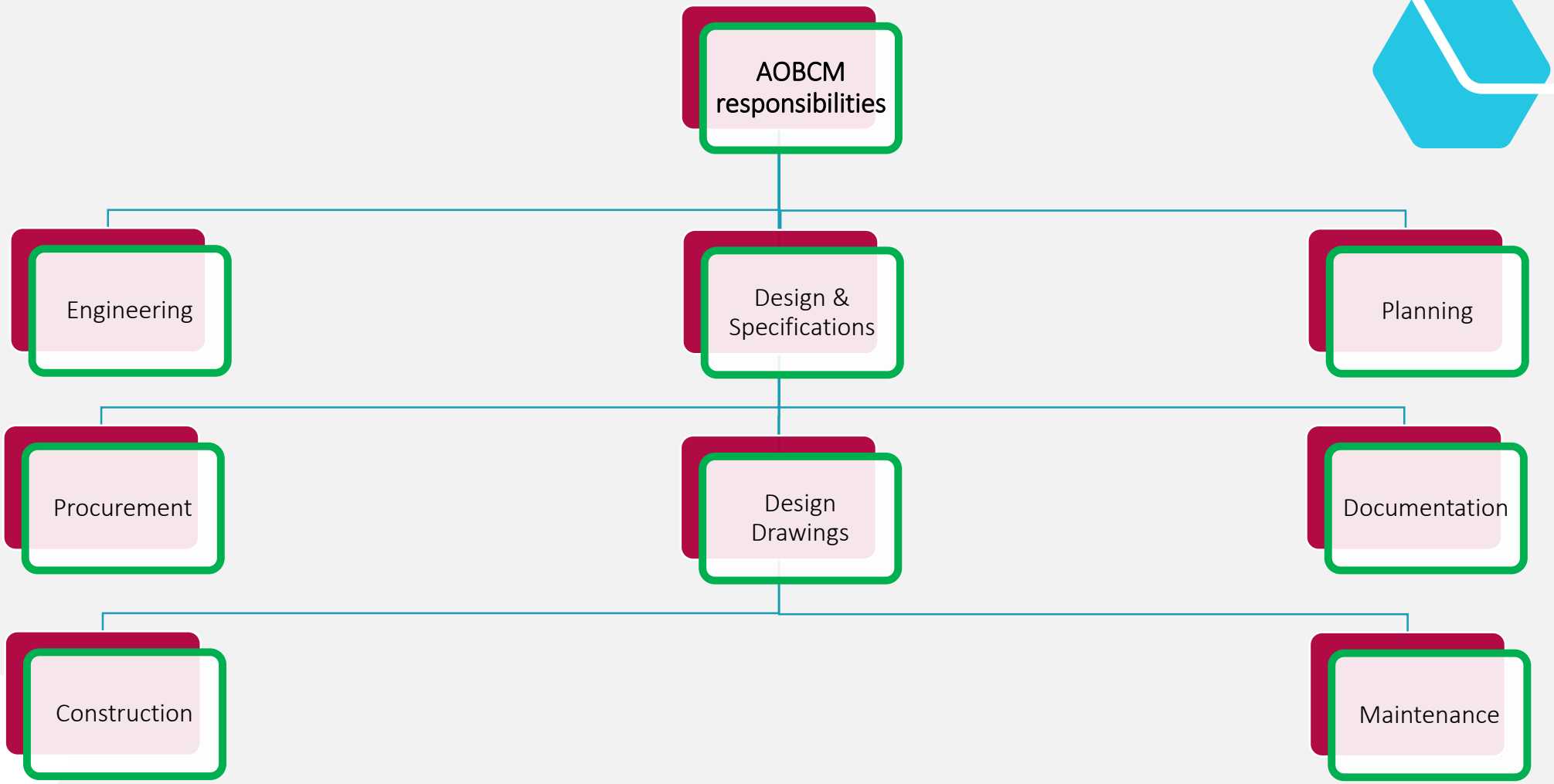
4.1.2 Attarat Oil shale mine infrastructure items

The mine infrastructure works within the project could be listed as follows:

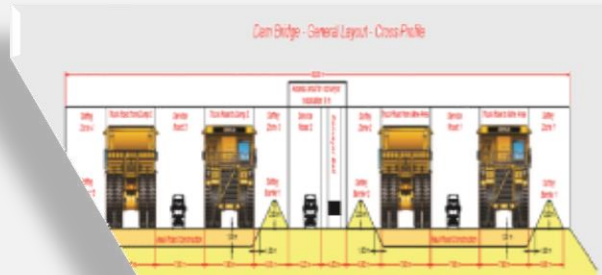
1. Dam Bridge.
2. Ramp Road.
3. Mine Main Roads (Road 2, Road 4, Road 5, and Road 8).
4. Road towards the North (Road 12).
5. Temporary road around the Intermediate stockpile (Road 13).
6. Interim road to Mining area.
7. Intermediate stockpile.
8. Ash Spreader Assembly Pads.
9. Areas within the mine and mine service area for crusher and conveyor assembly.
10. Wadi rerouting and construction of Wadi protective barrier.
11. Engineers Dormitory.
12. Labours Dormitory.
13. Temporary offices.

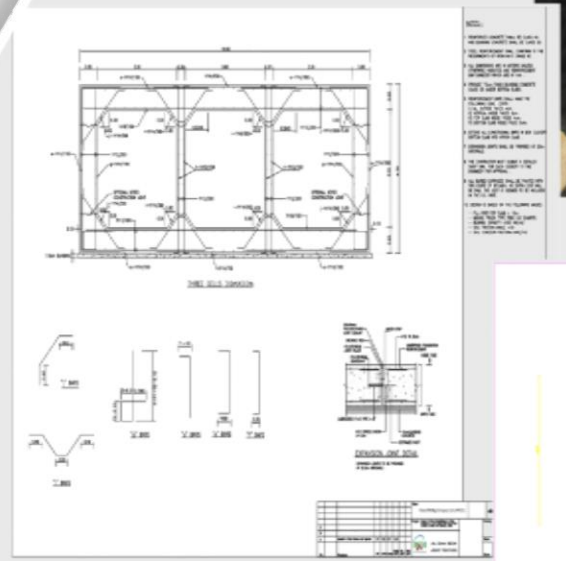
Details of main items will be mentioned on next sections

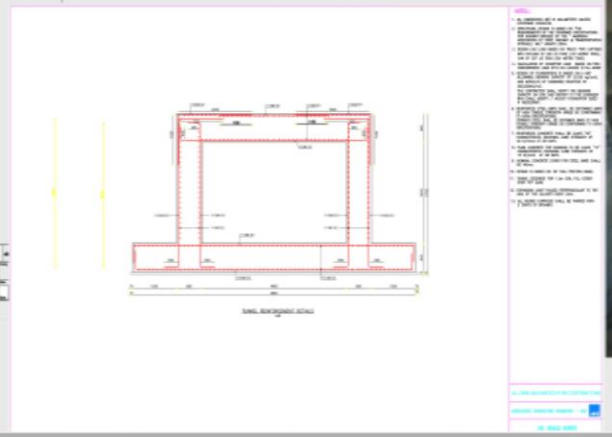
4.1.3 Mining Contractor (AOBCM JV) roles and responsibilities in developing the MIW



4.2 MIW Design Phase Details







4.2 Mine infrastructure works (MIW) Design Phase Details

4.2.1 Dam Bridge Design Phase

- The main role of constructing the dam bridge across the Wadi, is to connect the Mine and Mine service area, with the facility area.
- The width of the dam bridge is 80 meters, with a length of around 900 meters. The height of the embankment is about 18 meters, measured from the natural ground. The top level of the dam bridge is 810 a.s.l.
- The dam bridge was constructed together with roads 2 and 8, which are on top of it.
- The dam bridge construction can be divided into three items:

1. Dam bridge bulk embankment (Materials from overburden).
2. Concrete box culvert.
3. Conveyor belt tunnel.

4.2.1.1 Dam Bridge embankment Design phase

- Prior to starting the construction of the dam bridge embankments, a method of statement had to be in place, based on the design requirements within the contract.
- The bridge embankment had to be designed and constructed, based on a calculated weight bearing capacity, in such a way that the bridge can handle traffic of fully loaded payload mining trucks (200t class).
- The bridge is allowed a 2-way lane of 200t mining trucks, in addition to a surface conveyor width and area needed for servicing the conveyor, which locates in the middle of the dam bridge, between roads 2 & 8. The conveyor will be used to transport the oil shale to the facility area.
- In order to commence such a design, we started with two steps:

1. Materials sampling from the mine.
2. A one-meter-trial area was constructed and compacted to the west side of the culvert, in addition to a two-meter-lift to the east of the culvert, to be subjected to testing, to identify the properties of the materials and the compacted layers.

- The tests which had been conducted on the dam bridge embankments are as follows:

1. Plate bearing tests on one-meter and two-meter layers.
2. Sand replacement test.
3. Laboratory tests for the mine materials, and natural ground materials, which includes:
   a. Sieve analysis.
   b. Classification.
   c. Max. Dry density (proctor).
   d. Plasticity Index.
   e. CBR test.
   f. Specific gravity.
   g. Absorption.

   The natural ground samples were collected from trial pits prepared on site, where the dam bridge embankment were going to be dumped.

Sampling from mine materials

Plate bearing test

Sampling from Natural Ground

Sand replacement test

- The test results could be summarized as follows:

  - The mining materials consist of fill materials, and rocks with different sizes.
  - Most of the mine and the natural ground filling materials are classified as A-6, A-2-6, and A-7. Most of the rocks sourced from the mine are classified as weak rocks.
  - The natural ground can be classified between silty or clayey gravel, sand to silty, and clayey soils, according to the classification test results. That means the natural ground can be evaluated between fair to poor, and excellent to good, as a sub-grade of the embankment.
  - The plasticity index of the Natural ground materials was very close to 10%, which could be rated as a good sub-grade for the embankments.
  - The CBR values were very high for the natural ground materials, which indicates a good sub-grade for the embankments above it.
  - Because of the height of embankments, the load effect / distribution will be less on the natural ground.
  - The absorption and bulk specific gravity of the rocks sourced from the mine ranged between good (specific gravity more than 2.25, absorption less than 6%), and weak (Specific gravity is 2.00, soluble in water).
  - The CBR values for the mine materials were very low, which indicates the quality ranges between (very poor) to (poor and questionable).
  - The results of plate bearing tests for the one-meter-layer is less than 2.2, which indicated that it is possible to get a compacted and stability layer.
  - The results of plate baring tests for the two-meter-layer is more than 2.2, which indicated a non-stable layer.

- Based on the test results, a design and MS were finalized as follows:

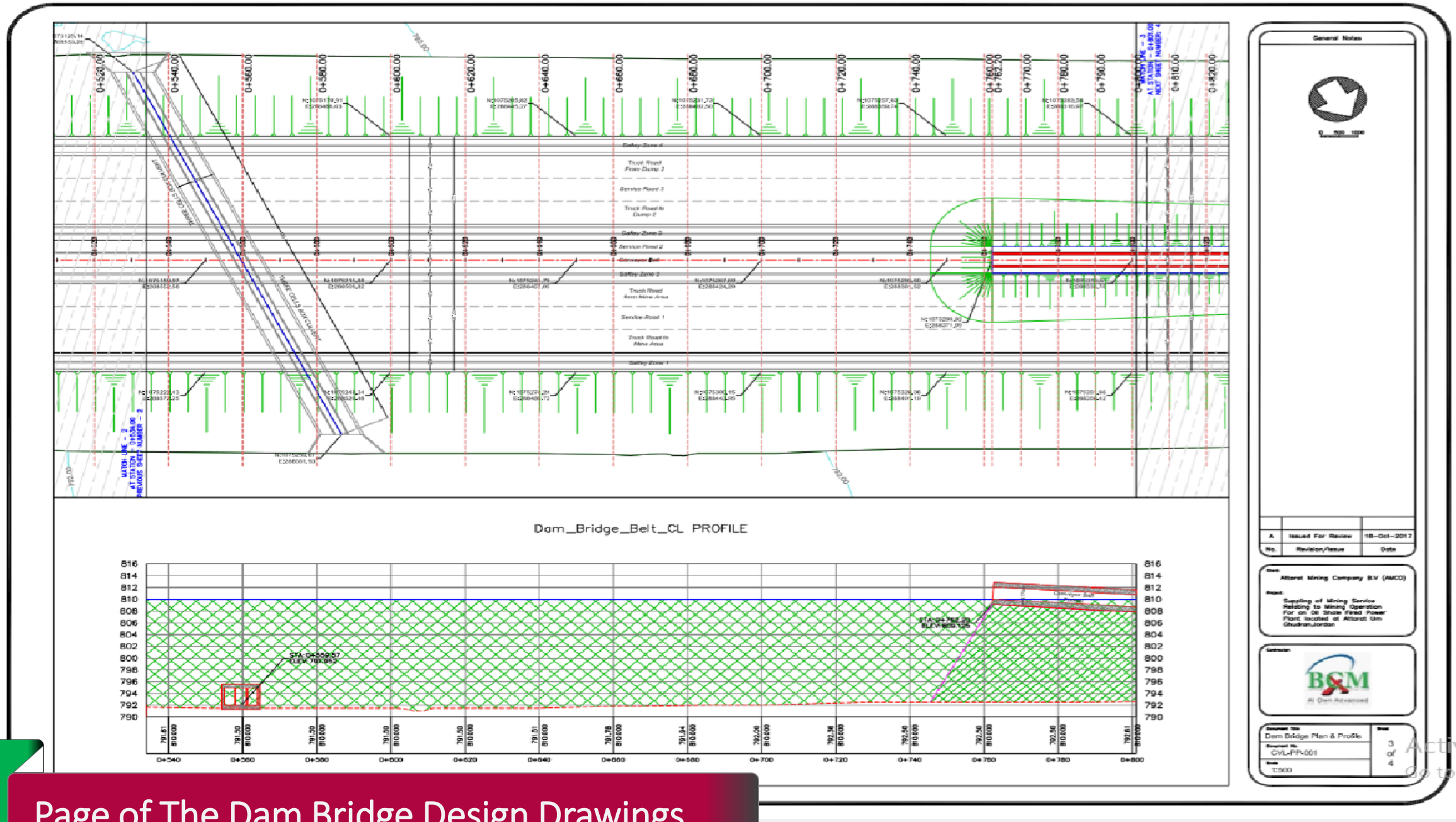
  - The rockfill materials were transported to the area by the 777 dump trucks, and by means of D9 dozers, the material was spreaded to a thickness of 1.30 meters. This included a 30% surcharge, to allow a layer of one meter compacted material in place.

  - Any lift more than one meter height, had to be tested and proofed at site with trial area.

  - Each layer had to be surveyed and documented with the inspection requests.

  - Plate bearing tests used to be performed on each layer. The location were chosen jointly between the JV and the owner representative staffs. All points had been surveyed and submitted with the inspection requests. If any point failed, we used to re-water and re-compact it, and re-tested if the ratio is much more than 2.2.

- Design drawings were prepared and submitted to the owner representative for approval. The design drawings consisted of the plan view, profile, and cross sections of the dam bridge.

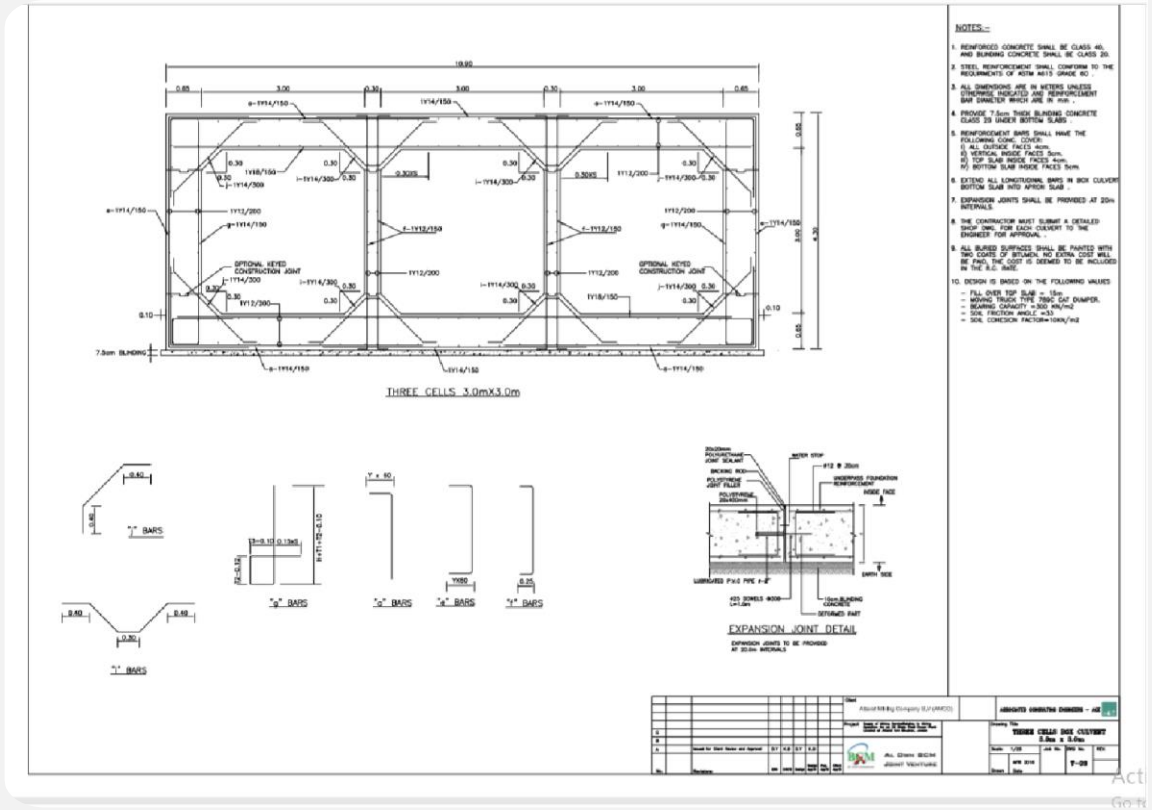


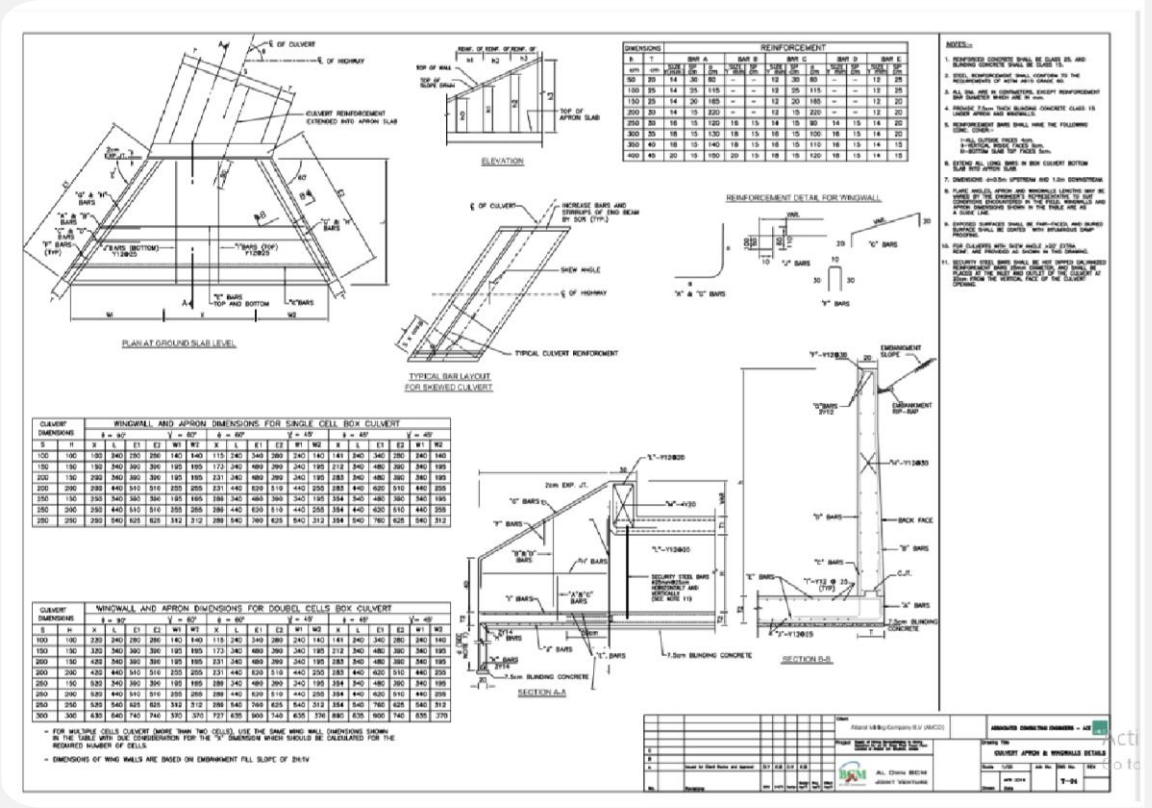
Page of The Dam Bridge Design Drawings

4.2.1.2 Concrete Box Culvert Design phase

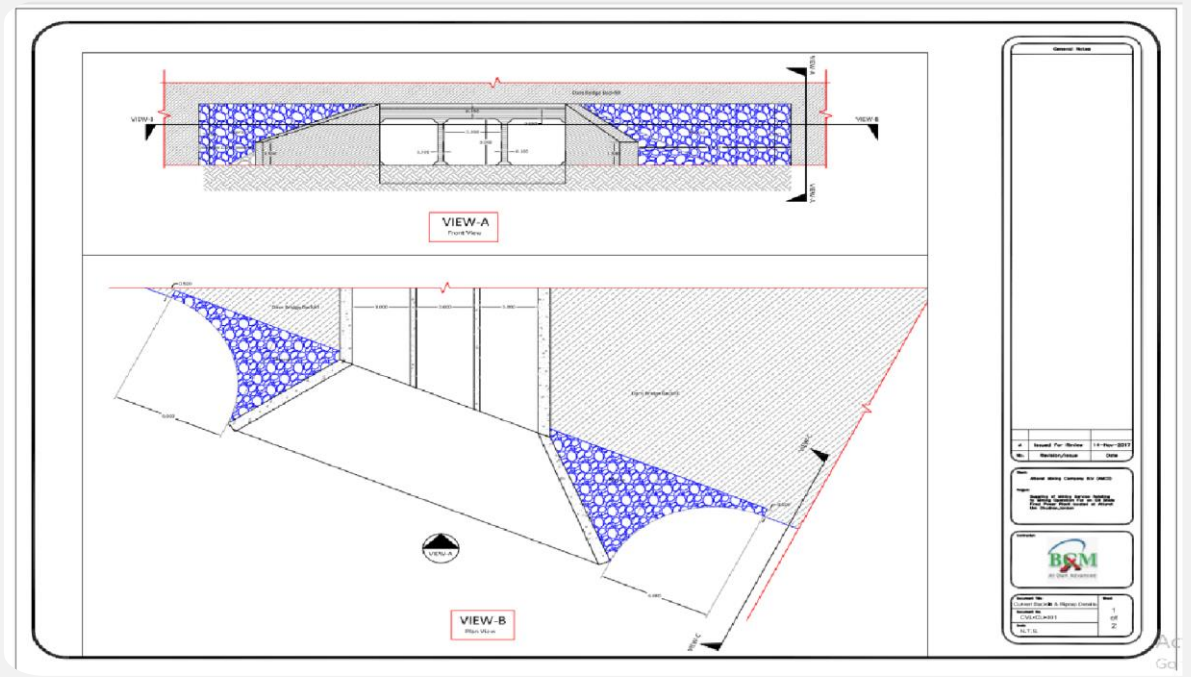
- In order to design a culvert, a hydrological study was done in terms of waterfall and expected water flow, for it to withstand the most stringent conditions of the following:
    - Culvert dimensions to be complied with the maximum surface water flow estimate, passing through the Wadi.
    - The water flow was calculated based on a severe thunderstorm with an hourly maximum rainfall of 50mm.
    - There was a report named “DHP” report dated on the 28th of May 2012, consisted of all details required for the design.
- According to the contract, the dam bridge shall have at least three culverts, each culvert shall have a size considered accessible for maintenance and cleaning by a Cat 226 or equivalent.

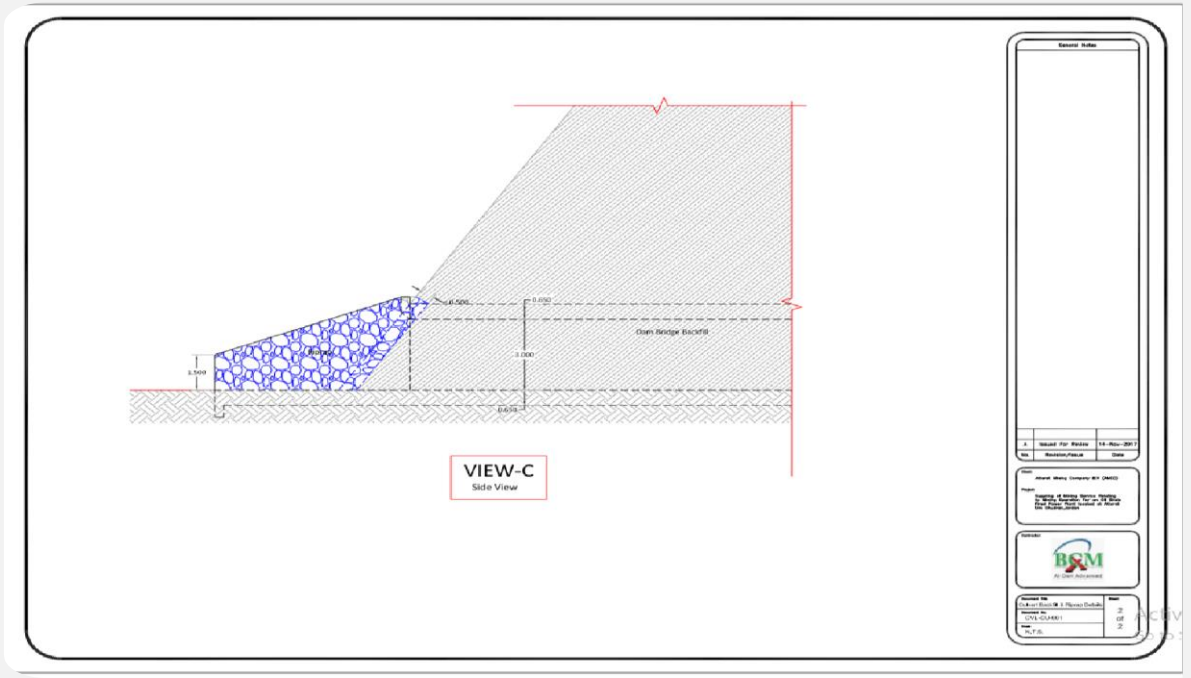
- The box culvert was designed, having three cells, each cell dimension is (3 x 3 meters).
- The length of the culvert followed the length of the dam bridge, taking the dam bridge side slopes into consideration, in such away that kept the top width of the dam bridge is 80 meters, hence, the length of the culvert is 135 meters.
- The culvert was designed with a reinforced concrete wing walls, with an appropriate angle away from the inlet and the outlet of the culverts.
- On April 2016, the cross section, and the reinforcement details were ready for the owner approval.



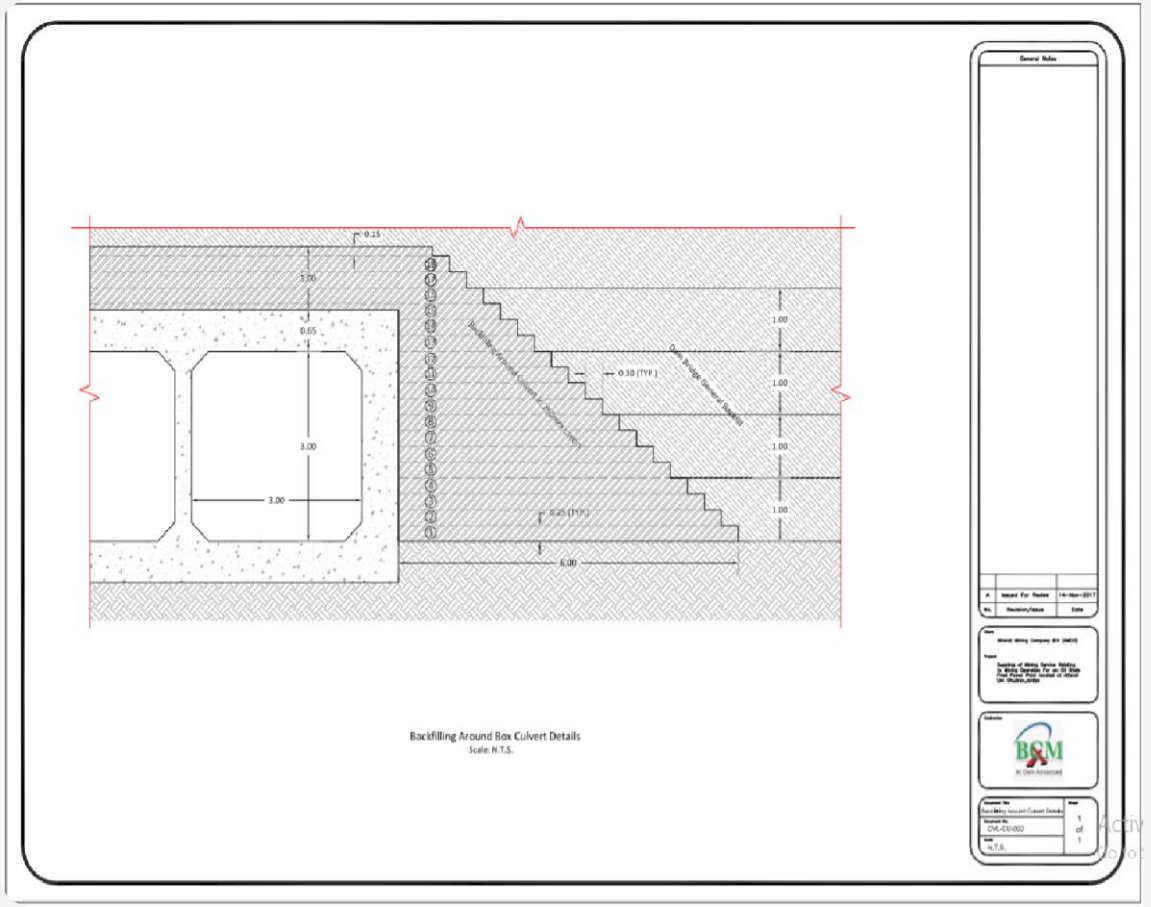


- Following the NGL/topo of the Wadi, a grouted riprap was placed at both ends of the culverts, to both sides of the wing walls, and in front of the aprons, in order to protect the ground and the slopes from water erosion.
- At the inlet side, the grouted riprap extended 30 meters to the east, 20 meters to the west, and 5 meters in front of the apron, with embedded key in the ground.
- At the outlet side, the grouted riprap extended 10 meters to both east and west, and 5 meters in front of the apron, with embedded key in the ground.
- On Nov 2017, the design drawings were submitted for approval.



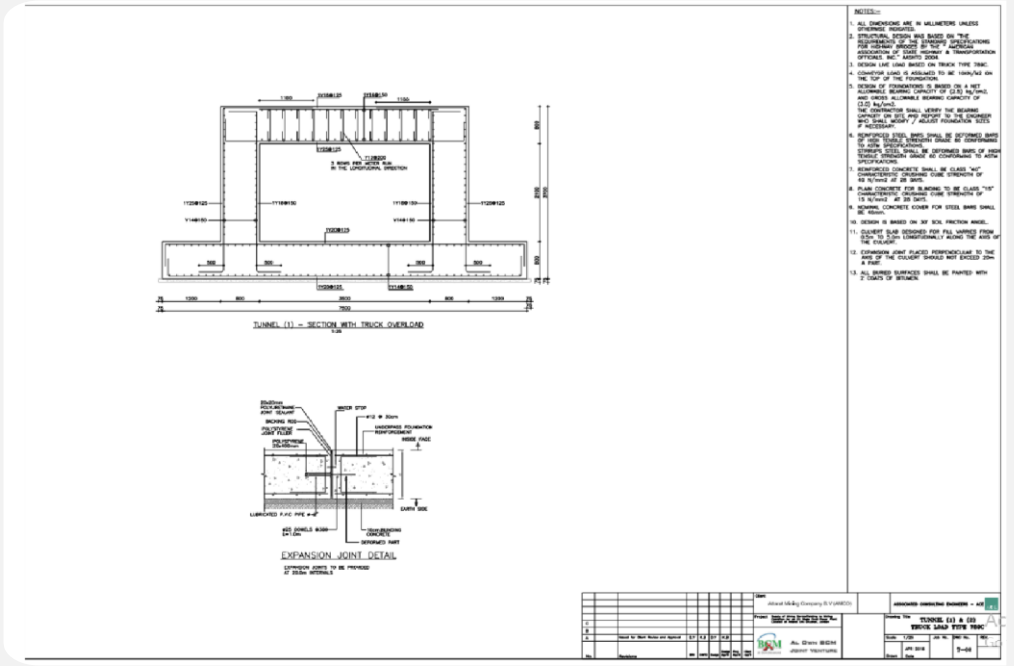


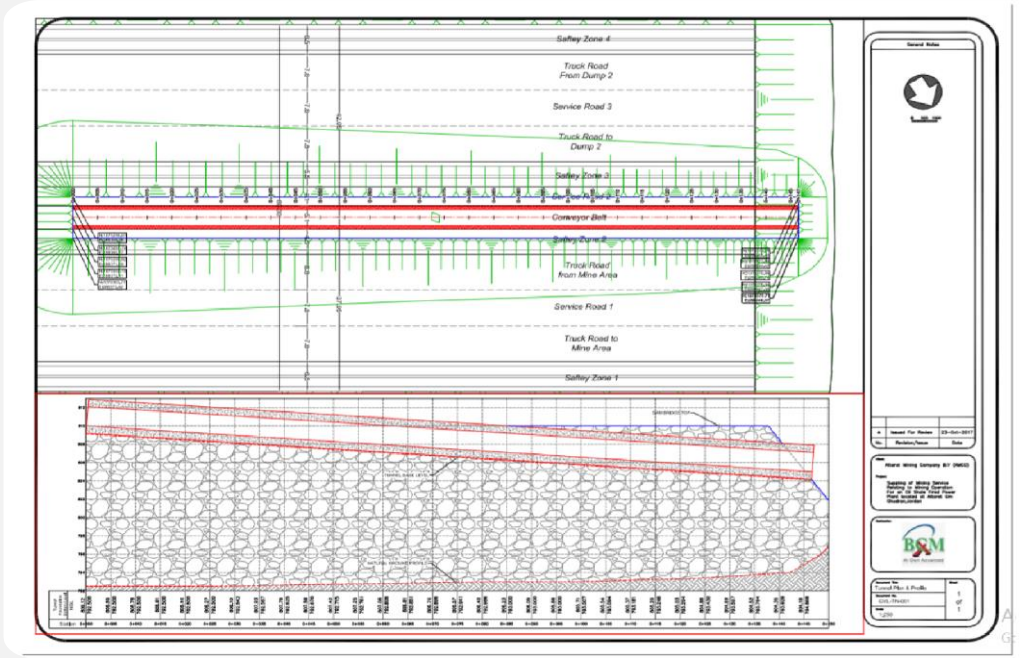
- Another important thing that was taken into consideration during the design phase and the method statement, is the embankment around the culvert. A particular attention was drawn to the methodology for the compaction around this structure.
- To avoid damages to the concrete caused by rocks, and in order to have a good compaction around and above the structure without any future settlements, selected Wadi materials were chosen upon laboratory testing.
- According to MPWH (Ministry of Public Works and Housing) specifications, these selected materials should have the following specifications:
  - Classification: Not A-6 or A-7.
  - Type of material: Fine granular material.
  - Plasticity Index: 10% maximum.
  - Compaction degree: 95% minimum.
- Around 18 layers were backfilled to both sides of the culvert, including one meter above it. Each layer thickness is 250 mm.



4.2.1.3 Conveyor belt tunnel Design phase

- A straight tunnel with reinforced concrete surface slab and continues inclination was constructed within the dam bridge for the surface conveyor, at the east side of it, started on the dam bridge, and ended at the power plant boundary.
- Before Nov 2017, the tunnel's inner width was 3.5 meters, the inner height was 2.1 meters, and the length was 147 meters. The top of tunnel's foundation started at elevation 810 a.s.l, and ended at 805 a.s.l.
- For the structural design, some specifications had to be provided to the designer, such as the live loads, height of fill above the tunnel, net allowable bearing capacity (kg/cm²), and modulus of subgrade reaction (KN/m³). The design was based on 789 dump truck live load, a fill height of 0.5-5 meters above the tunnel, and the other parameters were assumed, since we could not determine the exact values, until the dam bridge embankment is in place. These values had to be verified once the ground reached the bottom level of the tunnels' foundation.
- The final tunnel cross section and reinforcement details based on above design were ready and submitted on April 2016.
- Tunnel Plan and profile based on above deign were ready and submitted on Oct 2017.

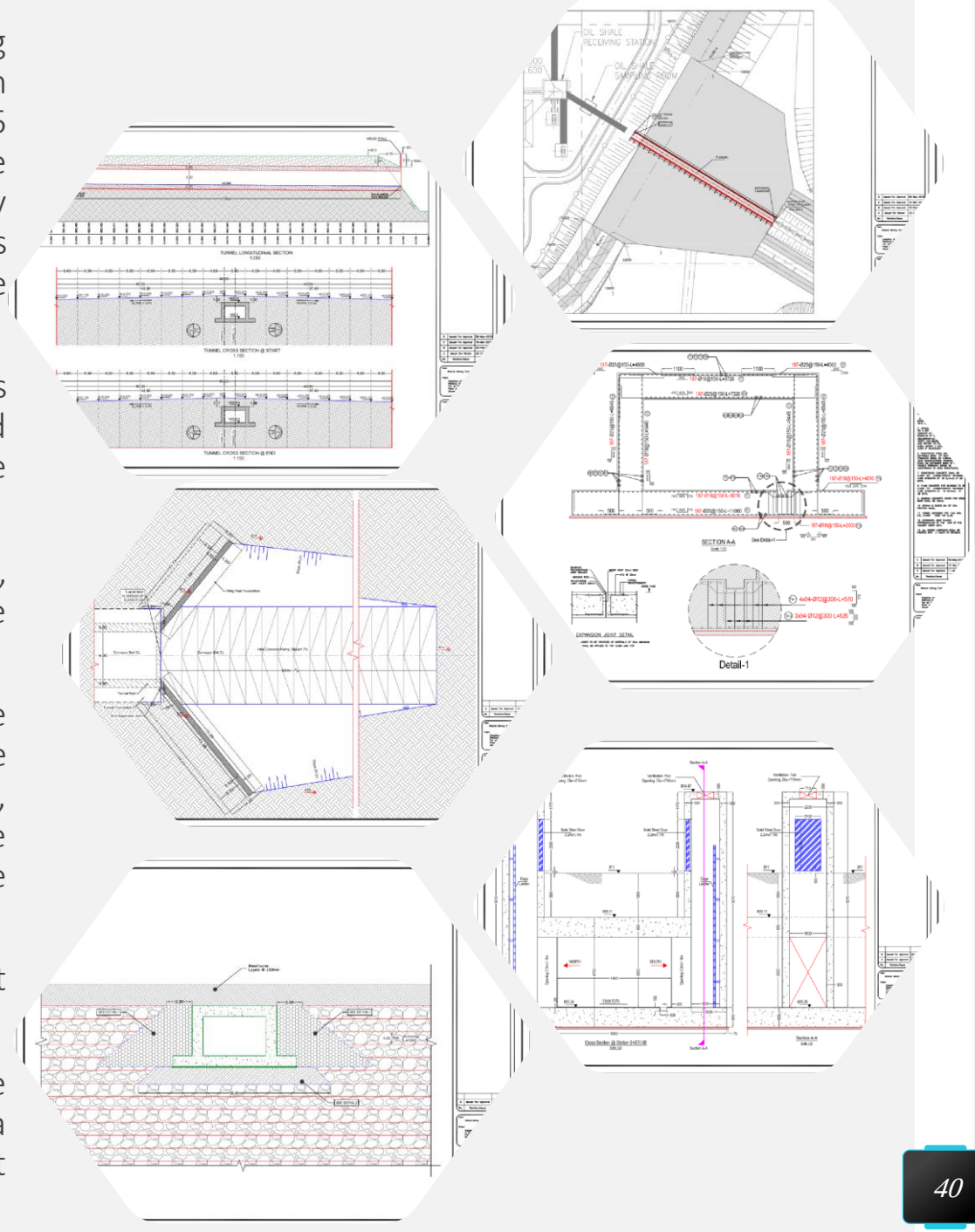




- On November 2017, a letter received form the owner representative with a new design of the tunnel.
- The tunnel inner width became 4.9 meters, the inner height became 3 meters, and the length became 139 meters.
- The inclination of the tunnel had been changed also. The top of tunnel's foundation changed to be at elevation 805.50 a.s.l, and ended at 805.024 a.s.l.
- The tunnel's inlet became a ramp, going down from elevation 810 a.s.l at top of the dam bridge, to elevation 805.50 a.s.l at top of the tunnel's foundation.

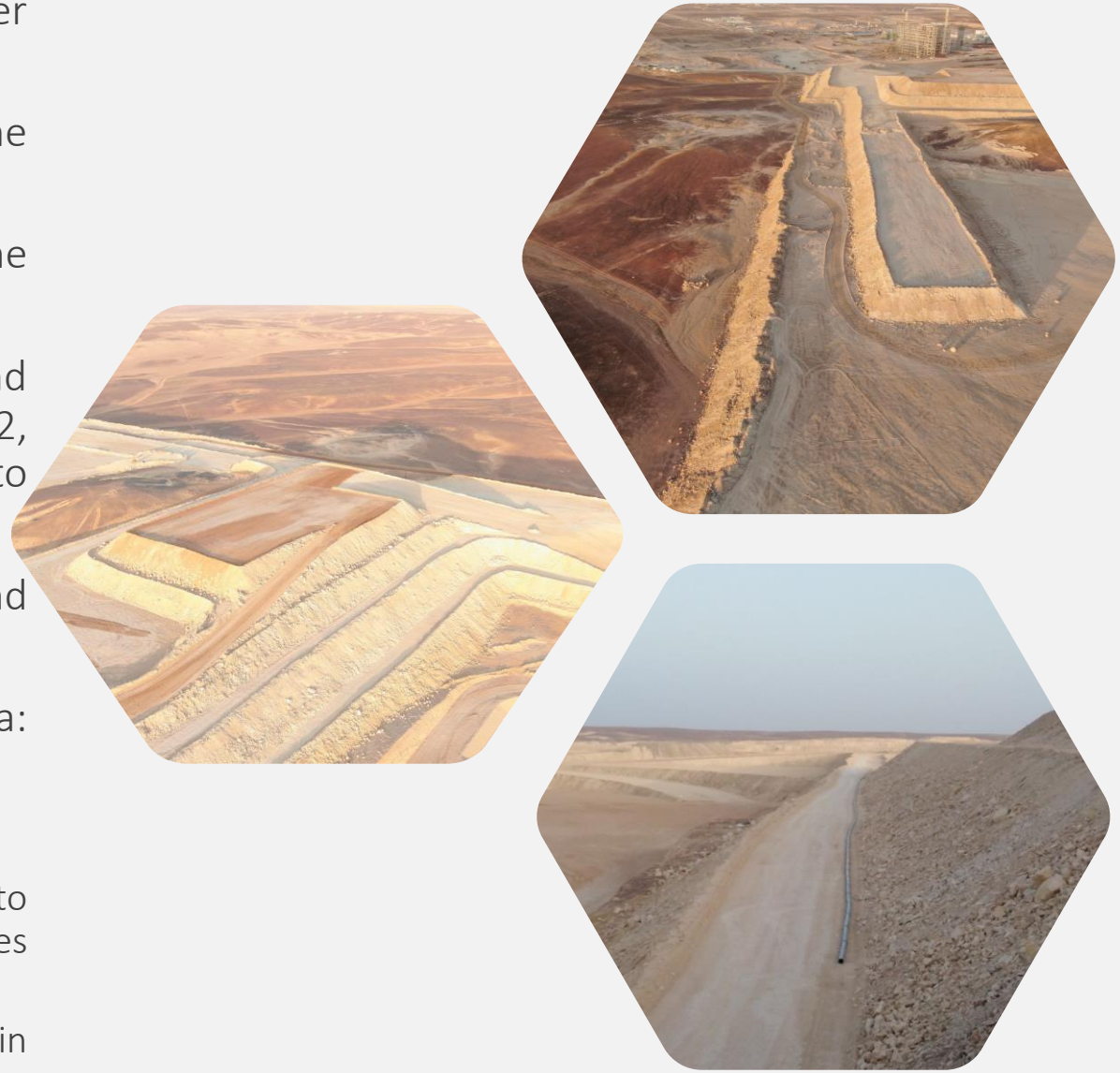
  In order to keep the radius of the conveyor below 250 meters at top and bottom of this ramp, and to keep the clear height between the conveyor and bottom of the tunnel's top slab not less than 2.06 meters, the minimum distance of the ramp is 64 meters, with a slope of 7%.
- Since the geometric for the tunnel and the fill height above it were changed, a new structural design had to be executed to determine the new width of the foundation, and the thicknesses of the tunnel's structural elements.
- The first draft design assumed that the net allowable bearing capacity is 3.80Kg/cm², because of the huge loads, specially when the fill height above the tunnel decreased, to became between 1.0 to 1.5 meters. However, the bearing capacity was not achievable. During that period, the rockfill embankments of the dam bridge were on progress, and the actual bearing capacity could be tested. The mine rockfill materials achieved a bearing capacity of 1.80 Kg/cm², which is very less than the required, to have a logical and practical cross section for the tunnel, capable to carry loaded 789 dump truck loaded weight.

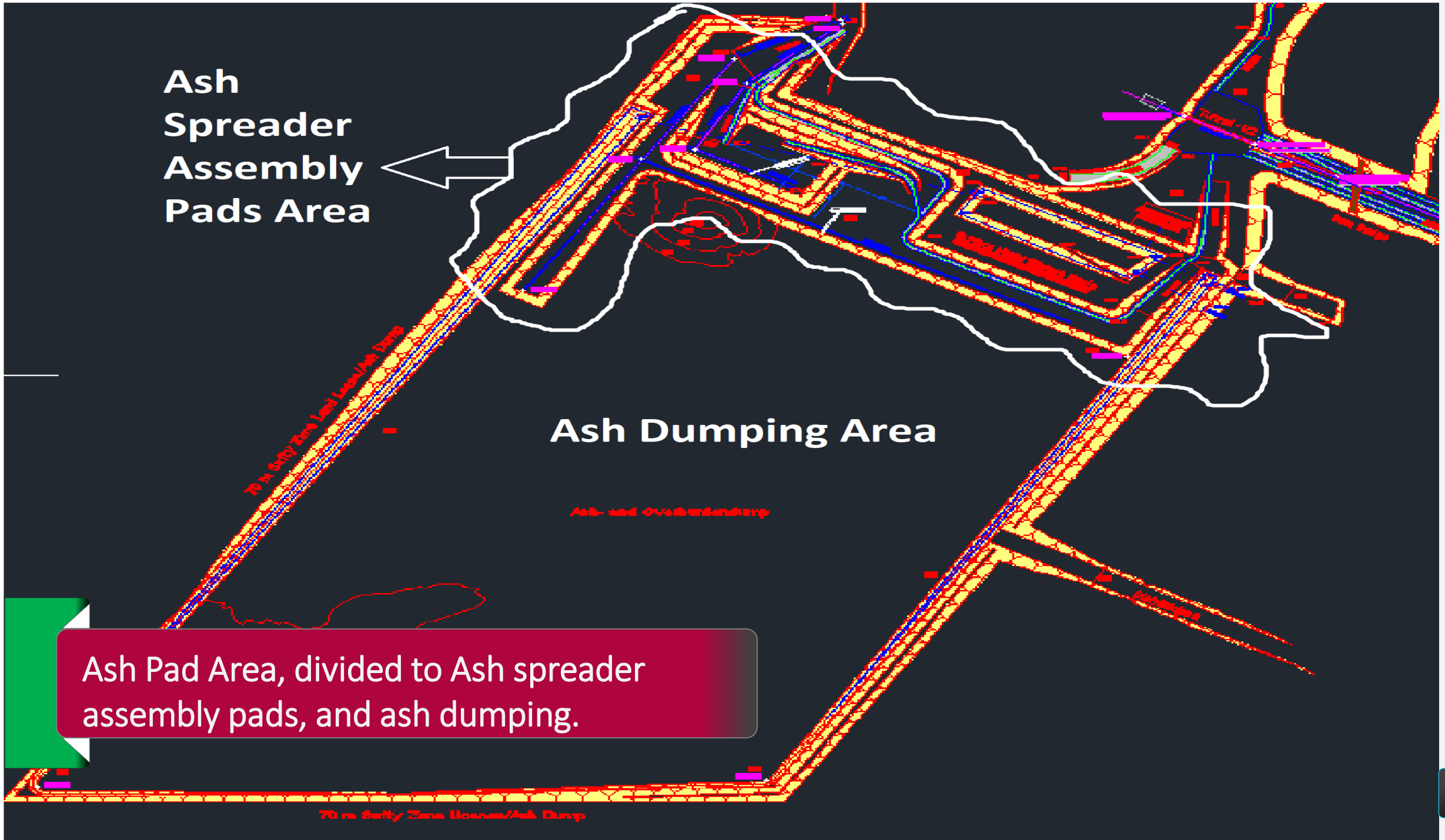
- Upon many testing, trials, and meetings, to find a way increasing the bearing capacity under the tunnel, it was agreed to increase it up to 2.5 kg/cm², in line with increasing the fill height above the tunnel to be ranged between 1.5 to 2.0 meters, which will cause increment of the dam bridge elevation above the tunnel, to be +811. Increasing the bearing capacity was done by constructing of 1.5 meters of base course under the tunnel. This 1.5 meters allowed the bearing capacity to go down from 2.5 Kg/cm² on top of the base course, to 1.8 Kg/cm² on top of the rockfill, based on the load distribution.
- Further to the client's request, two wing walls were designed at the tunnel's inlet, to hold the backfilling behind the inlet ramp. Also it was considered within the design, to construct two egresses / shafts, in the middle of the tunnel, at both sides, as an emergency accesses.
- Each egress/shaft was designed to have an access door on top of the tunnel, corrugated sheet slab, cage ladder, as an access from inside to the top of the tunnel.
- The water drainage inside the tunnel was taken into consideration during the design. The tunnel foundation has a side inclination of 0.5%, to allow the surface water to drain into a drainage channel, located along the tunnel, covered with galvanized steel grill. Also a sump pit was designed to be at the tunnel's inlet, in order to collect the water before it drains towards the drainage channel.
- Two head walls were designed to be constructed on top of the tunnel, at both sides, to hold the backfilling on top of the tunnel.
- With regards to the structural backfilling around the culvert, it had the same concept of the culvert backfilling, taking into consideration that there is a road on top of the tunnel, so we have to account the height of the pavement layers.



4.2.2 Ash Spreader Assembly Pads Design Phase

- The Ash Pad area is divided into two areas; the ash spreader assembly pads, and the ash dumping area.
- The Ash spreader assembly pads is the area where the assembly of the ash spreaders is going to take place.
- The materials used to dump and shape the area is the overburden material from the mine.
- The Ash Spreader assembly pads started from topo (around 795 a.s.l) and raised up to different elevations (805, 820, 832, and 854 a.s.l), while the ash dumping area will reach up to 820 a.s.l, which will be the sub-grade of the dumped ash.
- The main assembly areas are located at elevations 832 and 854 a.s.l.
- The dimensions of the ash spreader assembly pads area: (1200 x 300) meters.
- The design of the ash pad area could be classified as follows:
  - Ash spreader assembly pads Embankments, which shall be built to sustain the installation and operation of 200-ton crawler cranes (1.16 Kg/cm^2).
  - Water surface drainage system shall be designed for the rain water.





Ash Pad Area, divided to Ash spreader assembly pads, and ash dumping.

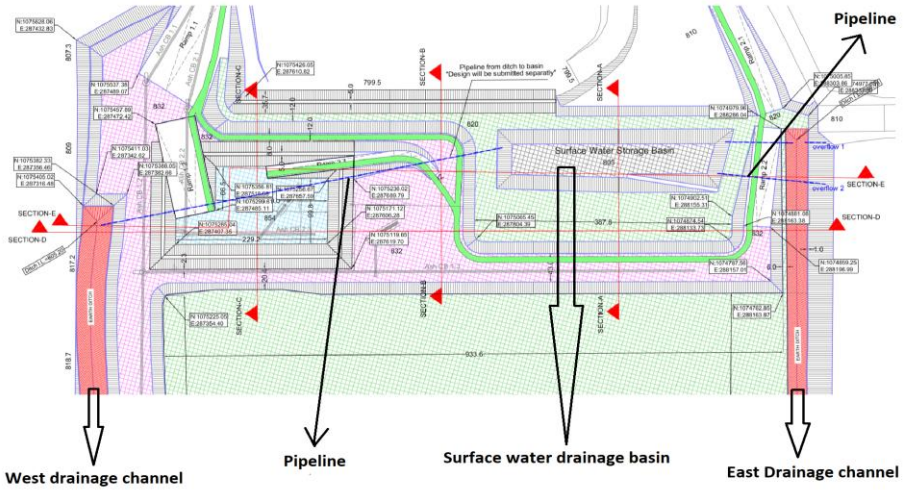
4.2.2.1 Ash Spreader assembly pad embankment design phase

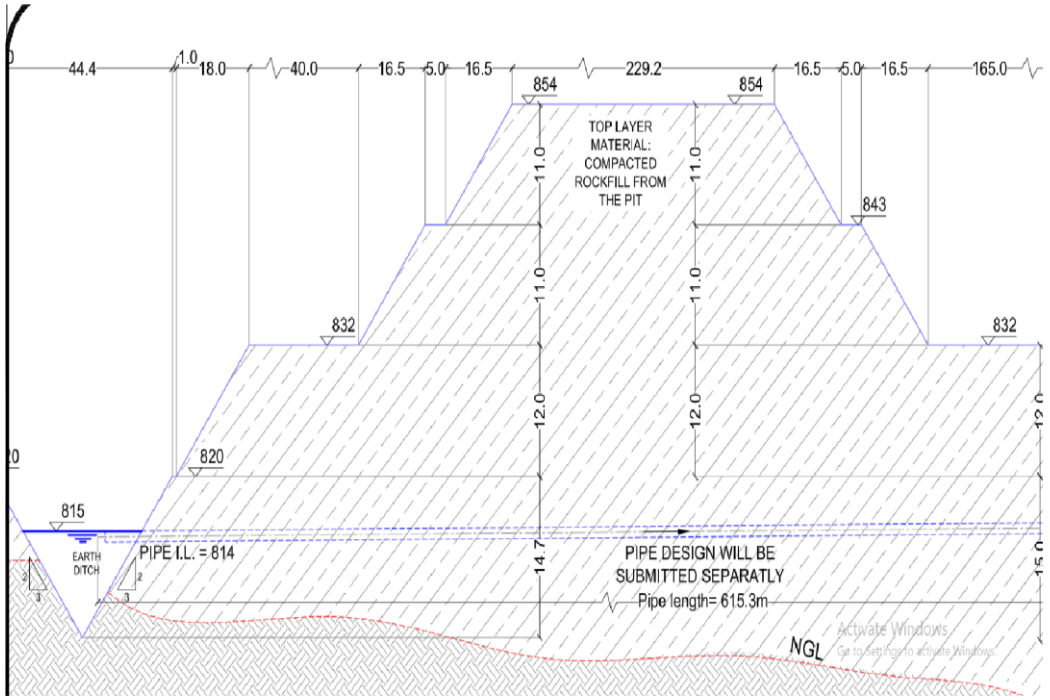
- As the materials used for ash pad dumping was from mining, the same concept for the dam bridge embankment had been followed.
- Trial pits had been executed for Natural ground samples, in addition to the samples were collected from the mine materials.
- Based on all trials and tests, a design and MS were finalized as follows:

  - The rockfill materials were transported to the area by the 777 dump trucks, and by means of D9 dozers, the material was spreaded to a thickness of 1.30 meters. This included a 30% surcharge, to allow a layer of one meter compacted material in place.
  - Any lift more than one meter height, had to be tested and proofed at site with trial area.
  - Each layer had to be surveyed and documented with the inspection requests.
  - Plate bearing tests used to be performed on each layer. The location were chosen jointly between the JV and the owner representative staffs. All points had been surveyed and submitted with the inspection requests. If any point failed, we used to re-water and re-compact it, and re-tested if the ratio is much more than 2.2.

4.2.2.2 Ash Pad Water surface drainage system design phase

- In order to prevent the rain water which is mixed with the ash to infiltrate to the underground water, a full drainage system shall be designed and constructed, as mentioned in the contract drawings. For that reason, a drainage channel surrounding the ash pad area shall be in place.
- On the contract, a V-shaped slopped channel surrounded the ash pad, divided into two channels, having the same start point, one channel will surround the ash pad from the east, and one from the west.
- Both channels had the same start point elevation, 819 a.s.l. The east drainage channel ended at elevation 808.49 a.s.l, while the west channel ended at elevation 805.20 a.s.l. (Longitudinal slope 0.50%)
- The concept of the design was to have an underground drainage pipe from each channel, towards an area called surface water drainage basin, which located in the middle between the two channels, within the ash spreader assembly pads area. The water will run by gravity towards the water basin.
- However, the difficulty of constructing these types of channels (V-shape) in mining industry, and because the pipes will have a huge height of embankments above them, it was hazardous to go with such a design; if the pipes damage, no way to replace them, or to maintain them.

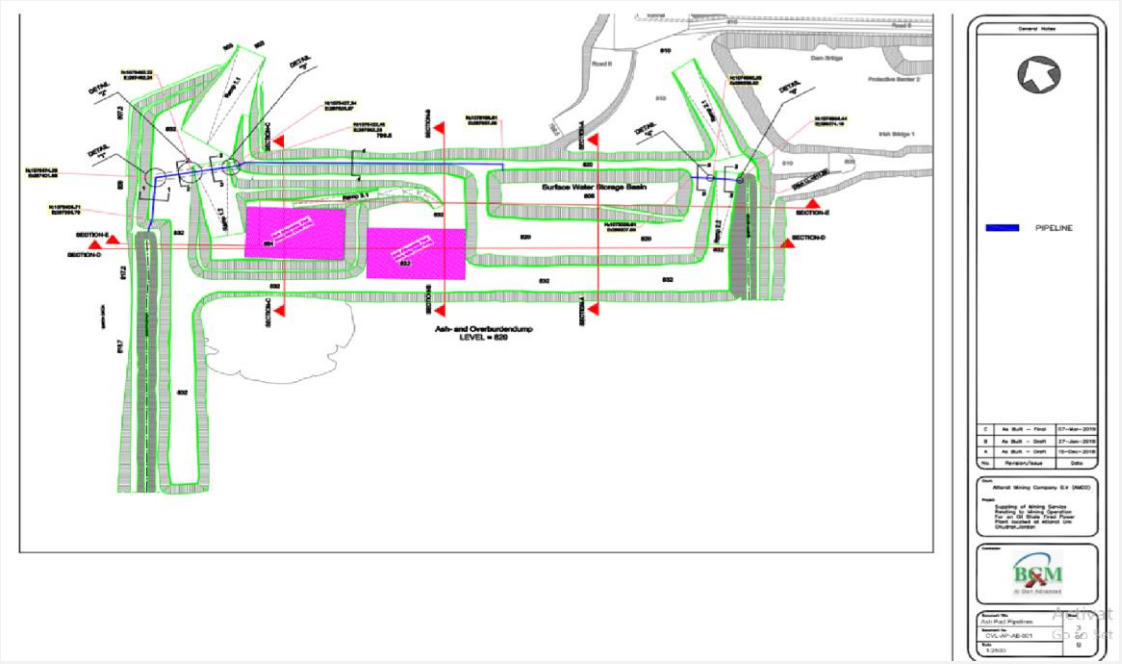


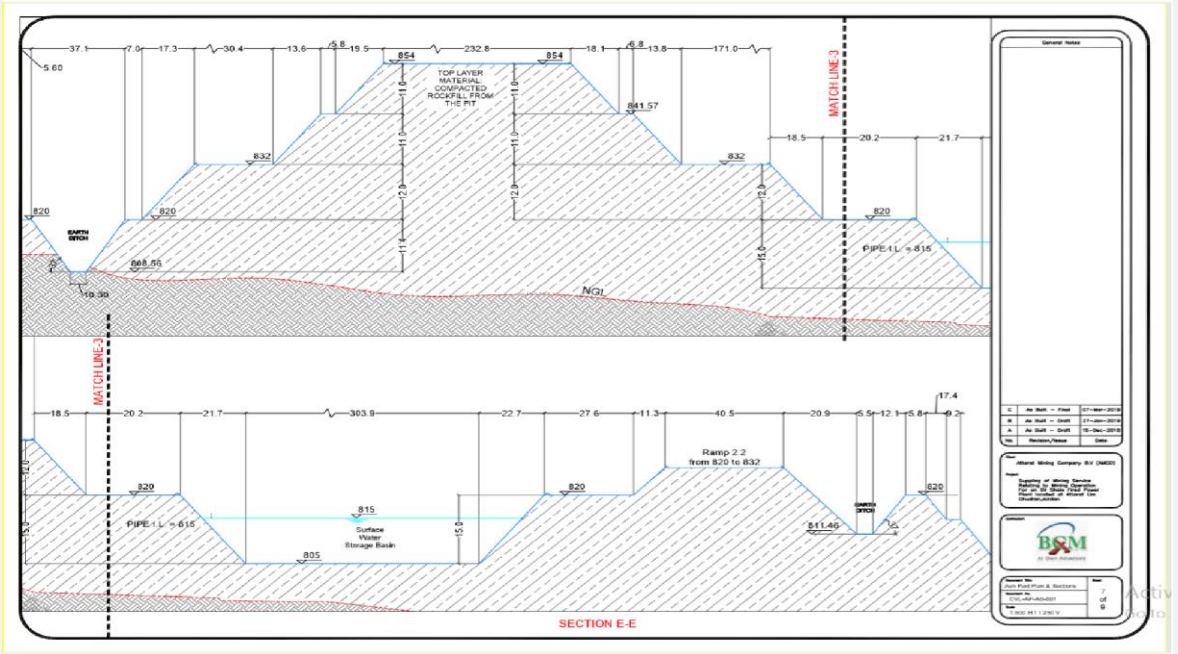


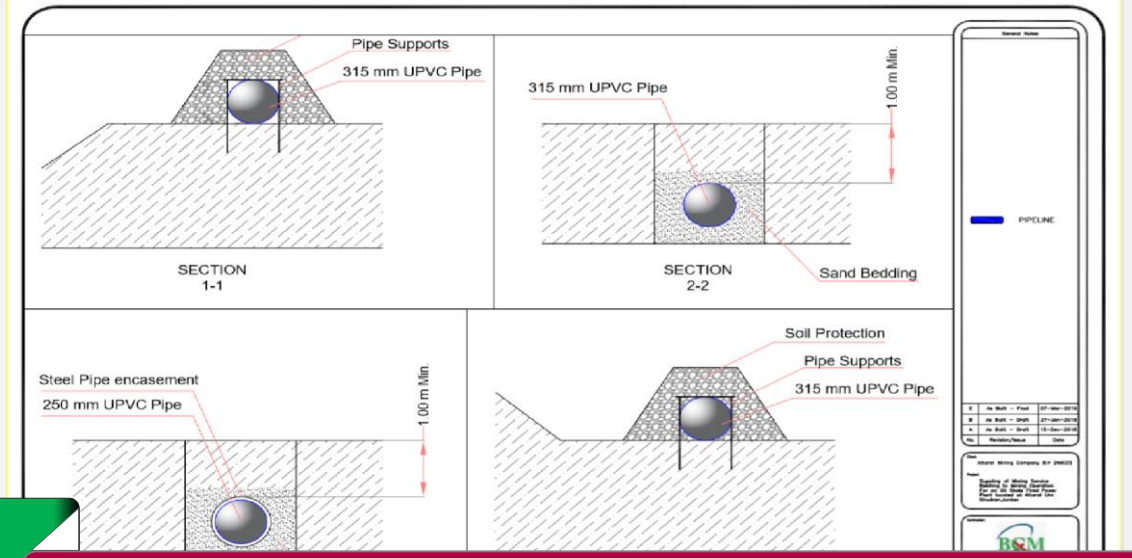
- Thus, it was agreed with the client, to re-design the drainage channels, and submit an alternative design to pump the water towards the water basin, through pressurized pipeline, instead of gravity pipelines. The pressurized pipeline will be above ground, except for the areas where a traffic will be crossing through.
- In order to perform such a design, a full hydrological study was made for the project area. The study included the rainfall intensity in severe thunderstorms, water runoff, water flow in the ditches and its type, and water speed. Since the water will be pumped off the channels, the JV suggested a trapezoidal cross section for the channels, with no longitudinal slope. By then, the channels will work as a temporary reservoir until the water is pumped towards the water basin. However, the owner representative insisted to have a minimum longitudinal slope, of 0.38 %.
- The final cross section was a trapezoidal channel, with a bottom width of 5 meters. A longitudinal slope was 0.38%. Hence, the eastern channel will end at elevation 811.25 a.s.l, and the western channel will end at elevation 808.54 a.s.l.

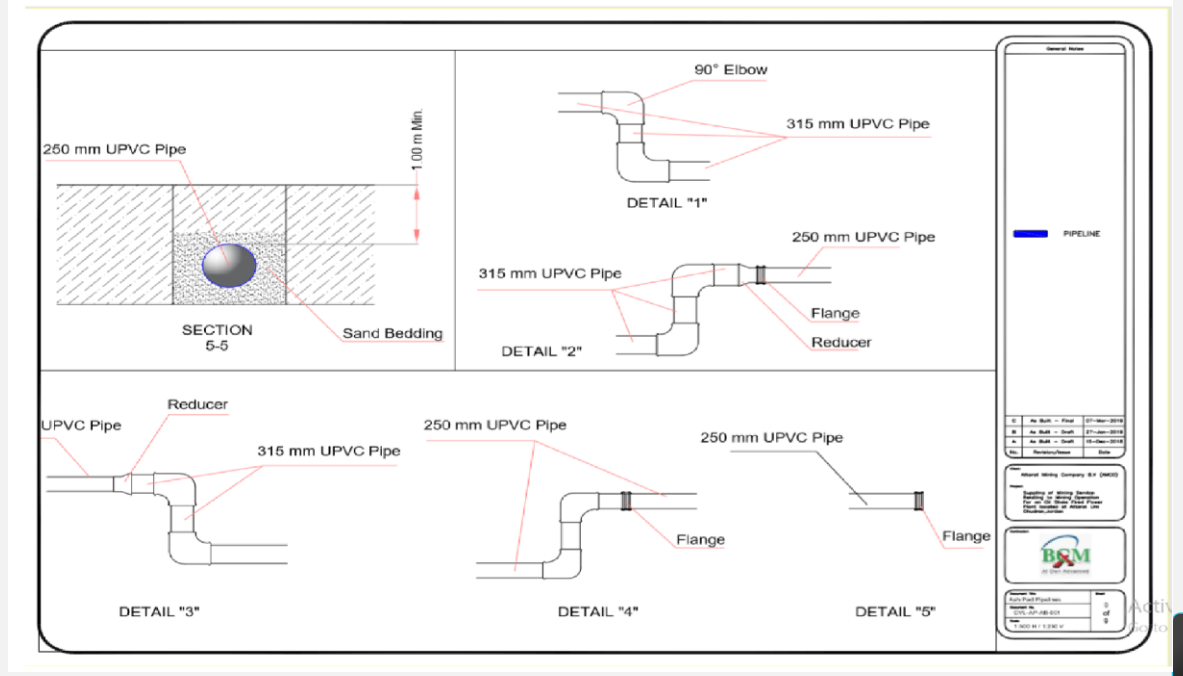
  A detailed design for the pumps and the pipelines was submitted to the client, as follows:

  - Based on the hydrological report, the water volumes that may enter the channels is 4341.62 m^3 to the west, and 3433.26 m^3 to the east. (The area was divided into two parts).
  - Based on these volumes, the pumps selected with a flow rates of 41 L/s for the east channel, and 51.10 L/s for the west channel.
  - The pipelines are UPVC pipes, PN-10 (10 bars). The western pipes have a nominal outside diameter of 315 mm, while the eastern pipelines have a nominal outside diameter of 250 mm.
- A full set of design reports and drawings were submitted to the owner representative (See next slide).







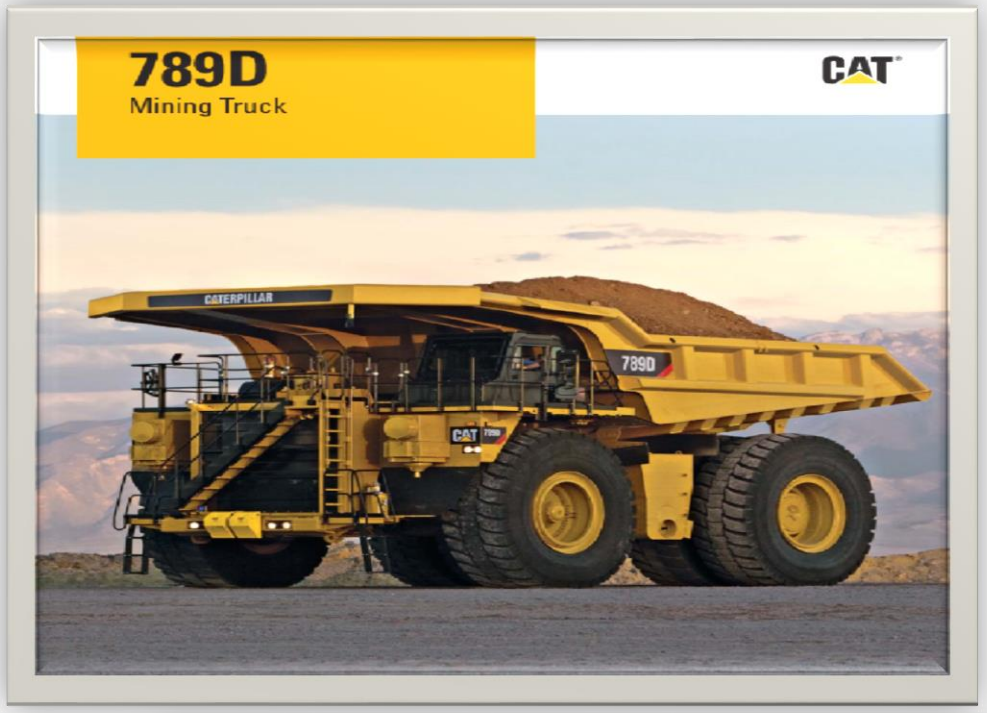


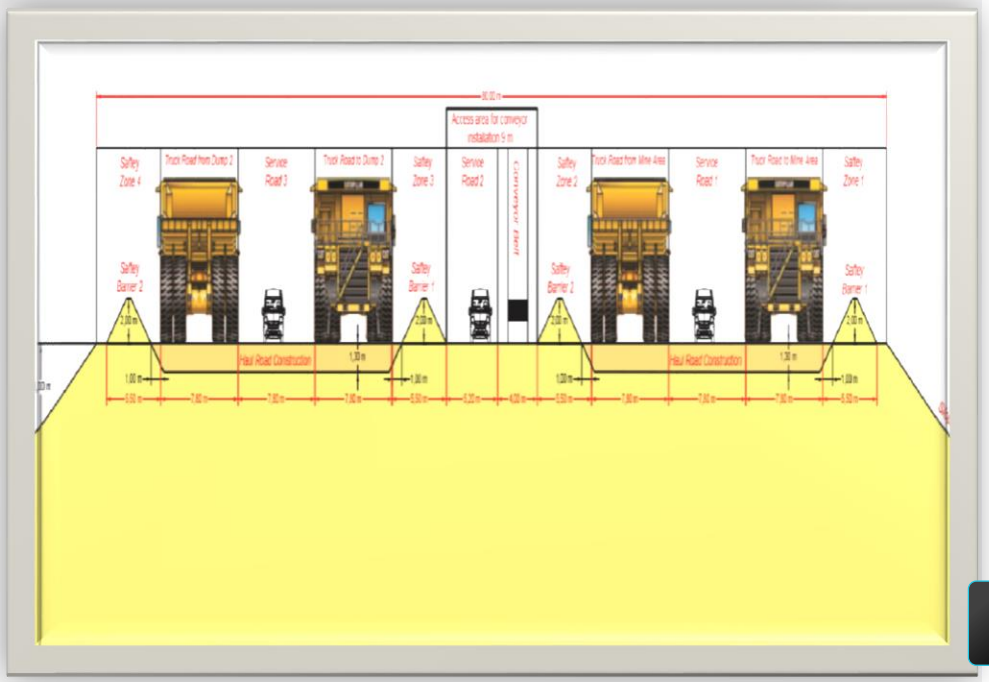
Ash Spreader Assembly Pads and surface water drainage system Design drawings

4.2.3 Haul Roads Design phase

- The main role of constructing the hauling roads is to have a safe and sufficient access to the mine site by men and mining equipment, also to evacuate the oil shale to the processing site or port.
- The main mine roads in our project are:

1. Road “2” (819 meters); which is on top of the dam bridge, connecting the mine and the mine service area with the facility area.
2. Road “4” (593 meters with 139 meters were extended as a variation); connecting the mine yard to the dam bridge.
3. Road “5” (197 meters); connecting the power plant area (area 4) to the dam bridge.
4. Road “8” (776 meters); which is on top of the dam bridge, connecting the mine and the mine service area with the facility area.
5. Roads “12” & “13” (1,946 meters); surrounding the intermediate stockpile, and connected to the middle of road “2”.
6. Main Ramp Road (693 meters); connecting roads “2”, “8”, and “12”, with the mine, down to 740 a.s.l.





- The basic concepts which were followed to perform the design of the hauling roads are summarized as follows:
  - The method used for the engineering analysis and design calculations was the California Bearing Ratio (CBR) method. The (CBR) method is one of the most widely used methods of computing the required layer thickness for road construction. For final design, CBR values obtained from testing the actual sub-grade and fill materials designated for road construction, should be used in the CBR charts for determining layer thickness requirements.
  - Construction materials and layers specifications: The haul road cross section was divided into four distinct layers, described in the contract as follows:
    1. Sub-grade layer: Which shall be sourced from in-situ soil or rock, or any other existing surface.
    2. Sub-base layer: Which shall be sourced from selected compacted granular material, which is fairly stiff and sourced from the strongest rock available.
    3. Base Course layer: Which shall be a high quality treated or untreated material, with suitable particle size.
    4. Running/Surface course layer: Which shall be gravel or fine crushed overburden material with controlled grading.

    Based on the CBR method, an initial design drafted on April 2016. The specifications of each layer shall be as follows:

    1. Sub-grade layer: CBR value 8% min.
    2. Sub-base layer: CBR value 30% min., thickness 0.55 m.
    3. Base Course layer: CBR value 80% min., thickness 0.20 m.
    4. Running/Surface course layer: CBR value 100% min., thickness 0.20 m.

Since most of these layers had to be sourced from the materials available in the mine, and referring back to mine materials test results, we had to select the strongest mine materials available, which meet the required specifications in the contract, in addition to MOPWH specifications.

For that, crusher and screening plants were imported to site, by a sub-contractor, in order to crush the strongest rocks, which were limestone rocks, and the screen was for screening the Wadi materials, which located to the north side of the mine.

Samples were collected from the screened and crushed materials to be tested, trial layers were executed and tested. Based on the test results, the haul roads pavement layers specs were modified by the designer as follows:

1. Sub-grade layer: Consisted of rockfill from the mine, CBR value 20% min., thickness 1.00 m.
2. Sub-base layer: Consisted of screened Wadi materials, CBR value 65% min., thickness 0.35 m.
3. Base Course layer: Consisted of a mix between the crushed and screened materials, CBR value 100% min., thickness 0.20 m.
4. Running/Surface course layer: Consisted of crushed aggregate, CBR value 100% min., thickness 0.15 m.

- There are basic design requirements which was followed, to perform the design for the haul roads, other than the layers specifications:
  - Road width must allow two-way traffic of 200 tons class mining trucks (789); a minimum of 3 – 3.5 truck width must be applied, while a minimum of 3.5 – 4 truck width must be applied at corners. (789 DT width is 7645 mm).
  - The haul road gradient must be less than 10%.
  - At the sides of the haul roads, safety berms must be constructed, with a minimum height of half the wheel height of a 200t class mining truck. (789 DT wheel height is 3440 mm).
  - A super elevation of 1.5% - 2% must be considered within the road cross section, to carry the water away during the rain, towards a drainage channel located at the side of the road.
  - Curves radii shall always exceed the minimum turning radius of the equipment (minimum turning radius of 789 DT is 30.23 m). Curves shall be designed so that the sight line of the driver is equal to or higher than the stopping distance of the mining truck.

- All mining roads in the project was designed based on all previous requirements and specifications, however, the main ramp road was a special case, because the pavement layers are going to set on a hard natural ground, while other roads' pavement layers were on rockfill embankments (Engineering fill). Thus, the pavement layers for the main ramp are two layers, each of them has 150 mm thickness.

  What distinguishes the main ramp also, there will be a ditch with a depth of one meter to the side of it, while a small ditch was constructed to the side of the other roads, with a depth of around 300 mm.

4.3 MIW Construction Phase Details

4.3 Mine infrastructure works (MIW) Construction Phase Details

4.3.1 Dam Bridge (Completion date: 16th September 2018)

4.3.1.1 Concrete Box Culvert Construction phase

- The construction of the concrete box culvert commenced on May 2017. It started with the bottom slab (foundation), external and internal walls, top sab, and head walls.
- There was a pouring sequence followed for concrete pouring; the culvert was divided into parts, separated by expansion joints. The distance between two expansion joints was around 20 meters.

- During September 2017, the concrete works were completed. The main activities which were on progress: concrete repairs and waterproofing, in order to make it ready for the structural backfilling.
- The final inspection on the culvert's works carried out on the 1st of November 2017, ready for structural backfilling

- Structural backfilling to the sides of the culvert started by mid of November 2017, and completed by 10th of December 2017.
- 16 layers were backfilled to the sides of the culvert, and 4 on top of it.
- The structural backfilling was executed in parallel with the dam bridge embankment (1-meter-rockfill layers). The backfilling layers were interlocked with the rockfill layers.

- 4.3.1.2 Dam Bridge embankment construction phase
- The trial area was dumped on August 2017 for the design and MS purpose.
- Upon the design approval, dumping the rockfill layers officially started on October 2017, to west and east sides of the culverts. The dam bridge embankment was completed on 26th of August 2018.
- The progress of embankments could be summarized as follows:
  - There was a specific limits for the dumping each month, following the desptach instructions.
  - The 1st stage was to dump to the east and west of the culvert (interlocking the layers with the backfilling layers).
  - The dumping proceeded on top of the culvert up to the level of base course layers under the tunnel.
  - The dumping proceeded to the east, towards the main ramp, away from the tunnel's construction site. The dumping was done gradually away from the tunnel, taking the tunnel's inlet ramp into consideration.
  - Once the tunnel construction was completed, the rockfill layers were raised up to the tunnel's foundation level.
  - Following the same procedure for the culvert, the rockfill layers were interlocked with the tunnel's structural backfilling.
  - The rockfill layers had been raised until the bottom level of the road was reached.
- General provisions applied on dam bridge embankment construction:
  - Maximum layer thickness was 1 meter.
  - Each layer was tested used plate bearing test method. Random number of test locations used to be selected on each layer. The maximum modulus of elasticity ratio had to be achieved on each location was 2.2. If the ratio was between 2.2 and 2.5, the location was re-watered and re-compacted. If the ratio exceeded 2.5, the area was re-watered, re-compacted, and re-tested.
  - Each layer had to be surveyed in terms of location and elevation. Each test point had to be surveyed as well. The surveying data used to be attached with the inspection request for each layer.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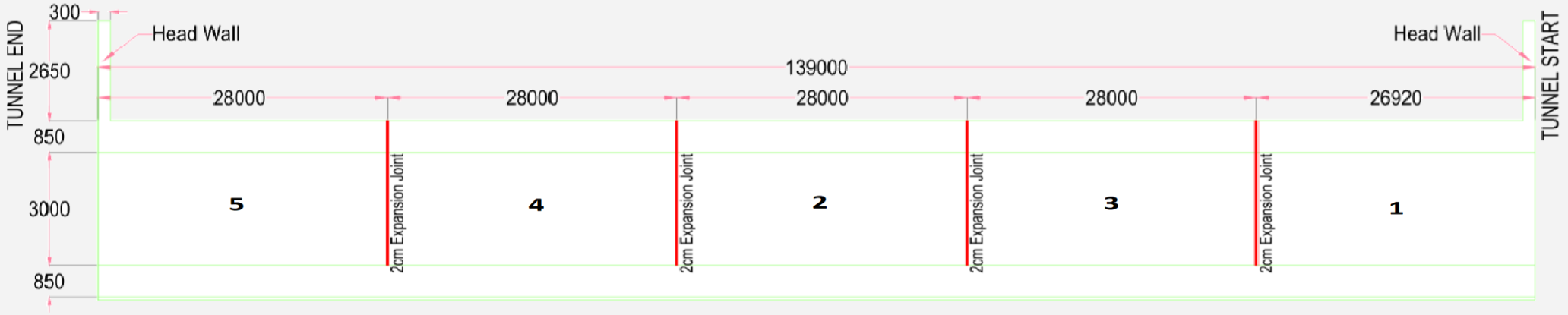
- 4.3.1.3 Conveyor belt tunnel construction phase

- Tunnel construction phases could be divided as follows:
  - Tunnel's infrastructure / Sub-grade (Base course layers).
  - Tunnel's concrete works.
  - Tunnel's backfilling works.
- 1st layer of base course layers was on place on the 27th of March 2018, and completed on 15th of May 2018. 9 layers were constructed. Each layer was tested using sand replacement method. On the final layer, bearing capacity test was done using the plate bearing method, in order to make sure that the actual bearing capacity on site met with the design bearing capacity (2.3 Kg/cm²).
- Blinding concrete (112 m³ - class 15) was casted on 16th of May 2018. Tunnel's work was completed End of August 2018, including the backfilling around it. Steel works were executed during October 2018.
- Concrete pouring for tunnel's foundation started on 04th of June at 10:50 PM, and finished on 05th of June at 11:00 AM. The foundation was casted in one shot. The concrete quantity was around (1,120 m³ - Class 40).
- The tunnel's walls and top slab was divided into 5 parts, separated by expansion joints, in addition to the shafts (two casts), and the wing walls (foundation and walls). The walls and top slab were poured together for each part. The pouring sequence was as follows:



TUNNEL GENERAL ARRANGEMENT
Side View

- The pouring dates for each part were as follows:
  - Segment “1”: 23-June-2018.
  - Segment “2”: 28-June-2018.
  - Segment “3”: 05-July-2018.
  - Segment “4”: 10-July-2018.
  - Segment “5”: 17-July-2018.
  - Head Walls: 19-July-2018.
  - Shafts Part (1); up to slab level: 28-June-2018.
  - Shafts Part (2): 26-July-2018.
  - Wing walls foundation: 15-July-2018.
  - Wing walls: 28-July-2018 & 04-August-2018.

- Before construction of wing walls started, the wing walls’ sub-grade had been dumped in two layers, with rockfill materials. The bearing capacity was tested before pouring the blinding, to check it with the design bearing capacity, which is 1.8 Kg/cm².
- During the concrete works (including reinforcement and formworks), concrete repair and waterproofing were on progress for each part which had been casted previously. Also expansion joint works (surface preparation, packing rods, and sealant application) were on going as well.

- After the completion of all repairing and waterproofing works, the structural backfilling to the sides of the tunnel, shafts, and wing walls started. 11 layers were executed up to the top of the tunnel. Each layer thickness ranged between 250 to 300 mm. Screened Wadi materials used for the backfilling.
- Steel works were executed inside the tunnel, including: Grill for inlet pit and drainage channel, steel doors, cage ladders, platform, and handrail for the shafts/egresses.

- Concrete new-jercies have been placed on top of the tunnel, to isolate the tunnel area from the traffic, following the traffic management plan, and also to work as safety berms for the roads.
- As a part of dam bridge handing over, grouted riprap had been placed at the inlet and outlet of the culvert.
- During the construction works, daily progress monitoring report used to be prepared, to follow up with the progress, in terms of quantities, productivity, daily % completed, and cumulative % completed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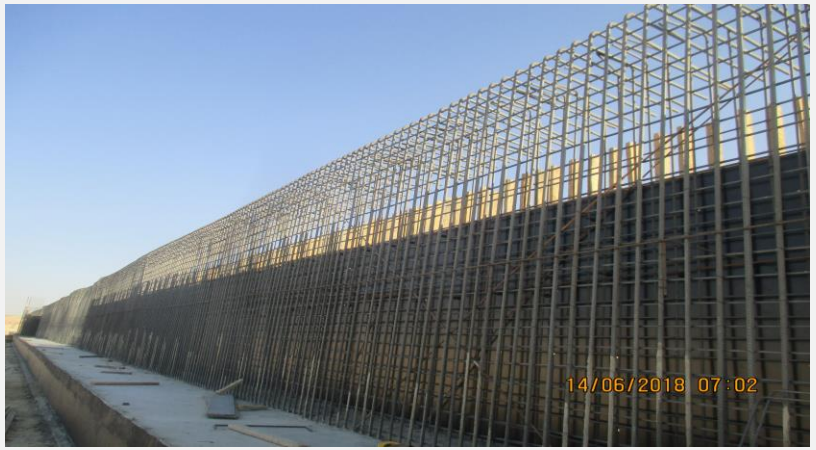
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08/08/2018 16:14


23/09/2018 17:09


04/10/2018 09:53


04/10/2018 09:54


02/10/2018 13:34


02/10/2018 13:38


05/08/2018 15:26


06/08/2018 11:04


05/08/2018 10:20


25/08/2018 16:40


02/10/2018 13:43


02/10/2018 13:52


29/09/2018 11:02

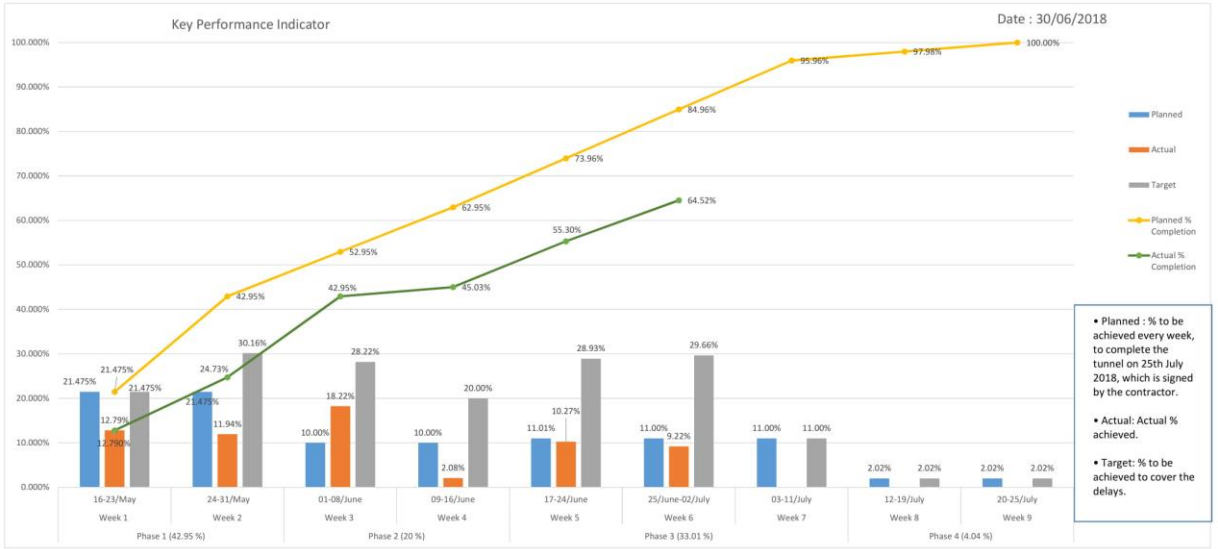
- Progress monitor form:

AL Own BCM Join Venture

Tunnel Project		Daily Control Sheet				Date:	30/06/2018
Phase	Unit	Daily Quantity	Cumulative Quantity	BOQ Quantity	Modified BOQ Quantity	Actual Quantity	% Completed
Blinding Concrete	m^3		86.000	104	104	86	100.00%
Formwork For Foundation	m^2		257.720	257.72	257.72	257.720	100.00%
Foundation Reinforcement	Tons		145.524	142.23	144.474	145.524	100.00%
Foundation Concrete	m^3		1118.000	1158.72	1134.38	1118	100.00%
Walls Reinforcement	Tons	4.438	25.167	49	49	54.618	46.08%
Walls Formwork	m^2	0.000	787.306	1668	1668	1945.524	40.47%
Walls Concrete	m^3	0.000	285.820	708.90	708.90	741.20	38.56%
Top Slab Formwork	m^2	0.000	374.169	917.40	917.40	931.34	40.18%
Top Slab Reinforcement	Tons	0.000	19.704	49.40	49.40	48.50	40.63%
Top Slab Concrete	m^3	0.000	311.920	779.79	779.79	782.060	39.88%
Expansion Joint For Walls	m	0.000	1.800	36	36	24	7.50%
Expansion Joint For Top Slab	m	0.000	1.980	39.60	39.60	26.40	7.50%
Waterproofing For Foundation	m^2	86.651	341.107	683.72	683.72	669.62	50.94%
Waterproofing For Walls	m^2	0.000	163.464	834	834	903.006	18.10%
Waterproofing For Top Slab	m^2	0.000	23.155	1153.70	1153.70	1153.70	2.01%

Blinding % Completed	100.00%
Foundation % Completed	97.55%
Walls % Completed	38.06%
Slab % Completed	36.61%
Project % Completed	**64.52%**
Delays	**-20.44%**

Dismantling walls outer formwork for segment 3 / Steel fixing for segment 2 south wall / bitumen paint for segment 1 top foundation / repair started for inner walls at segment 1.



End of June 2018

AL Own BCM Join Venture

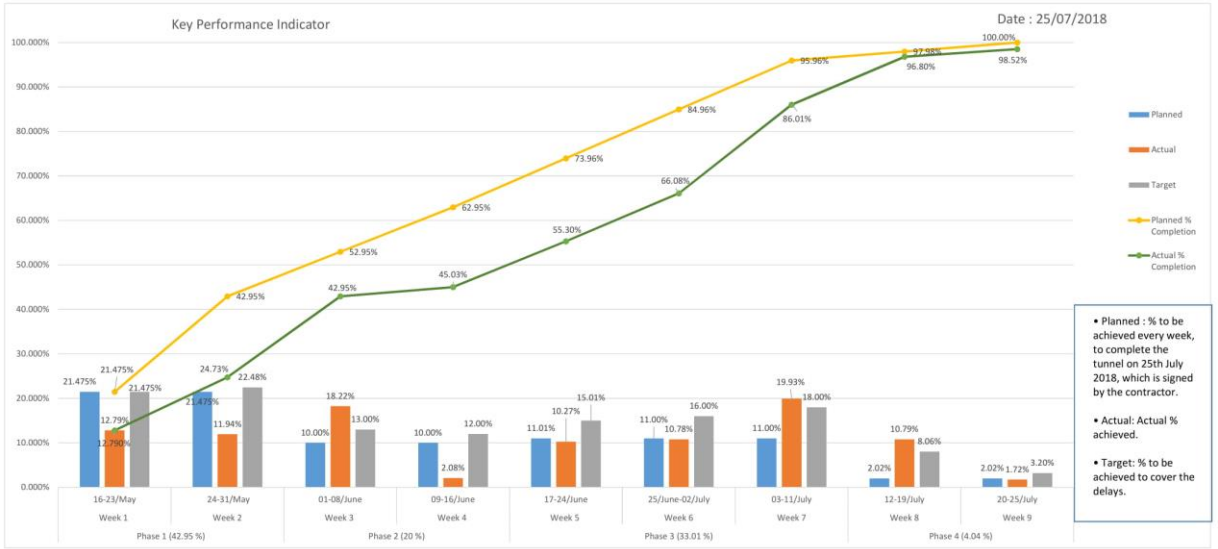
Tunnel Project		Daily Control Sheet				Date:	25/07/2018
Phase	Unit	Daily Quantity	Cumulative Quantity	BOQ Quantity	Modified BOQ Quantity	Actual Quantity	% Completed
Blinding Concrete	m^3		86.000	104	104	86	100.00%
Formwork For Foundation	m^2		257.720	257.72	257.72	257.720	100.00%
Foundation Reinforcement	Tons		145.524	142.23	144.474	145.524	100.00%
Foundation Concrete	m^3		1118.000	1158.72	1134.38	1118	100.00%
Walls Reinforcement	Tons	0.158	54.619	49	49	54.618	100.00%
Walls Formwork	m^2	45.300	1945.524	1668	1668	1945.524	100.00%
Walls Concrete	m^3	0.000	723.160	708.90	708.90	742.70	97.37%
Top Slab Formwork	m^2		931.341	917.40	917.40	931.34	100.00%
Top Slab Reinforcement	Tons		48.498	49.40	49.40	48.50	100.00%
Top Slab Concrete	m^3		789.840	779.79	779.79	789.840	100.00%
Expansion Joint For Walls	m	1.800	20.400	36	36	24	85.00%
Expansion Joint For Top Slab	m	0.000	18.480	39.60	39.60	26.40	70.00%
Waterproofing For Foundation	m^2		669.620	683.72	683.72	669.62	100.00%
Waterproofing For Walls	m^2	0.000	834.998	834	834	903.006	92.47%
Waterproofing For Top Slab	m^2	185.374	765.548	1153.70	1153.70	1153.70	66.36%

Blinding % Completed	100.00%
Foundation % Completed	100.00%
Walls % Completed	97.82%
Slab % Completed	96.82%
Project % Completed except wing walls	98.52%
% ahead of Schedule	-1.48%

Today's works

Finishing off the formworks and rebar works for tunnel's egress / closing formworks for sout wing walls after inspection / finishing off the bitumen paint for segfment 4 and 5 top slabs / sealant and packing rods application for walls expansion joints.

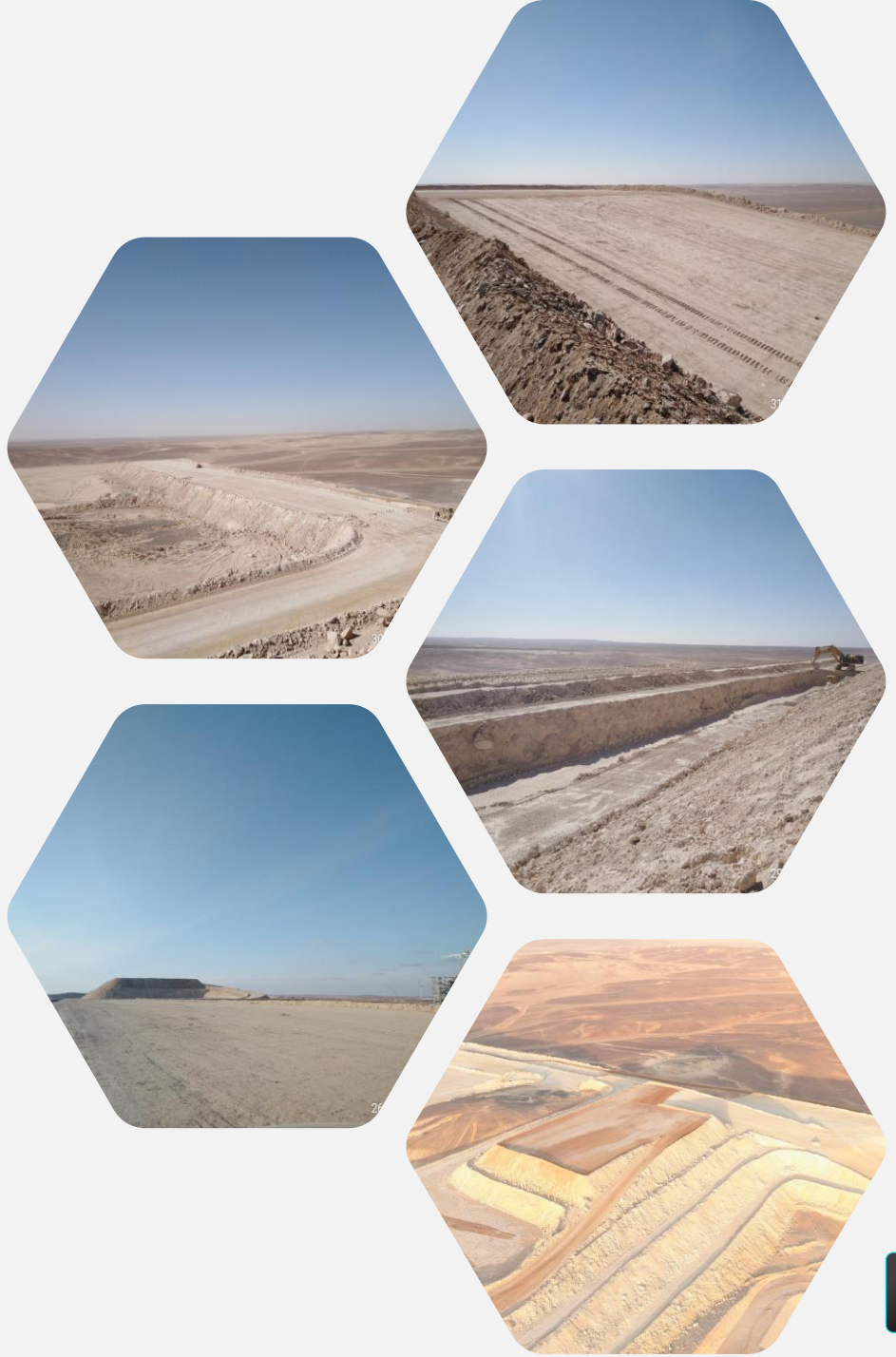
WING WALLS	TOTAL QTY	AVHIEVED QTY	% ACHIEVED
BLINDING	13.000	13.000	100.00%
FORMWORK	375.882	138.131	36.75%
REBAR	11.725	9.522	81.21%
CONCRETE	122.298	52.878	43.24%
BITUMEN	251.584	0.000	0.00%
JOINTS	21.614	10.807	50.00%
WING WALLS TOTAL ACHIEVED			57.63%



End of July 2018

4.3.2 Ash Spreader Assembly Pads Construction Phase (Completion Date: 16th November 2018)

- The Ash Spreader Assembly Pads construction commenced on October 2017 and completed before 16th November 2018, except for the water drainage which were considered as a snag.
- It was agreed that the NGL will stay as it is prior to start dumping, since it will be more stable rather than disturb it.
- Each month, we had a specific area to dump, according to the dispatch instructions.
- Ash spreader Assembly Pads had been constructed following the method statement (one-meter-compacted and tested layers). The tests were performed on each layer, using the plate bearing method.
- Ash spreader assembly pads could be divided to segments as follows:
  - Assembly Pads at 832 a.s.l.
  - Assembly Pads at 854 a.sl.
  - Drainage system which included: Water Ditches, water basin, and water pipelines.
  - Stackers area at elevation 832 a.s.l.
  - Area surrounded the water basin at 820 a.s.l.
  - Access roads at 820 a.s.l and 832 a.s.l
  - Ramps:
    - Ramp 2.1 from the tunnel area (810 a.s.l) up to 820 a.s.l.
    - Ramp 2.2 from 820 a.s.l up to 832 a.s.l, on the east side.
    - Ramp 1.2 from the power plant to 832 a.s.l, on the west side.
    - Ramp 2.2 from 832 a.s.l to the assembly pad at 854 a.s.l, on the west side.
    - Ramp 3.1 from assembly pad at 832 a.s.l. up to assembly pad at 854 a.s.l.



- As mentioned previously, the ash spreader assembly pads were constructed by one-meter-layers, following each month despatch instructions, in line with ramps construction.
- Each layer was watered, compacted, and tested using plate bearing test method.
- The bearing capacity of the assembly areas at 832 a.s.l and 854 a.s.l were checked on site, to make sure there is a minimum bearing capacity of 1.16 kg/cm² for 200 tons crawler crane. The actual bearing capacity was 1.8 kg/cm².
- Part of the water ditches was executed, which is within the ash spreader assembly area limits. The eastern ditch area was dumped up to 820 a.s.l, and excavated to the required elevations according to the design. However, part of the western ditch N.G.L required to be excavated, hence, it was blasted then excavated to the required elevations.
- The pipelines were laid and fixed after the completion of the area and the ditches. Rubber ring method was followed for the pipes jointing.
- The pipelines constructed below ground where there is a traffic access, or ash stackers. The depth between the pipe and the ground surface is minimum one meter. Single size sand bedding was used below, around, and above the pipeline.
- Steel casing pipe used where the UPVC pipes are getting through the ramps (ramps 1.2 and 2.2). The UPVC pipe was pushed inside the steel casing. Flexible flange used on both sides of the steel casing pipes to connect the UPVC.
- Steel supports were fixed along the pipelines, thrust blocks were casted at the elbows.
- The aboveground pipeline was covered with sand for protection.


28/09/2017 09:02


02/10/2017 11:04


07/11/2017 16:56


30/12/2017 08:52


05/02/2018 08:41


03/03/2018 10:48


29/10/2018 09:34 AM


31/12/2018 08:39 AM


03/01/2019 08:52 AM


19/01/2019 09:54 AM


14/02/2019 10:28 AM


24/02/2019 02:24 PM


02/03/2019 10:19 AM


03/03/2019 02:04 PM


09/03/2019 10:01 AM

4.3.3 Haul Roads (2,4,5,8, Completion date: 16-Sept-2018) (12 & 13 Completion date: 16-June-2019)

- On August 2018, construction works started at roads 2, 4, 5, and 8, and completed by end of September 2018, with snags.
- On February 2019, construction of roads 12 & 13 started, and it is still under process, to be completed by mid of April 2019 (two months ahead of schedule).
- Wadi materials have been screened and stocked, mixed with water in place, and then moved to the roads for the sub-base layer (350 mm thick).
- For the base course layer, a mix design was followed to mix screened Wadi materials with crushed aggregate. These materials have been mixed with water and moved to the roads to construct a layer of 200 mm thick.
- For the running course layer, crushed aggregate have been mixed with water, and then moved to the roads to construct a layer of 150 mm thick.
- Before starting construction of each road, a sample of each material used to be collected from the stocks, to make sure that it complies with the design parameters and mix ratios.
- Each layer was built with a super elevation of 1.5% towards one side.
- Each layer was tested every 100 meters, using sand replacement method.
- Safety berms have been constructed to the sides of each road, keeping the minimum road width required. The minimum height for the safety berms was 1.72 meters. Also a drainage channel has been shaped to the lowest side of each road, to collect rain water.
- Main ramp road Has not started yet.


42
29/08/2018 08:22


03/09/2018 15:51

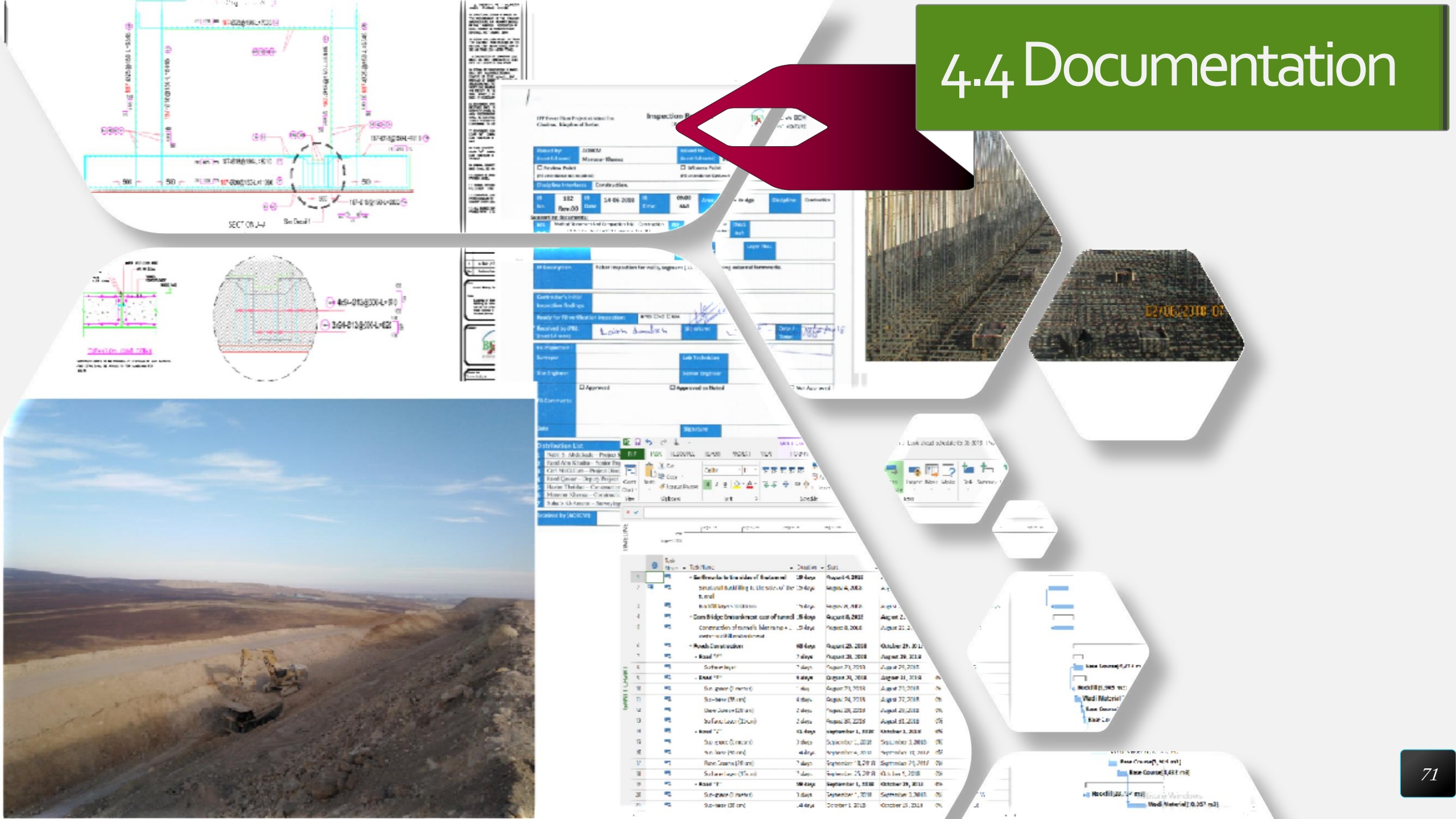

03/09/2018 16:03


08/09/2018 16:07


09/09/2018 15:00


15/09/2018 11:10

4.4 Documentation



- In this section, we'll go a brief summary about the documentations, related to the JV internally, and between the JV and the client and/or the owner representative.
- Below is a list of the documentation which occurred between the JV and other parties:

1. Letters (Between AOBCM and Faris Bagaeen, AMCO, and APCO.

   Number of letters between all parties so far which related to construction is around 200.

2. Contractor Submittals: which included drawings and material approval requests.

   Number of submittals between all parties so far which related to construction is around 31 excluding the number of revisions.

3. Inspection requests: To hand over each and every item on site.

   Number of submittals between all parties so far which related to construction is around 430 excluding the number of revisions.

4. Daily Report: Reporting construction progress day by day.

5. Monthly Report: Reporting construction progress during the month.

6. Annual Report: Reporting construction progress during the year.

7. Monthly three-month-look-ahead schedule: Reporting the JV construction plan for the next three months.

Al Own Advanced AL Own BCM Join Venture

Date: Ref:SPH/MJQP/BN (12082015/21082017/029)

Attention:

Project: **Shale Fired Mine. IPP Power Plant Project at Attrat Um Ghudran,Mashemite. Kingdom of Jordan. Contract Number SPH/MJQP/BN (12082015)**

Subject:

Dear Sir,

Yours Faithfully.

Project Director.

Enc:

1 Copy:

File: Office.

Letters Template

Letters Template

IPP Power Plant Project at Attrat Um Ghudran, Kingdom of Jordan

Inspection Request

(IR form)

AL OWN BCM JOINT VENTURE

Raised by: (insert full name)	AOBCM Mansour Khzouz			Issued to: (insert full name)	FB Raed Abu Khadra		
☐ Review Point (FB attendance not required)		☐ Witness Point (FB attendance Optional)			■ Hold Point (FB attendance Required)		
Discipline Interfaces	Construction, Mining, Surveying						
IR No.	310 Rev.00	IR Date	19-08-2018	IR Time:	12:00 PM	Area:	Dam Bridge
Discipline:	Construction						

Supporting documents:

MS Ref:	Method Statement And Compaction Trial - Construction Of Ash Pad And Rockfill Causeway Rev.003	ITP Ref:	Material Test Plan and Implementation	DWG Ref:	
Location:	Tunnel's sides backfilling	Level:		Layer No.:	3 & 4
IR Description:	Compaction test for 3rd and 4th layers of screened Wadi materials, to the south of the tunnel and wing walls.				
Contractor's Initial Inspection findings:					
Ready for FB verification inspection:	■YES ☐NO ☐N/A				
Received by (FB): (insert full name)	NASSEL	Signature:		Date / Time:	19/8/2018

Received Date:

FB Inspection :			
Surveyor		Lab Technician	
Site Engineer		Senior Engineer	
FB Comments:	☐ Approved ☐ Approved as Noted ☐ Not Approved		
Date		Signature	

Distribution List	
1	Nabil S. Abdelkader – Project Manager. (FARIS BAGAEEN) n.abdelkader@fb-architects.com
2	Raed Abu Khadra– S
3	Carl MacCallum – Pr
4	Raed Qassar – Deput
6	Mansour Khzouz – C
7	Suhaib Al-Amarat – Surveying Engineer (AL O

Received by (AOBCM):

Page 1 of 1

Inspection Requests Template

Inspection Requests Template

CONTRACTOR'S SUBMITTAL

PROJECT NAME	PROJECT CONTRACTOR	EMP. REPRESENTITIVE	PAGE
SHALE FIRED MINE, IPP POWER PLANT PROJECT AT ATTARAT UM GHUDRAN, HASHEMITE KINGDOM OF JORDAN.	AL OWN BCM JOINT VENTURE	FARIS BAGAEEN ARCHITECTS ENGINNERS CONSULTANTS	01 OF 01
DATE: 31st January, 2019	ADDRESS : First floor, 32 Saad bin Abee Waqqas Street, Um Othinah, Amman, Jordan.	ADDRESS: Umm Dorman St 2, Amman, Jordan	DESIGN DRAWING ☒ / SHOP DRAWING ☐ / REPORT ☐ / CALCULATION ☒ / MATERIAL APPROVAL REQUEST ☐ / AS BUILT ☐
SUBMITTAL NUMBER: AOBCM – FB – SUBMITTAL – 029 - REV.00			DRAFT SUBMITTAL ☒ / FINAL SUBMITTAL ☐ / SAMPLE ☐
Roads 12 & 13 Design Drawings			

ITEM NO.	DESCRIPTION	PAGES	SIZE	COPIES	REVISION NUMBER	FB REVIEW	APPROVED			RESUBMIT		COMMENT NUMBER
							YES	AS NOTED	NO	YES	NO	DETAILS/OVER
01	CVL-PP-006	7	A3	1	A							
02	CVL-CS-006	2	A3	1	A							
03	Stopping Distance Calculations		A4	1	A							

SUBMITTED- AOBCM: ..... DATE: 29.1.2019

RECEIVED – FB: ..... DATE: 2/2/2019

ISSUED – FB: ..... DATE: .....

RECEIVED – AOBCM: ..... DATE: .....

Contractor Submittal Template

AL OWN BCM JOINT VENTURE

Level 1, 28 Road Ben AbiWaqqas, Umm Uthaina, Amman 11195, Jordan

Supply of Mining Services Relating to Mining Operations for an Oil Shale Fired Power Plant Located at Attarat Um Ghudran, Jordan

Contractor: Al Own BCM Joint Venture

Principal: Attarat Mining Company B.V.

Date: 01-04-2019

Report No: 640

Prepared By	Approved By
Mansour Khzouz. *Construction Field Engineer.*	Raed Qassar. *Deputy Project Manager.*

Distribution	(Distributed by Qutaiba Hanaktah)
1	Allan Mor
2	Raed Qass
3	Mohamma
4	Qutaiba Hanaktah –

Daily Report No. 640 01-April-2019
Construction Department

Daily Report Template

5. Surveying

5.1 Introduction

- What Is Surveying ?

Surveying is the science and art of making all essential measurements to determine the relative position of points or physical and cultural details above, on or beneath the surface of the Earth, and to depict them in a usable form, or to establish the position of points or details.

- Why Do we need Surveyors on mining industry ?

Surveyors in the mining industry fulfil an essential function, since they provide indispensable information to all other mining disciplines.

Mining surveyors are responsible for the accurate measurement of areas and volumes mined, design plans analyzing ,designing mine bench's in some occasions, plus the precise representation of the surface and underground situation on mining plans.

5.2 ALOWN BCM Surveying Department.

- ## 5.2.1: The Establishing of this Department

Al OWN BCM Surveying department have been established with the beginning of AL OWN BCM JV works at Attarat Um Al Ghudran Oil shale Deposit (Oil Shale Fired Mine, IPP Power Plant Project) at the Hashemite Kingdom of Jordan on July 2017, started with one Surveying Engineer, and then 3 more brilliant Surveyors joined during the last two years.

- ## 5.2.2: Responsibilities of Surveying Department at Al OWN BCM JV

  - Tracking the Progress of the Mining Operations and the Extension of mine bench's.
  - Drill holes marking.
  - Marking all the design limits for the mining areas.
  - Controlling the Dumping Areas based on Designs.
  - Controlling the construction of mine pit side slops.
  - Working on the construction of the mining ramps and Roads.
  - Tracking the Extraction and dumping processes for oil shale.
  - Cover up any changes on the topography with in the mine limits.
  - Full survey for the mining Area for the volume Calculations.

- 5.2.3: Mining Progress Tracking

  - On the time being our mining Pit is around 900,000 m2 , with the fact of 8 benches which require continuous follow up during the operation time, taking into consideration that the works within the mining area is controlled by monthly Dispatch issued by the client, which puts the guidelines and limits for each bench, within a specific design, in line with the design volumes distribution.

- 5.2.4: Drill Holes Marking

  - Under the cooperation between the surveying team and the drilling & blasting team, it's required from the surveying team marking the drill holes based on a drill pattern, designed by the drilling engineer, and within the month dispatch limits.

  - Also it's required to mark the sampling holes as agreed with the client, especially within the areas that join oil shale layers.

- 5.2.5: Marking the Dispatch design Guide Limits

  - At the Start up of each month, the client usually sends to the JV a layout plan, involves the design for the required progress on each bench, and the related Dumping Areas. These monthly plans are created based on an annual plan delivered on march of the previous contractual year.

    The surveying team has to mark the crust and toe of each bench sides as per the plans, and make sure that the mining team stuck with the limits.

    Also the same is required for the limits of the dumping Areas.

- 5.2.6: Controlling the Dumping Areas and procedures

One of the most important parts with in our project is the Earthworks, which are created using the overburden materials extracted from the mining pit.

In this project, all the overburden materials are used to create important earthworks, represents huge part of the power plant related infrastructures, such as Ash pads, Ash spreader assembly areas, road sub grade layers, dam bridge, Irish bridges, stockpile yards, and protective barriers.

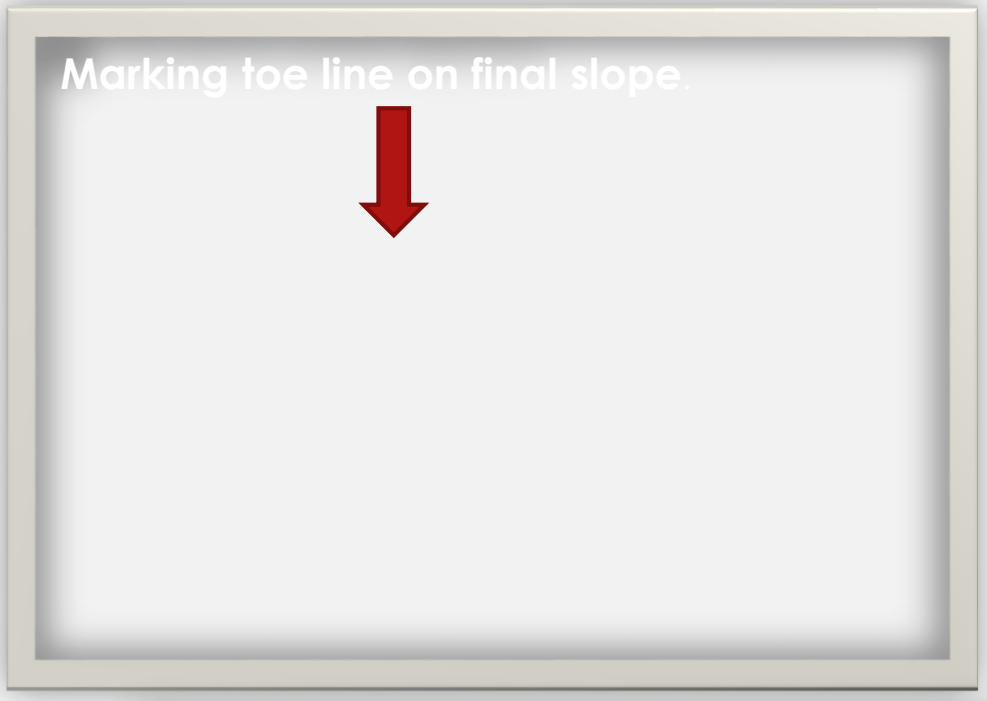
The surveying team is reasonable of the marking for the design breaker lines, and controlling the construction of these earthworks based on the design requirements .

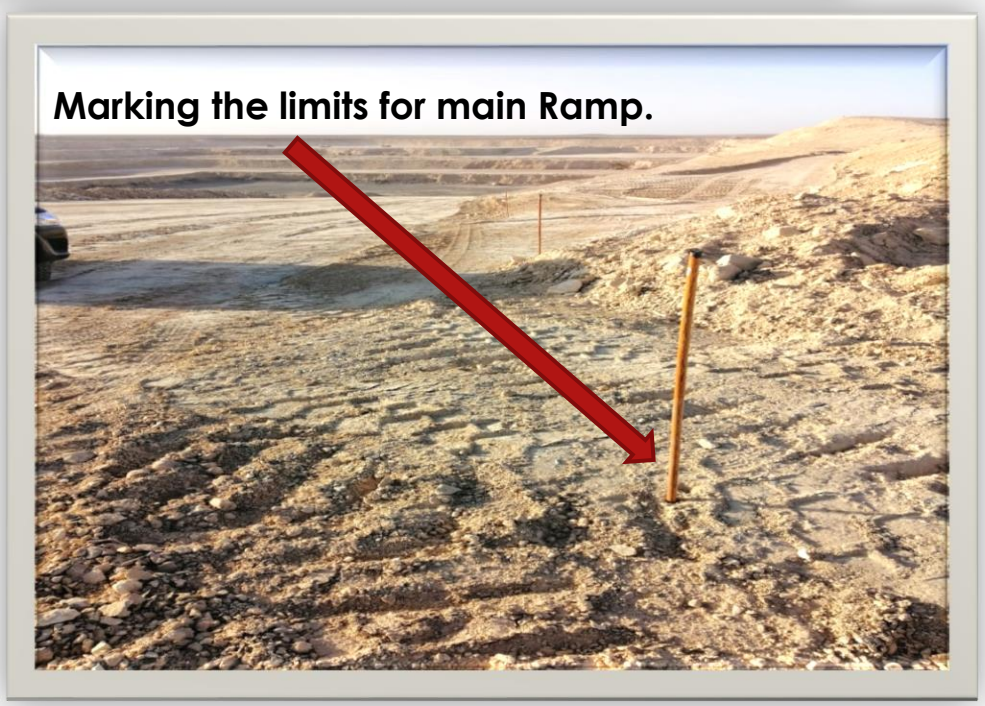
- 5.2.7: Controlling Constructing side slopes and ramps

  - The Design of the mining pit includes creating slopes with different angels (34 and 18.4 degrees), and a number of permanent and temporary Ramps, in addition to a main ramp around 700 m length.

  - These construction Items need continues supervision from the surveying team, to make sure that these items have been constructed based on design limits, and to make it easier for the mining team.

  - This process requires in some cases the presence of surveyor on the site and supervise the operations





- 5.2.8: Tracking the Extraction and Dumping of oil Shale

  - In this Mining site there is separated benches for oil shale. Under the supervision of the client, the work procedure on these benches goes under some specifications, related to the slopes and levels of extraction, before and after we hit the oil shale layer, especially with the existence of few thin layers of weathered oil shale and overburden within the bench, which requires different work procedure and continues survey supervision.

- ## 5.2.9: Cover Up the changes on topography and full End of month Survey

  - One of the Major jobs that totally goes under the surveying scope of work, is the End of month Survey and Volumetric calculations.

  - It is required from the surveying engineer to give a volumes report by the end of each month, based on the results of the survey, using the Auto plan software to Make the calculations, in addition to the distribution of the quantities based on the hauling routs, and connecting each quantity with the related extraction point and delivery point.

  - During the works within the mining Acquisition area, if AL OWN BCM team or any of his Sub-Contractors have made any changes on the surveyed areas of the topography, in a way that affects the volume calculations, or makes a deflection between the plans and the actual situation on the ground, It is required from the surveying Team to cover up any changes on the topography, jointly with the client surveyors, and reflect that on the plans and the origin DTM, that is usually being used in the volumes calculations

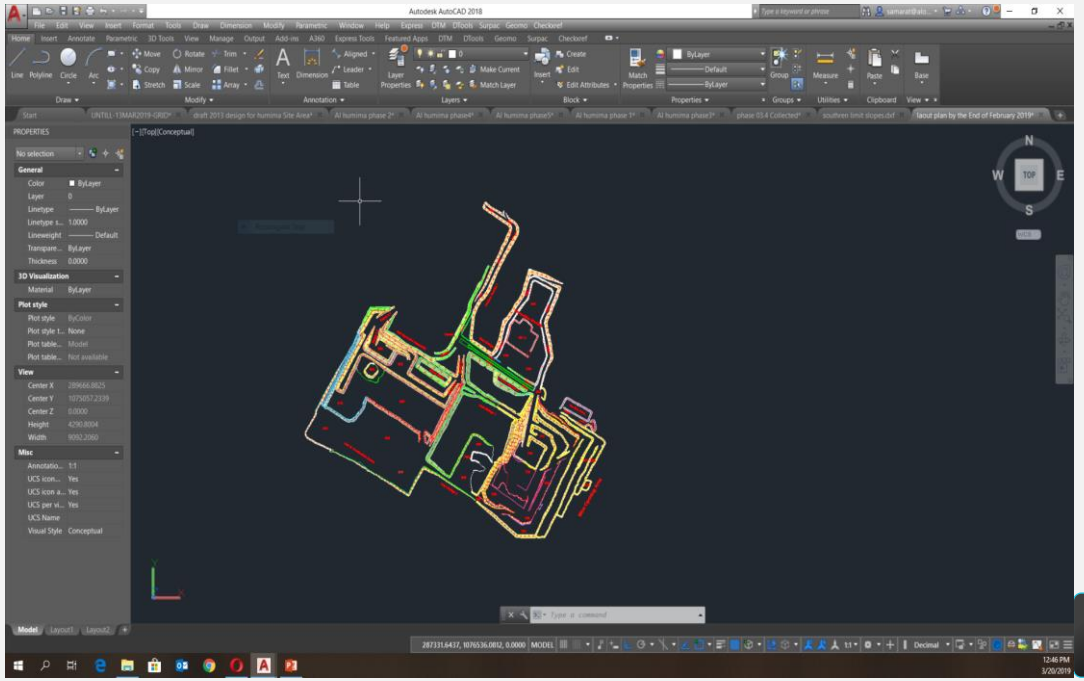
- ## 5.2.10: Planning and designing

  - The surveying Department is responsible of delivering representative plans to the project management and other departments, in Order to make the decision making easier for each of them, and to follow up the changes on site.

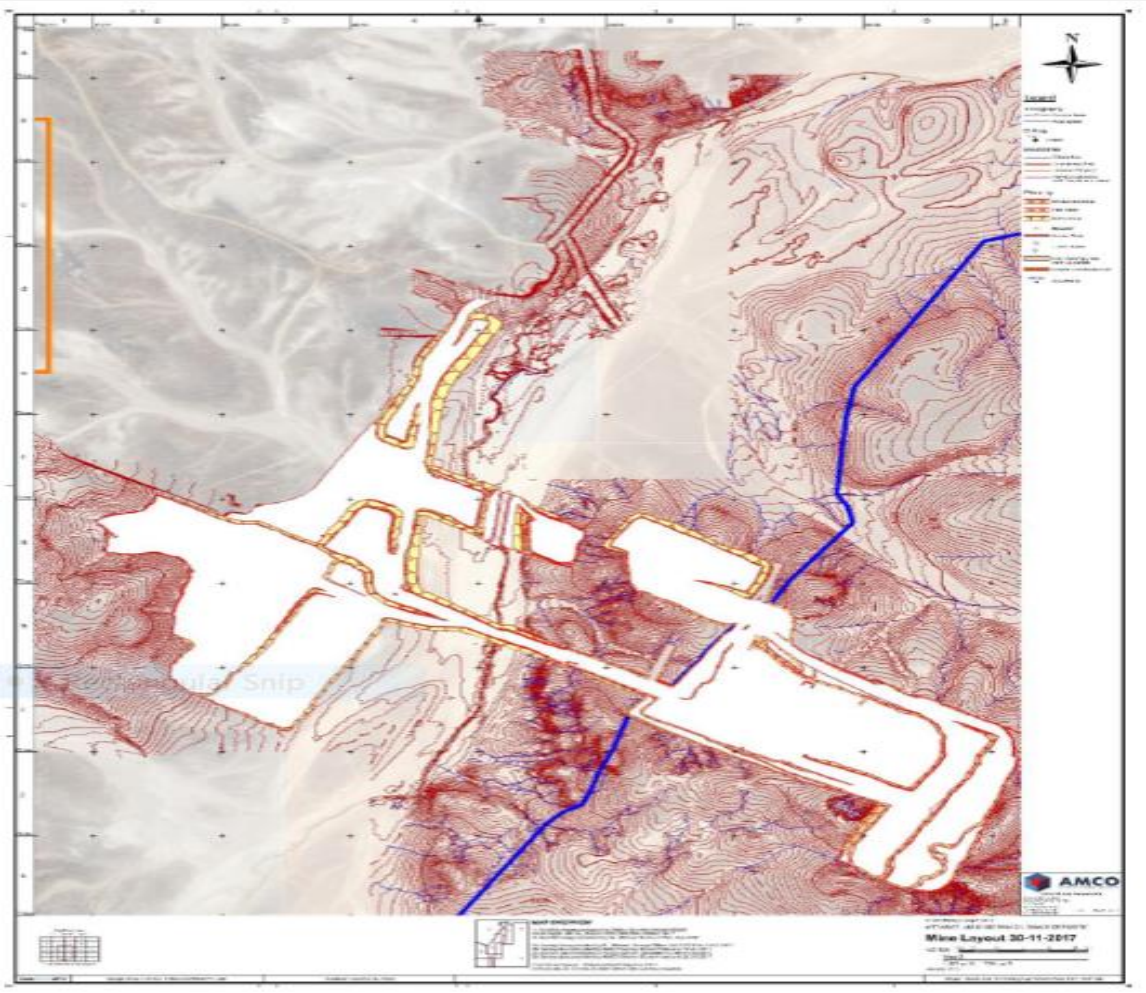
  - These plans might be based on dispatch instructions, design drawings related to construction plans for the surveyed areas during the month in specific cases, to make specific decisions. In addition to the as-built drawings for the practical completion of the construction items.

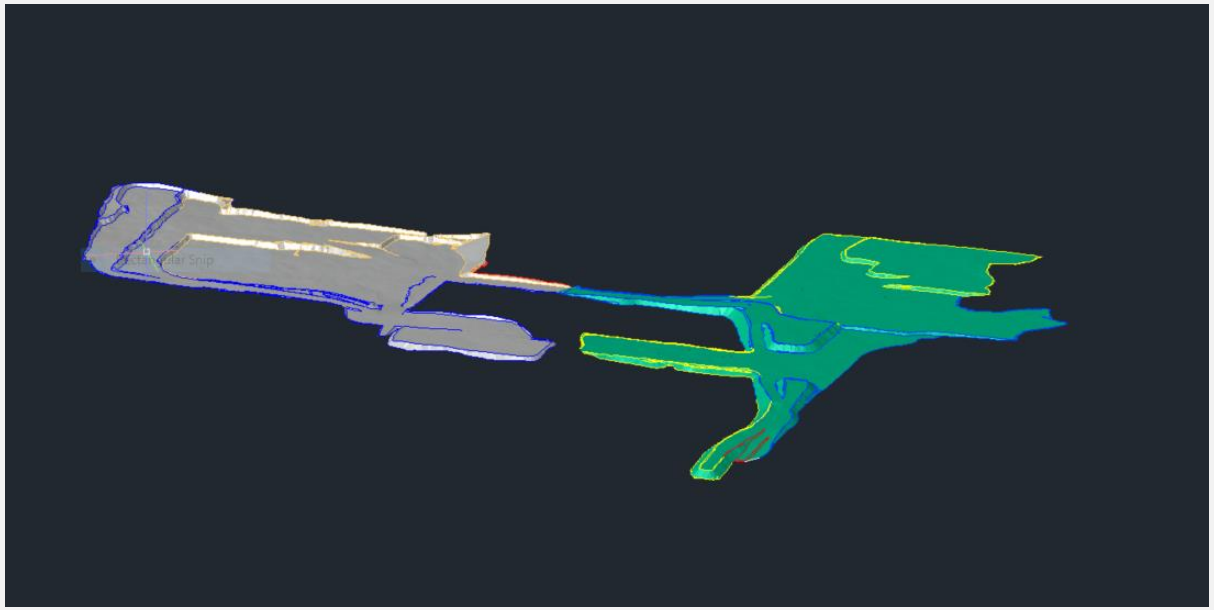
  - In some cases, it is required from the surveying department to make some designs to introduce proposals to the client, in order to make changes on their designs, in a way that helps the production on site, or make proposals to start extraction and dumping, in areas that are not within the client dispatch. At the same time, it helps us with our work progress.

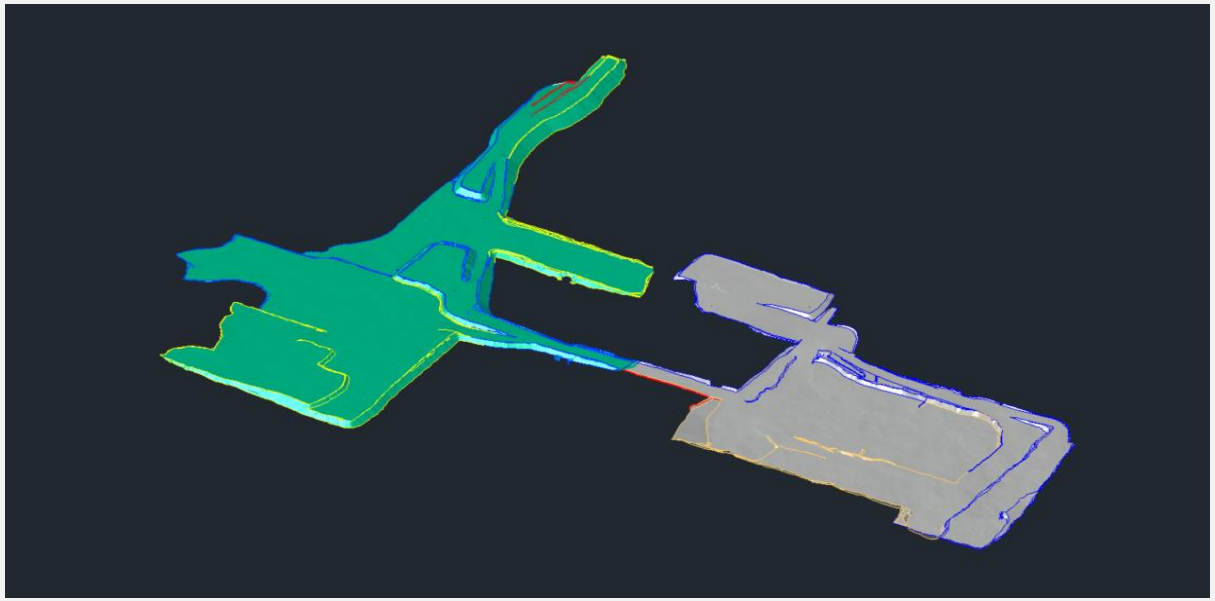
  - The plans that is introduced from the surveying Department is created using Auto Plan software.



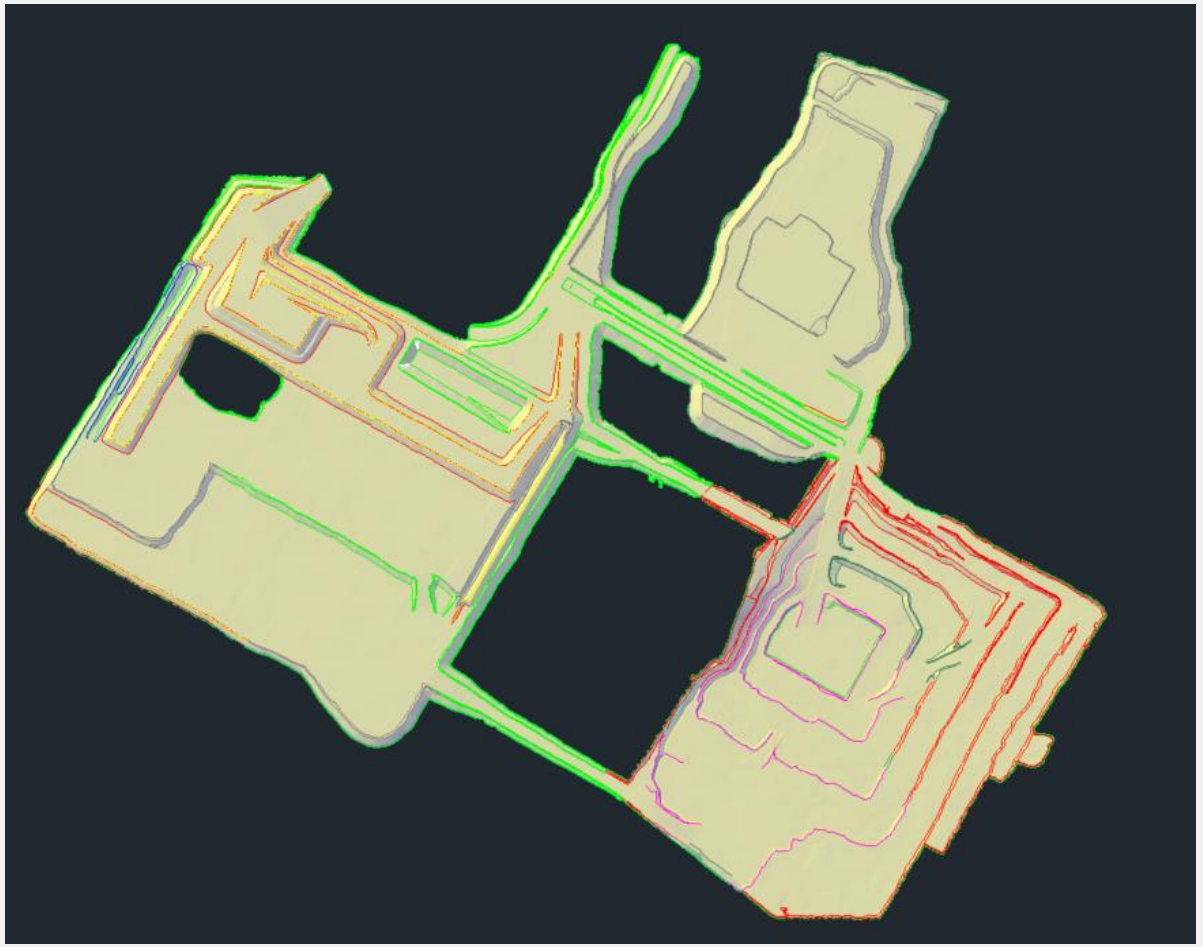
5.3 Over View on the Pit Progress During the Last two Years



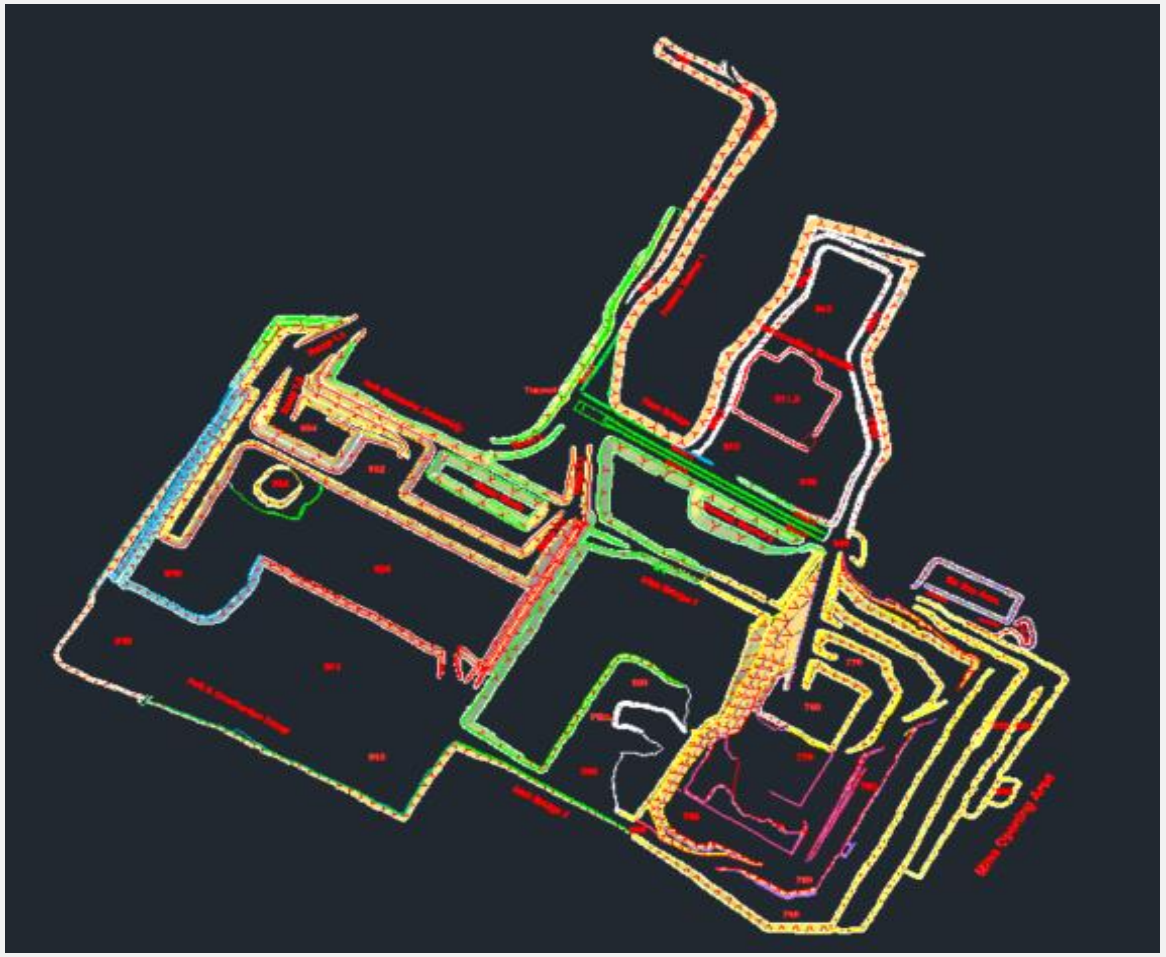


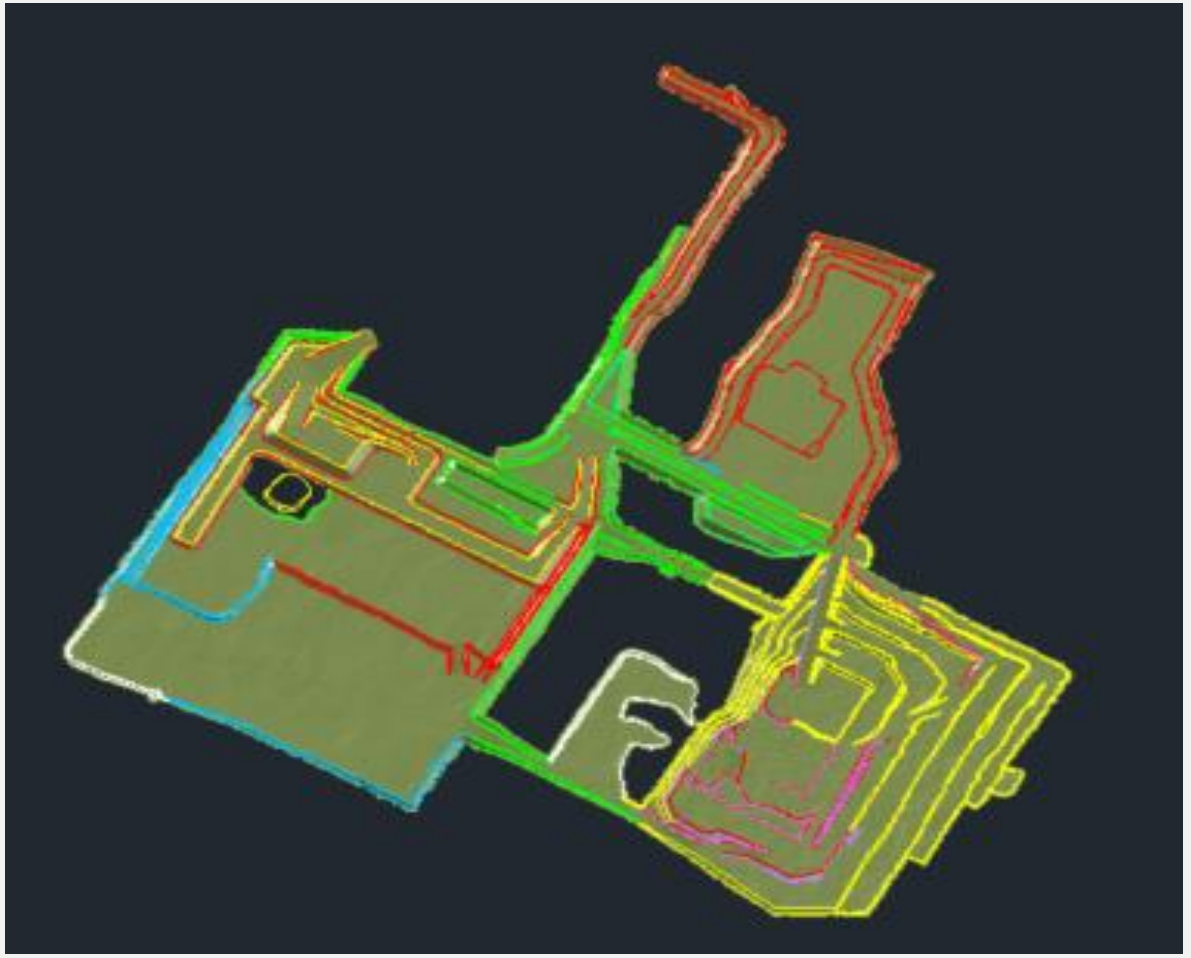


End of 2017



End of 2018





End of February, 2019

6. Administration & Logistics

- The main temporary items that have been established and mobilized by the JV, related to mobilization & logistics, are as follows:

  (Note: All of them shall be made available until (effective date + 30 months; September 2019), since by then, the JV staff will move to the permanent facilities, which will be provided and supplied by the owner)

  - Camp (prefabricated), including:

    - Managerial dormitory.
    - Engineers dormitory.
    - Labours dormitory.
    - Supervisors dormitory.
    - Dormitory for AMCO.
    - kitchen & dining halls.
    - Mosque.
    - Offices.
    - Security room.

The camp is provided with a lot of facilities, such as: solar panels lighting, water boilers, AC for each room, fridge containers, waste container, asphalt yard including parking areas, septic tank, fire fighting and fire alarm systems, pressurized water lines connected to tanks, filtration, chlorination, and RO units for water treatment, and generators.

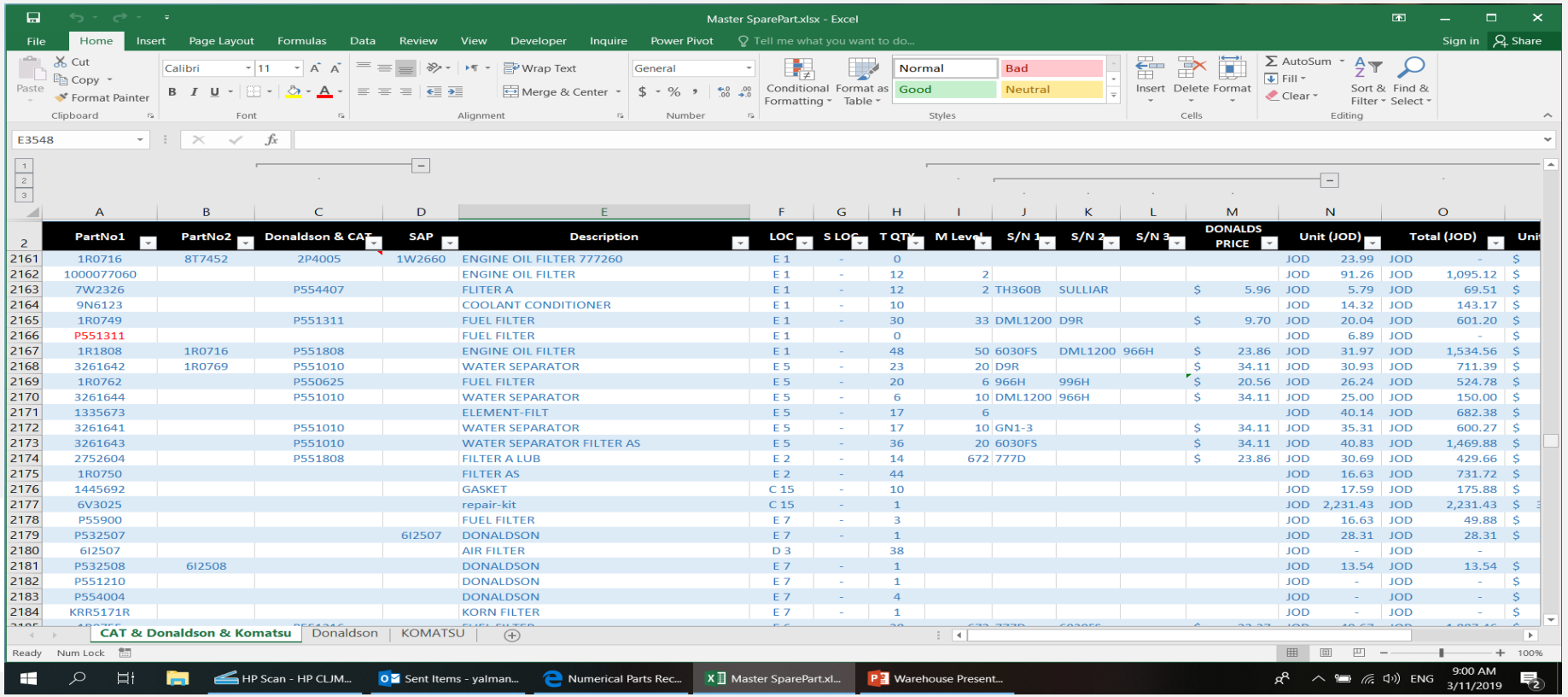
- Temporary offices (Prefabricated).
  - Two prefabricated units, used by the JV and AMCO staffs.
  - Parking area.
  - Small yard with solar panels lighting.

- Temporary workshop (Steel structure).
  - Maintenance pad.
  - Two rooms for storage.
  - Offices on the 2nd floor.

- Clinic (Prefabricated).
  - It is managed by professional medical company (capabilities Medical center company L.C.C). They provide integrated medical and health care, full physical examinations, and regular medical tests for the staff.
  - The clinic serves the project 24/7, following the highest health and safety international standards.
  - There is a brand new ambulance car, fully equipped with the most advanced medical equipments.

- Training center (Prefabricated).
  - Used by safety department, to do safety trainings and inductions.

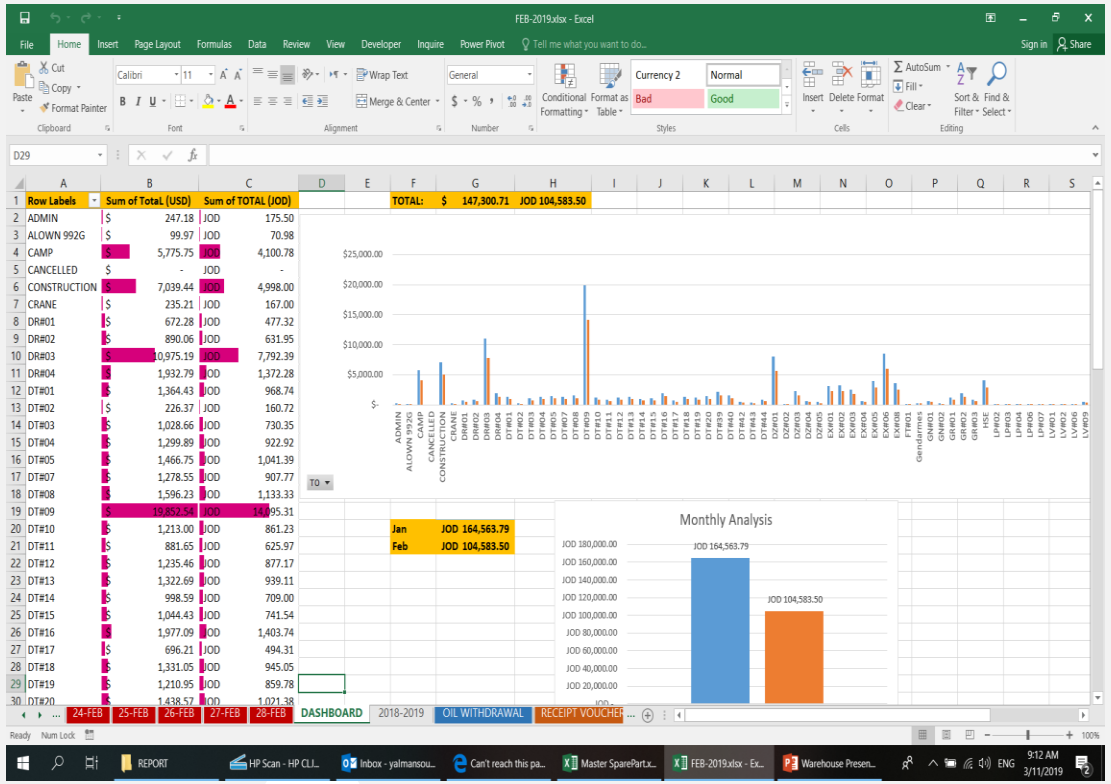
- Temporary warehouse (Steel structure).
  - The warehouse was built with racks for spare parts storage.
  - The mechanism of dealing with the stored part have been systemized in such a way that increases the warehouse efficiency, to provide good services to maintenance team, to finish their tasks with Zero wasted time.
  - The in-puts and out-puts are systemized in professional way, and archived with right documentation, per ISO 9001-2005, to provide the right data to our finance department with Zero error.
  - The parts are separated based on size and part number.
  - The location of parts are being documented suing excel. Also, the excel sheet includes data such as the logs, price JD/$, description, and the alternative numbers from JETC.



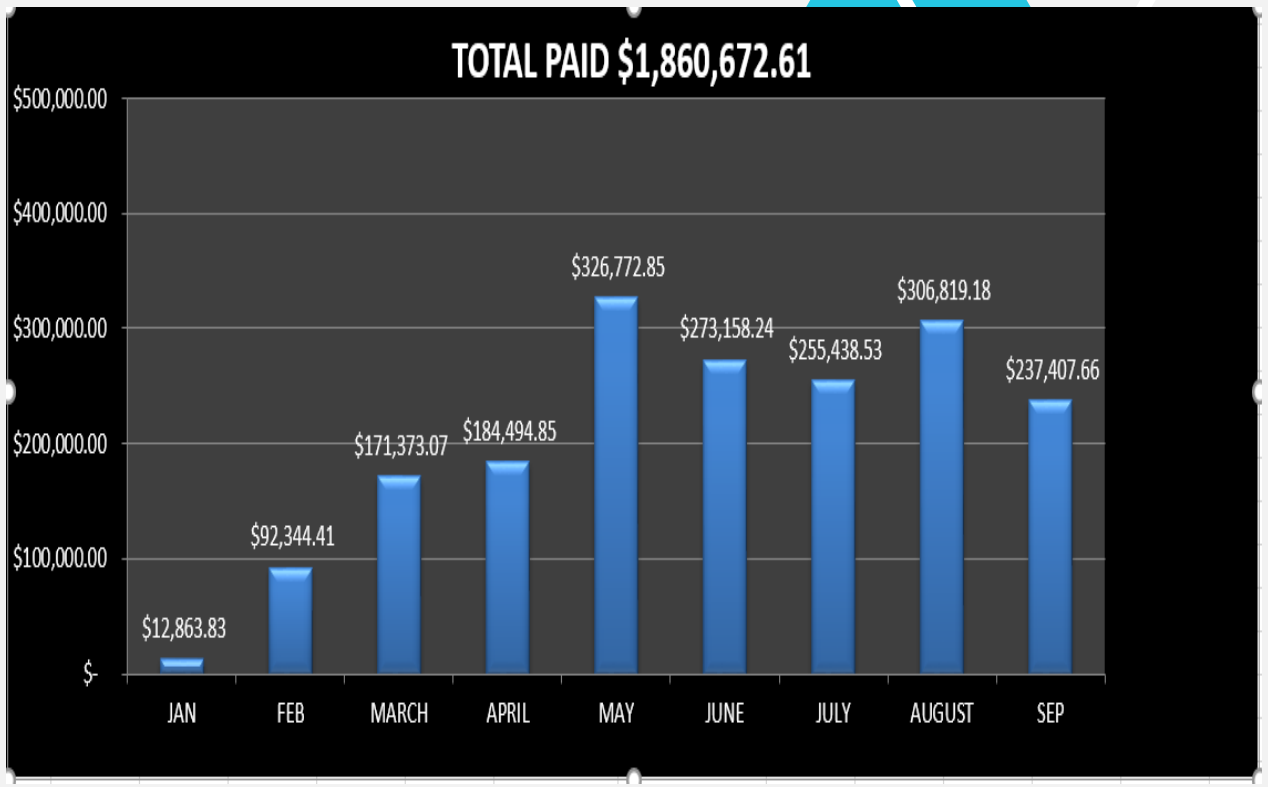
	PartNo1	PartNo2	Donaldson & CAT	SAP	Description	LOC	S LOC	T QTY	M Level	S/N 1	S/N 2	S/N 3	DONALDS PRICE	Unit (JOD)	Total (JOD)	Uni
2161	1R0716	8T7452	2P4005	1W2660	ENGINE OIL FILTER 777260	E 1	-	0						JOD 23.99	JOD -	$
2162	1000077060				ENGINE OIL FILTER	E 1	-	12	2					JOD 91.26	JOD 1,095.12	$
2163	7W2326		P554407		FLITER A	E 1	-	12	2	TH360B	SULLIAR		$ 5.96	JOD 5.79	JOD 69.51	$
2164	9N6123				COOLANT CONDITIONER	E 1	-	10						JOD 14.32	JOD 143.17	$
2165	1R0749		P551311		FUEL FILTER	E 1	-	30	33	DML1200	D9R		$ 9.70	JOD 20.04	JOD 601.20	$
2166	P551311				FUEL FILTER	E 1		0						JOD 6.89	JOD -	$
2167	1R1808	1R0716	P551808		ENGINE OIL FILTER	E 1	-	48	50	6030FS	DML1200	966H	$ 23.86	JOD 31.97	JOD 1,534.56	$
2168	3261642	1R0769	P551010		WATER SEPARATOR	E 5	-	23	20	D9R			$ 34.11	JOD 30.93	JOD 711.39	$
2169	1R0762		P550625		FUEL FILTER	E 5	-	20	6	966H	996H		$ 20.56	JOD 26.24	JOD 524.78	$
2170	3261644		P551010		WATER SEPARATOR	E 5	-	6	10	DML1200	966H		$ 34.11	JOD 25.00	JOD 150.00	$
2171	1335673				ELEMENT-FILT	E 5	-	17	6					JOD 40.14	JOD 682.38	$
2172	3261641		P551010		WATER SEPARATOR	E 5	-	17	10	GN1-3			$ 34.11	JOD 35.31	JOD 600.27	$
2173	3261643		P551010		WATER SEPARATOR FILTER AS	E 5	-	36	20	6030FS			$ 34.11	JOD 40.83	JOD 1,469.88	$
2174	2752604		P551808		FILTER A LUB	E 2	-	14	672	777D			$ 23.86	JOD 30.69	JOD 429.66	$
2175	1R0750				FILTER AS	E 2	-	44						JOD 16.63	JOD 731.72	$
2176	1445692				GASKET	C 15	-	10						JOD 17.59	JOD 175.88	$
2177	6V3025				repair-kit	C 15	-	1						JOD 2,231.43	JOD 2,231.43	$
2178	P55900				FUEL FILTER	E 7	-	3						JOD 16.63	JOD 49.88	$
2179	P532507			6I2507	DONALDSON	E 7	-	1						JOD 28.31	JOD 28.31	$
2180	6I2507				AIR FILTER	D 3		38						JOD -	JOD -	
2181	P532508	6I2508			DONALDSON	E 7	-	1						JOD 13.54	JOD 13.54	$
2182	P551210				DONALDSON	E 7	-	1						JOD -	JOD -	$
2183	P554004				DONALDSON	E 7	-	4						JOD -	JOD -	$
2184	KRR5171R				KORN FILTER	E 7	-	1						JOD -	JOD -	$

- As part of the warehouse / logistics scope of work, a Cost Centre has been established for each equipment and each department. Based on it, the gaps and errors are easily to be defined, based on their withdrawals analysis.

  The “aim” of this process is to forecast our yearly budget & decrease the payments, as we can see from below sheets.



Row Labels	Sum of TotaL (USD)	Sum of TOTAL (JOD)
ADMIN	$ 247.18	JOD 175.50
ALOWN 992G	$ 99.97	JOD 70.98
CAMP	$ 5,775.75	JOD 4,100.78
CANCELLED	$ -	JOD -
CONSTRUCTION	$ 7,039.44	JOD 4,998.00
CRANE	$ 235.21	JOD 167.00
DR#01	$ 672.28	JOD 477.32
DR#02	$ 890.06	JOD 631.95
DR#03	$ 10,975.19	JOD 7,792.39
DR#04	$ 1,932.79	JOD 1,372.28
DT#01	$ 1,364.43	JOD 968.74
DT#02	$ 226.37	JOD 160.72
DT#03	$ 1,028.66	JOD 730.35
DT#04	$ 1,299.89	JOD 922.92
DT#05	$ 1,466.75	JOD 1,041.39
DT#07	$ 1,278.55	JOD 907.77
DT#08	$ 1,596.23	JOD 1,133.33
DT#09	$ 19,852.54	JOD 14095.31
DT#10	$ 1,213.00	JOD 861.23
DT#11	$ 881.65	JOD 625.97
DT#12	$ 1,235.46	JOD 877.17
DT#13	$ 1,322.69	JOD 939.11
DT#14	$ 998.59	JOD 709.00
DT#15	$ 1,044.43	JOD 741.54
DT#16	$ 1,977.09	JOD 1,403.74
DT#17	$ 696.21	JOD 494.31
DT#18	$ 1,331.05	JOD 945.05
DT#19	$ 1,210.95	JOD 859.78
DT#20	$ 1,438.57	JOD 1,021.38



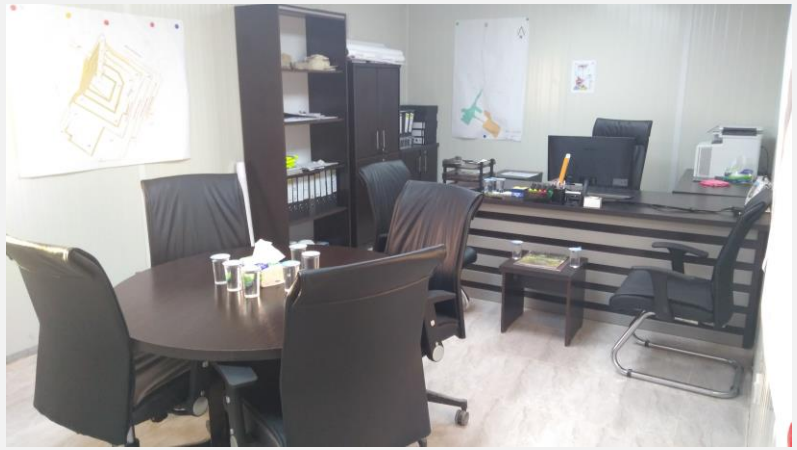
- A “Warehouse System Manual” “WSM” has been established per ISO 9001. This manual is a procedure for in-put and out-put data, which helps following the right procedures in such an accurate way.

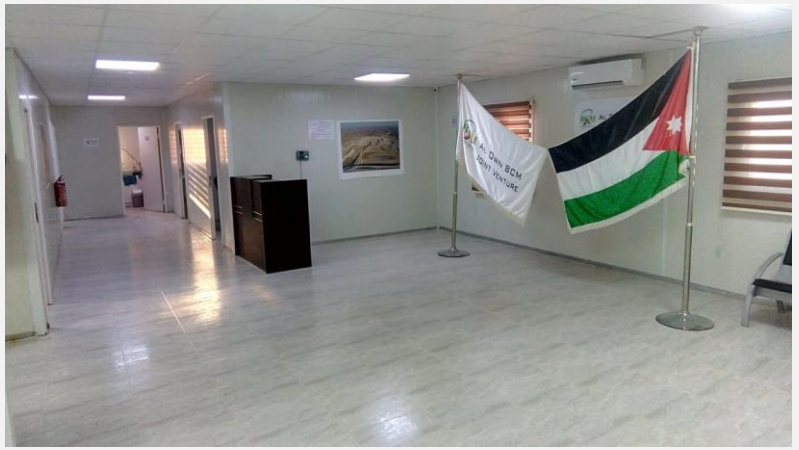
- Receipt procedure:
  1. Warehouse storekeeper receiving only items with PR/PO.
  2. Warehouse storekeeper receiving only items with official invoice from the supplier.
  3. Warehouse storekeeper must identical the quantity and the quality per the invoice & PR.
  4. Warehouse storekeeper must inform the PR requester on spot as soon as they receive the requested items.
  5. The requester MUST approve this is exactly the item he/she requested.
  6. Warehouse storekeeper must make (receipt voucher) for the item they receive and they must add the PR number as reference on the receipt voucher & invoice number.
  7. If the received item for a specific machine or department per the PR reference (NO need location) they have to take it if not inform Warehouse Manager.
  8. If the received item for the Warehouse stock; it must be locating immediately & if the item is first time we receive, we must follow the producer of open (NEW LOCATION FORM) new location and new part no.
  9. The receipt voucher must be including (PR + manual receipt voucher + electronic receipt voucher + invoice).

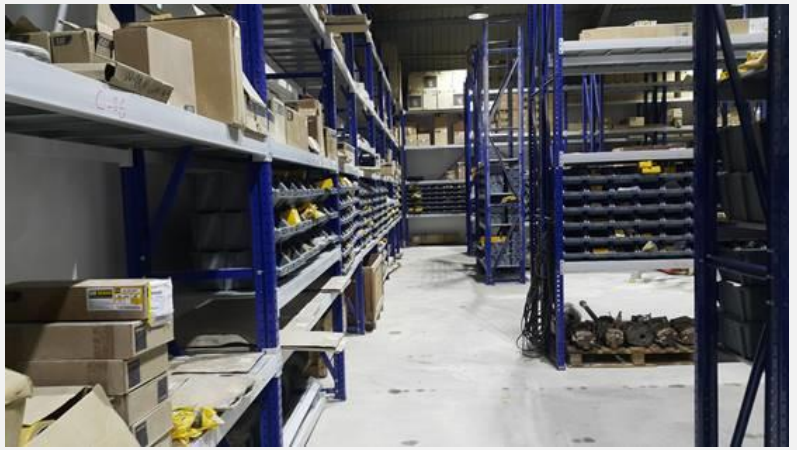
- Issue voucher procedure:
  1. The manual issue voucher must fill by the “assist storekeeper”.
  2. The manual issue voucher must fill (machine no. or department code).
  3. The manual issue voucher must fill (Machine type).
  4. The manual issue voucher must fill (date).
  5. The manual issue voucher must fill (approval of Engineers supervisor or Maintenance supervisor or Maintenance superintendent (if for an equipment) if the issue voucher for Department, The department head approval needed on the issue voucher.
  6. The warehouse Data entry must add the issue voucher on the system and give final documentation provided manual issue voucher & electronic issue voucher to the warehouse manager to identical both manual and electronic right.


2


NO
SMOKING





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7. HSE

- The JV management system was designed to follow our Client System as per General Conditions of Contract.
- In this section, we will view some of the HSE procedures and plans, which were implemented since the start of this project.

"OUR CHALLENGES IS TO HAVE AN HSE MANAGEMENT SYSTEM AND CULTURE TO MEET THE REQUIRMENT OF OUR CLIENT. AND BETTER THAN OUR COMPETITORS IN THE NATURE OF OUR BUSINESS"

- Basic safety rules:

1		**Never report to work under the influence of alcohol or drugs**	Purpose: To ensure employees is physically and mentally fit to work in the workplace. Examples, but not limited to: - Never consume alcohol or illicit drugs while at work. - Never take prescribed medicine without informing site medical personnel. - No personnel is allowed to work under the influence of alcohol or drugs.
2		**Never operate or modify equipment unless competent and authorised to do so**	Purpose: To ensure equipment is operated safely and that all modifications are assessed before changes are made. Examples, but not limited to: - Never operate any mobile equipment unless you have the required Training and Assessment - Never operate fire hydrants unless trained and authorised. - Never modify any tools and equipment unless authorised.
3		**Never work on equipment without following isolation procedures**	Purpose: To ensure the hazard of an energy source is controlled when work is performed Examples, but not limited to: - Never work on energized plant or equipment without an isolation lock and tag.
4		**Never remove, bypass or modify a safety protection device**	Purpose: To ensure safety devices / systems remain in place and that risks are assessed before changes are made Examples, but not limited to: - Never remove any guarding from rotating equipment (grinder, cutter, etc.) or using unguarded equipment.
5		**Never work at height without using the required fall protection device**	Purpose: To ensure anyone working at height cannot fall and hit the ground Examples, but not limited to: - Never use an excavator/shovel/wheel loader bucket as a man lifting device. - Never work at height where there is a potential to fall, without wearing a full body harness and attached to an appropriate anchor point.
6		**Never use lifting equipment: unless authorised, unless its within design criteria; or place yourself under a suspended load**	Purpose: To ensure no one is at risk of being struck by a dropped or falling object Examples, but not limited to: - Never operate lifting equipment unless you have the required licence and authorisation. - Never stand under a suspended load.
7		**Never enter a confined space or restricted area without Authorisation**	Purpose: To ensure risks and associated control measures for high hazard tasks / areas are understood by all personnel working in the area. Examples, but not limited to: - Never enter restricted areas (i.e. mine blast area) unless authorised. - Never enter a confined space unless authorised and with a confined space permit.

- One of HSE department responsibilities is to monitor the water testing. Water sample analysis is conducted in monthly basis, to ensure good water quality.

  In addition to water inspection, HSE department ensure the food quality also, which served at the camp kitchen.
- Annually, medical check-up is conducted to all employees, under the responsibility of HSE department.
- Every certain period of time, HSE department gives awareness lectures and trainings, to the JV senior and junior staffs, increasing their awareness of safety procedures and aspects in the project.
- HSE department has a main role in blasting announcement, and making sure that the mine is clear and safe.
- HSE department usually do regular noise measuring on the equipments.
- Every week, there is a tool box meeting with the staff.
- Every new employee and sub-contractor, shall go through under general safety induction, with the HSE department.
- Some training was performed to the employees, by the civil defense, in cooperation with our safety department, such as first aid and fire fighting trainings.
- HSE department always monitor and control the hazardous and general waste, following procedures, in addition to controlling chemicals, stored in proper way, to protect the environment.
- HSE department is also controlling the distribution of safety and traffic singes, following the traffic management plan.


CAUTION

ThankYou

AL OWN BCM JV Team

Oil Shale Fired Mine, Attarat Um Ghudran, Hashemite Kingdom of Jordan