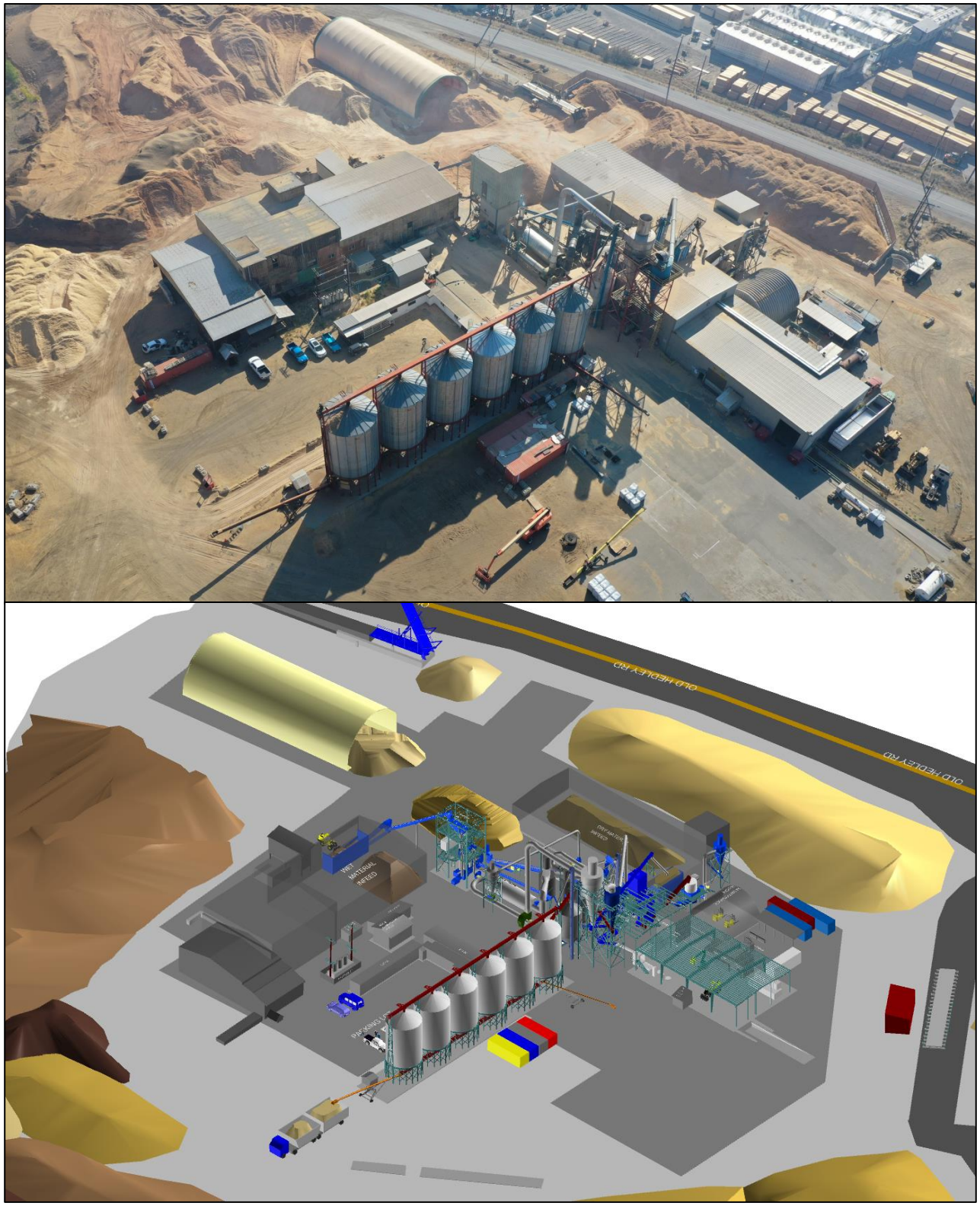



# Princeton BC Pellet Plant - Digital Twin Creation

Project Summary Booklet

**“Everything is created twice, first in the mind and then in reality”**

-Robin Sharma

With modern engineering technology you don't need to imagine it in your head, you can construct a digital version with detail and accuracy down to the nut and bolts. Laser Scanning and CAD technology will allow you to conceptualize your vision with clarity and precision like never before. Rome wasn't built in a day but it certainly would have been faster to build it in the 21st century.

# Table of Content

# Section 01-Background Information

# Princeton, British Columbia

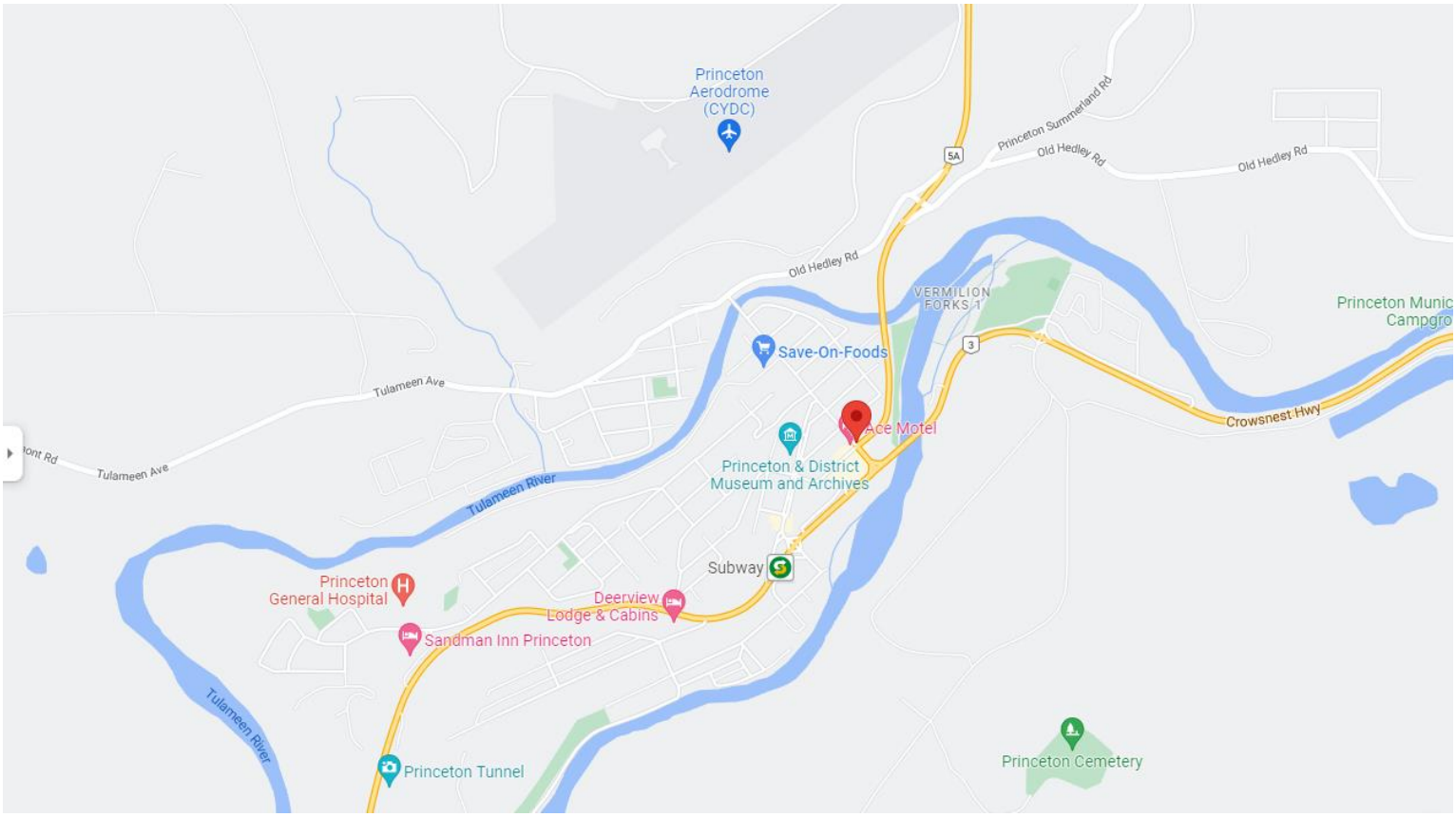
From Wikipedia, the free encyclopedia

**Princeton** (originally **Vermilion Forks**) is a town in the Similkameen region of southern British Columbia, Canada.[3][4] It lies just east of the Cascade Mountains, which continue south into Washington, Oregon and California. The Tulameen and Similkameen Rivers converge here.[5] At the 2016 census, the population was 2,828.[6]

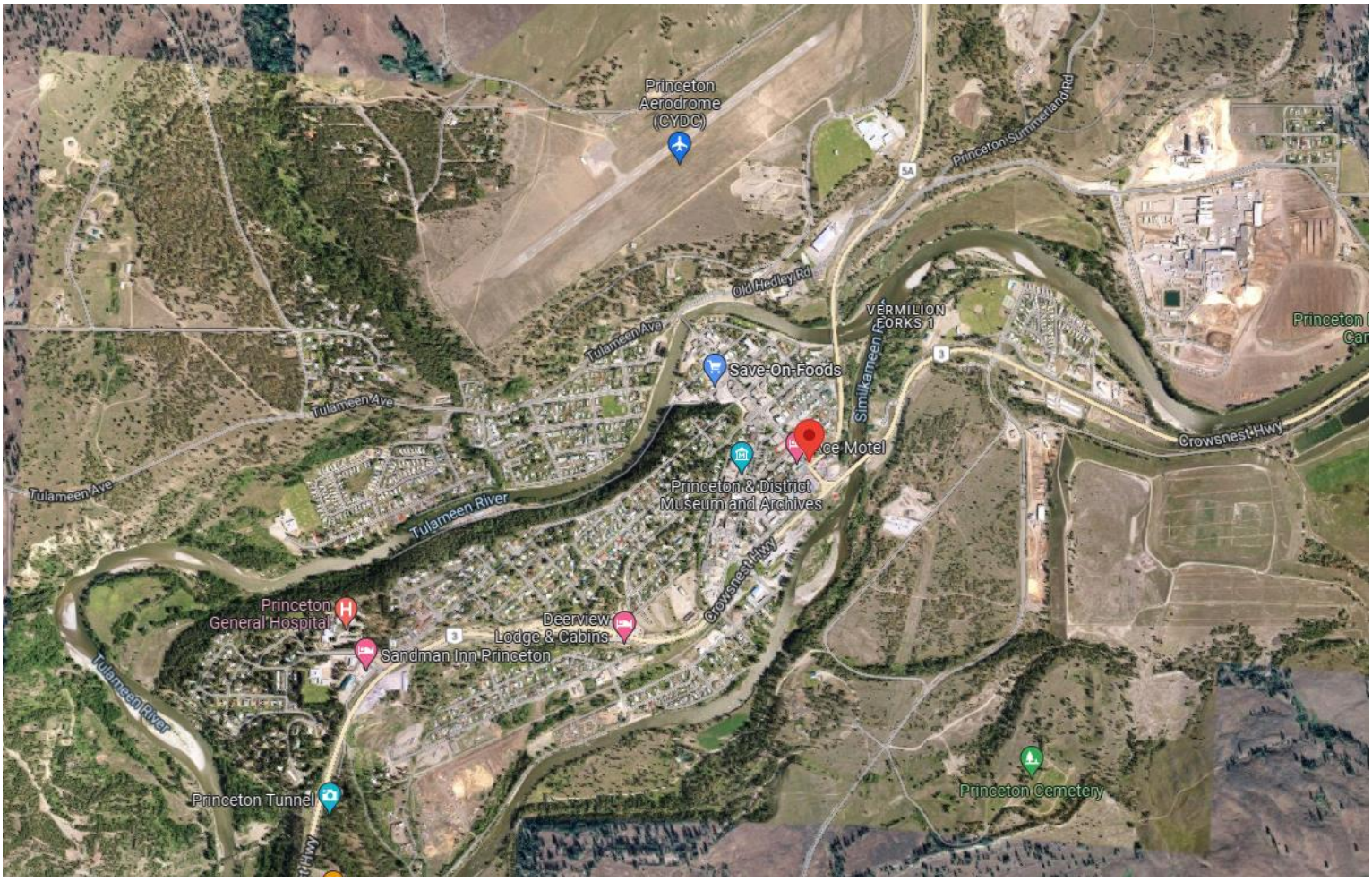
Princeton centres on seven blocks of businesses along Bridge Street and five blocks on Vermilion Avenue; there are also businesses along British Columbia Highway 3.[7]

Historically, the area's main industry has been mining—copper, gold, coal, and some platinum—The town's biggest employers are Copper Mountain Mine and a sawmill owned by Weyerhaeuser, along with a few smaller timber companies, such as Princeton Wood Preservers and Princeton Post and Rail.[8][5][4]

Drone Photo of Princeton BC




Map of Princeton BC




Satellite View of Princeton BC

# DRAX GROUP ANNOUNCES PURCHASE OF PRINCETON PELLET CORP. IN PRINCETON, BC

Posted on August 4, 2022

**Original Source:**
Drax to acquire Canadian pellet plant from PSPC

On Wednesday (8-3-22), the Drax Group announced that it has signed an agreement with Princeton Pellet Corp. to acquire its pellet plant located in Princeton, British Columbia, Canada. Terms of the agreement were not disclosed.

The Princeton pellet plant has been in operation since 1995 and has the capacity to produce 90,000 metric tons of wood pellets, predominately made from sawmill residues. Currently about half of the Princeton plant's production is contracted to Drax.

The Princeton facility is located in close proximity to the Drax Group's Armstrong and Lavington plants and the Port of Vancouver. The Princeton facility has 32 employees, and all are expected to transition to Drax.

The purchase is expected to be completed in Q3 of 2022. Following completion of the acquisition, the plant is expected to contribute to the Group's strategy to increase pellet production to 8 million metric tons a year by 2030.

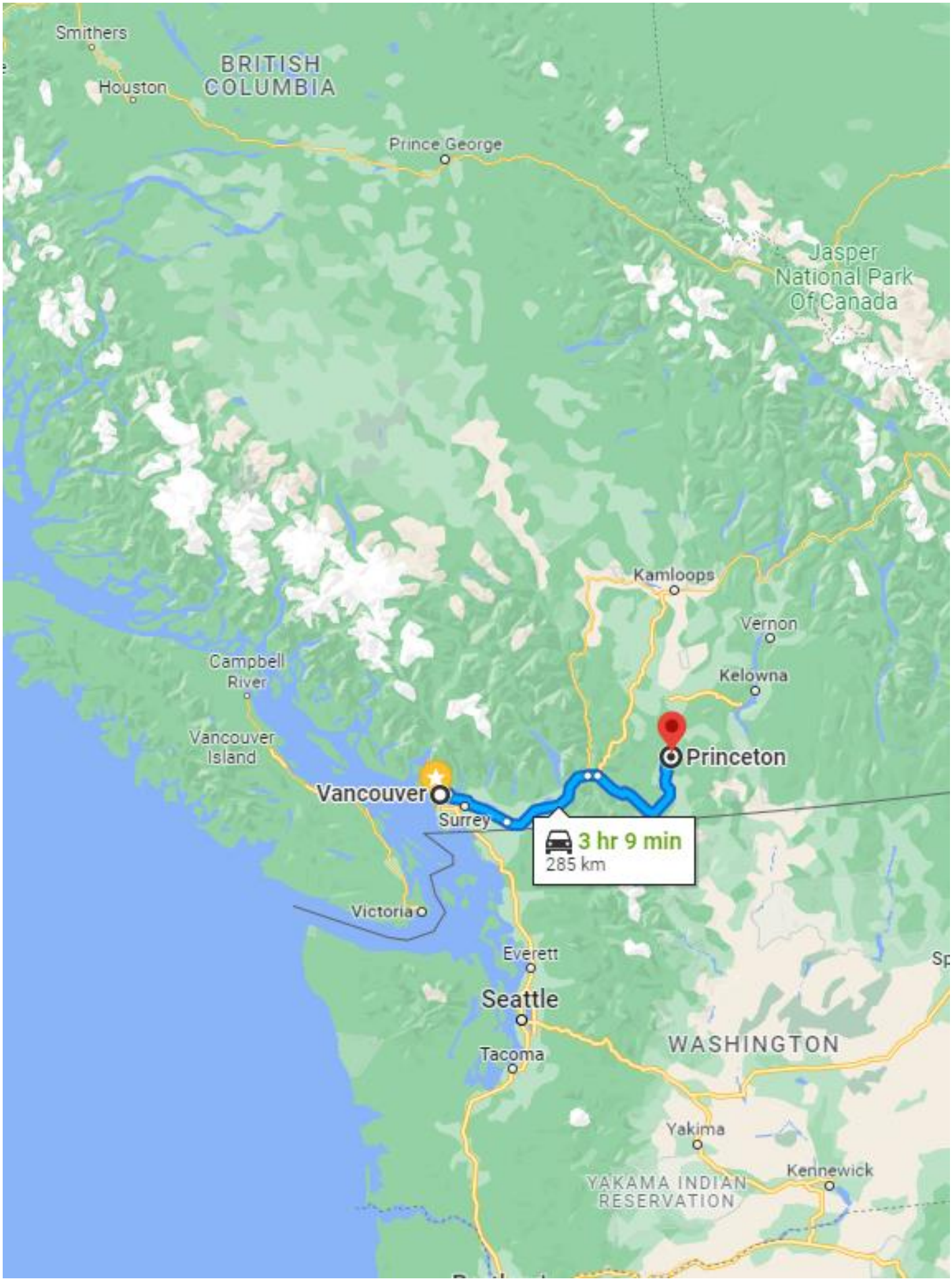
CANADIAN BIOMASS

PELLET MAP 2022


## CURRENT PRODUCERS

| | Name | City | Prov | Bulk/Bagged (%) | Capacity (tonnes/yr) |
|---|---|---|---|---|---|
| 1 | Drax Armstrong | Armstrong | BC | 95/5 | 72,000 |
| 2 | Drax Burns Lake | Burns Lake | BC | 100/0 | 365,000 |
| 3 | Drax Meadowbank | Strathnaver | BC | 100/0 | 230,000 |
| 4 | Drax Williams Lake | Williams Lake | BC | 100/0 | 215,000 |
| 5 | Houston Pellet LP - Drax/Canfor/Morristown Partnership | Houston | BC | 100/0 | 220,000 |
| 6 | Lavington Pellet LP - Drax/Tolko partnership | Lavington | BC | 100/0 | 300,000 |
| 7 | Smithers Pellet LP - Drax/West Fraser partnership | Smithers | BC | 100/0 | 140,000 |
| 8 | Premium Pellet | Vanderhoof | BC | 95/5 | 185,000 |
| 9 | Princeton Standard Pellet Corp. | Princeton | BC | 70/30 | 110,000 |
| 10 | Vanderhoof Specialty Wood Products | Vanderhoof | BC | 20/80 | 30,000 |
| 11 | Canfor | Chetwynd | BC | 100/0 | 100,000 |
| 12 | Canfor | Fort St. John | BC | 100/0 | 75,000 |
| 13 | Skeena BioEnergy | Terrace | BC | 100/0 | 92,000 |
| 14 | Drax Entwistle | Entwistle | AB | 100/0 | 400,000 |
| 15 | Northern Pellet Ltd. Partnership - Drax/Tolko | High Level | AB | 100/0 | 200,000 |
| 16 | Manning Forest Products division of West Fraser Mills | Manning | AB | 80/20 | 15,000 |
| 17 | La Crete Sawmills | La Crete | AB | 60/40 | 120,000 |
| 18 | Vanderwell Contractors | Slave Lake | AB | 50/50 | 60,000 |
| 19 | Spruce Products | Swan River | MB | 100/0 | 2,000 |
| 20 | Prairie Pellet Company | Elm Creek | MB | 80/20 | 10,000 |


Satellite View of Princeton BC showing Drax Pellet Plant and Weyerhaeuser Sawmill




Map showing the route from Vancouver to Princeton and the total driving time


Princeton BC wood pellets for animal bedding in bags

Animal using wood pellets as animal bedding that were produced from Princeton BC


Princeton BC wood pellets for fire stove


Princeton BC wood pellets in bags

Power plant that utilizes wood pellets

Wood pellets being produced in Princeton BC and getting loadout using belt conveyor to fill truck


# Eagle Valley Pine Pellets 18.14KG

EAGLE VALLEY

**$30.00** ~~$34.00~~ SALE

Shipping calculated at checkout.

Quantity

1

ADD TO CART

BUY IT NOW


# Talon Pine Pellets 15.91KG

TALON

**$28.00** ~~$32.00~~ SALE

Shipping calculated at checkout.

Quantity

1

ADD TO CART

BUY IT NOW

Dry material storage area-Shavings

Wet material storage area-Sawdust

Drying Infeed

Hammermill tower outfeed

Dry Side Hammermill

Wet side hammermill tower feeding into dryers and pellet storage silos

Drying area equipment layout looking from above

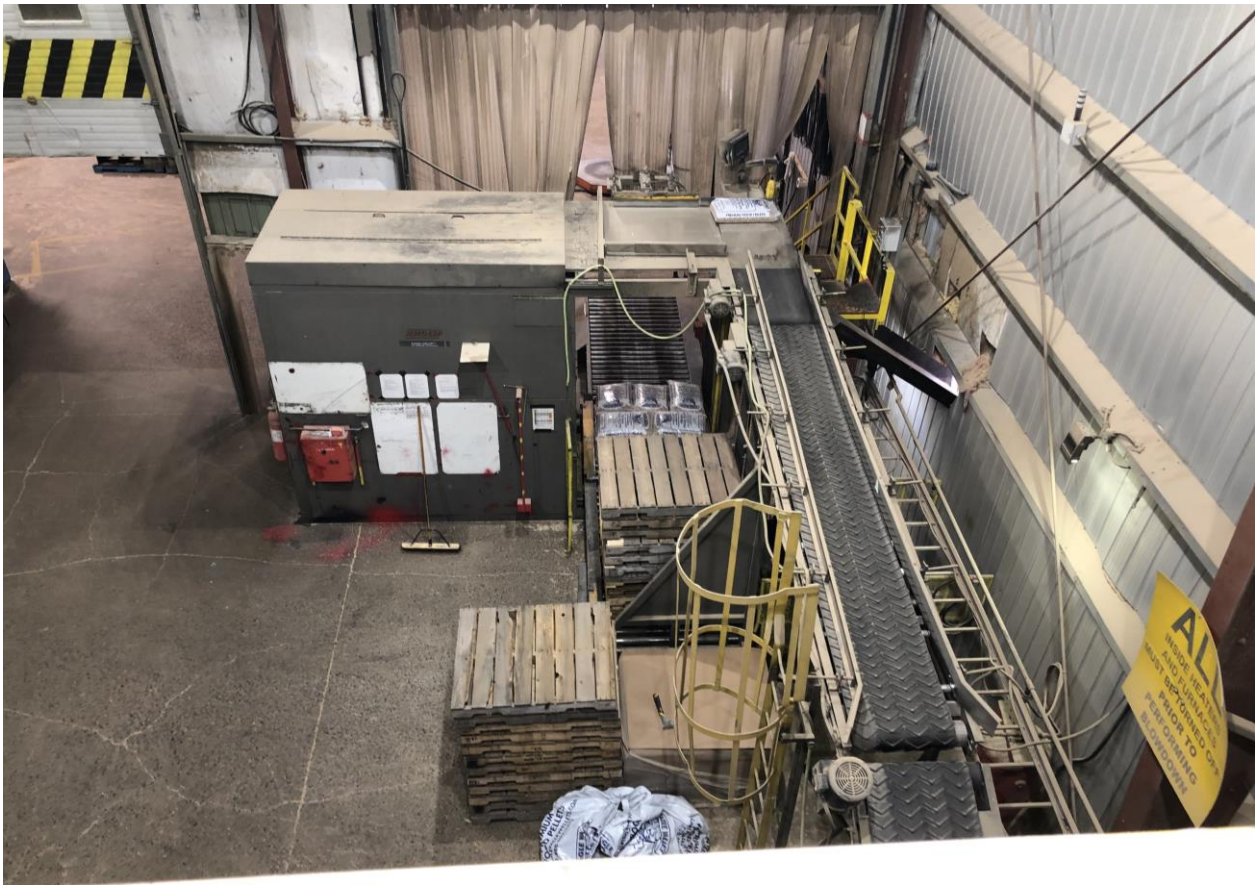

Pelletizers layout on structural steel platform


Pelletizer from an angle view

Pelletizer cooler

Pellet distribution system using a network of bucket elevators


Pellets Crumbler (for animal bedding)



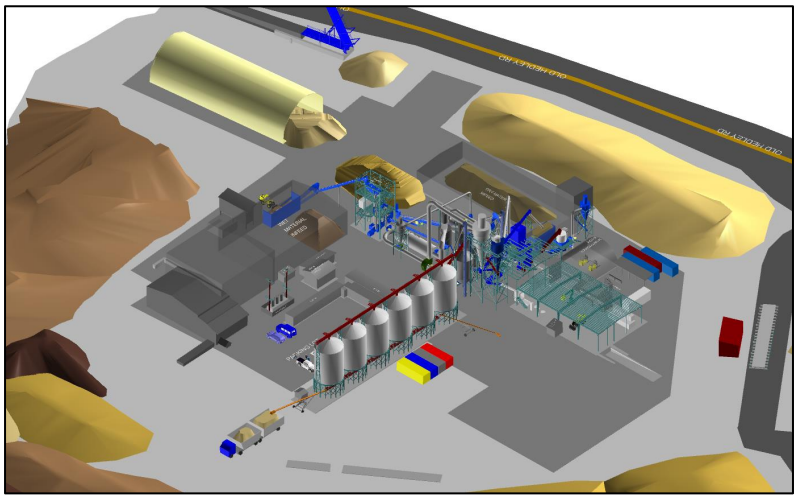
Pellets Bagging System

Pellet storage silos

Pellets on belt conveyor under the storage silos loading into a truck

# Section 02-Task and Objectives

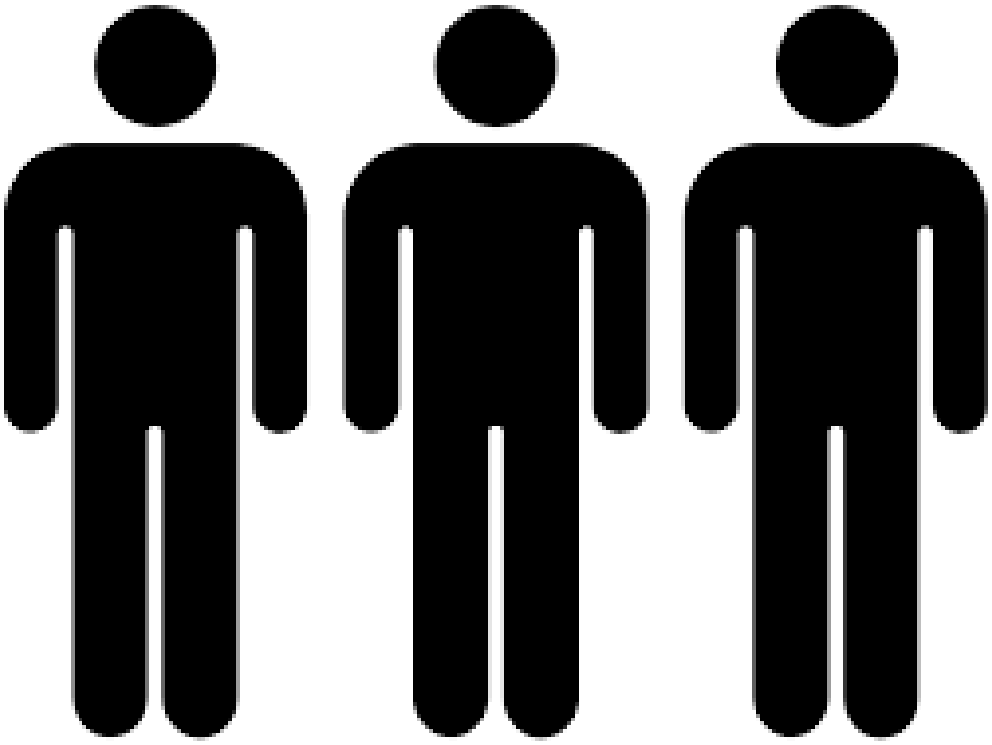
**Primary Objective:** Create a digital twin of the plant (capturing all of the plant geometry, site logistic and process information) for plant design, safety analysis and potential future expansion or modifications



**Secondary Objectives:**

1. Capture the plant on ground (mechanical equipment, structural steel, buildings and utilities) using 3D Laser Scanning Technology
2. Capture the plant (site information) from the air using Drone Technology

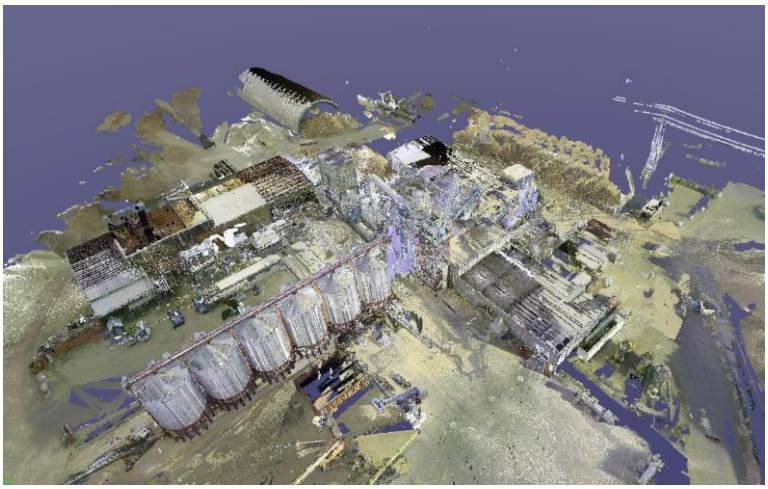
**Logistics:** The manpower and time resource that were allocated to the task were 3 days and 3 people

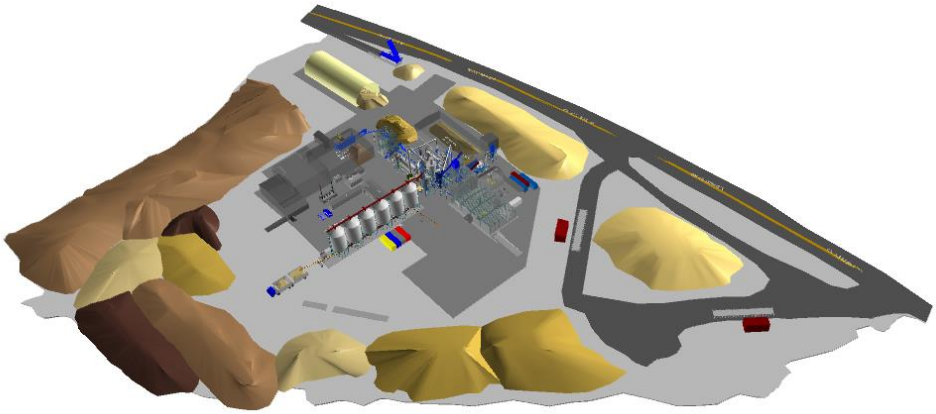
**Project Manager** | **Drone Specialist** | **3D Scanning Specialist**

**Game Plan:**

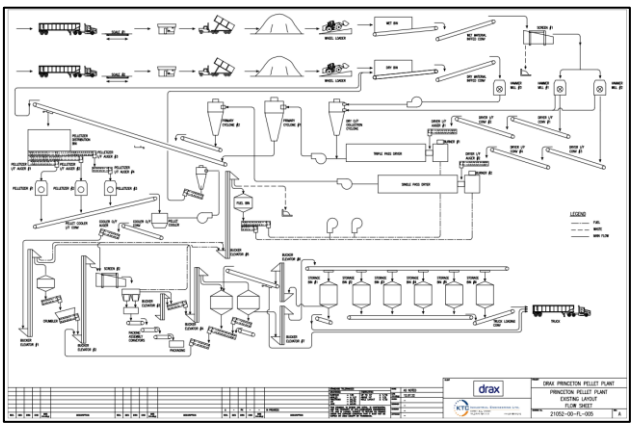
Step 01: Capture Site Data with Drone and 3D Laser Scanner

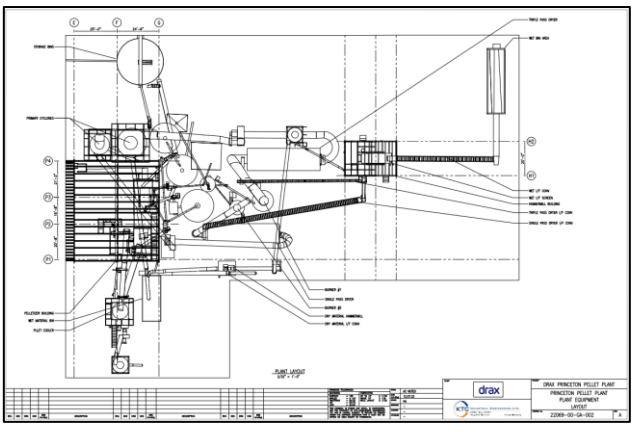


Step 02: Produce a 3D Model of the Plant from the point cloud



Step 03: Produce engineering documents such as Flow Sheet and General Arrangement based on the 3D Model





# Section 03-Quick Project Numbers

**426** **Photos** went into constructing the orthomosaic for the plant

**26** **Photos** went into constructing each of the paranorma on top of the plant

**153** **Scans** were taken in 153 different spots at less than 30 feet from each other

**114** **GB** was the final size of the RECAP file when all of the 3D scans were combined together

**5,727,218,128**

**Points** in the 3D scan

# Section 04-Drone Technology

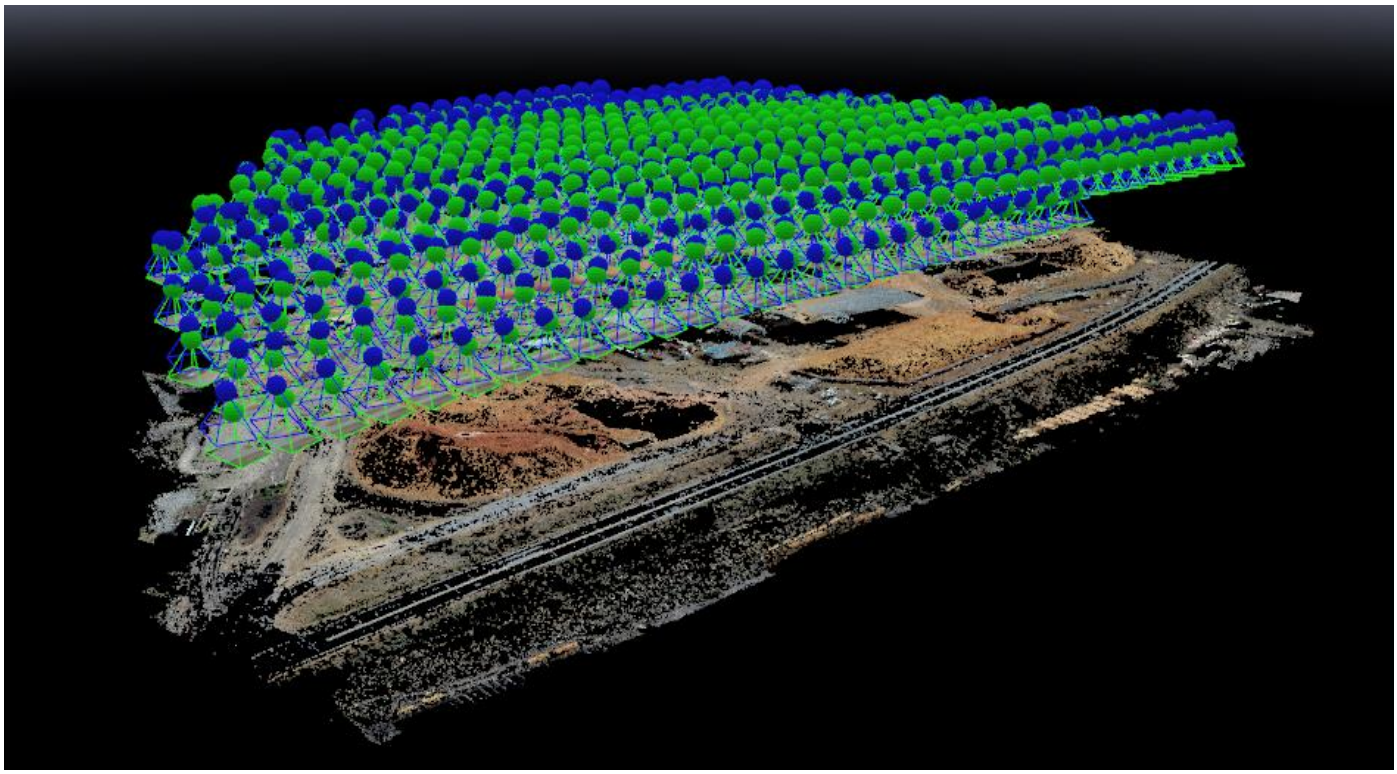

**Drone:** DJI Mavic 2

**Deliverables:**

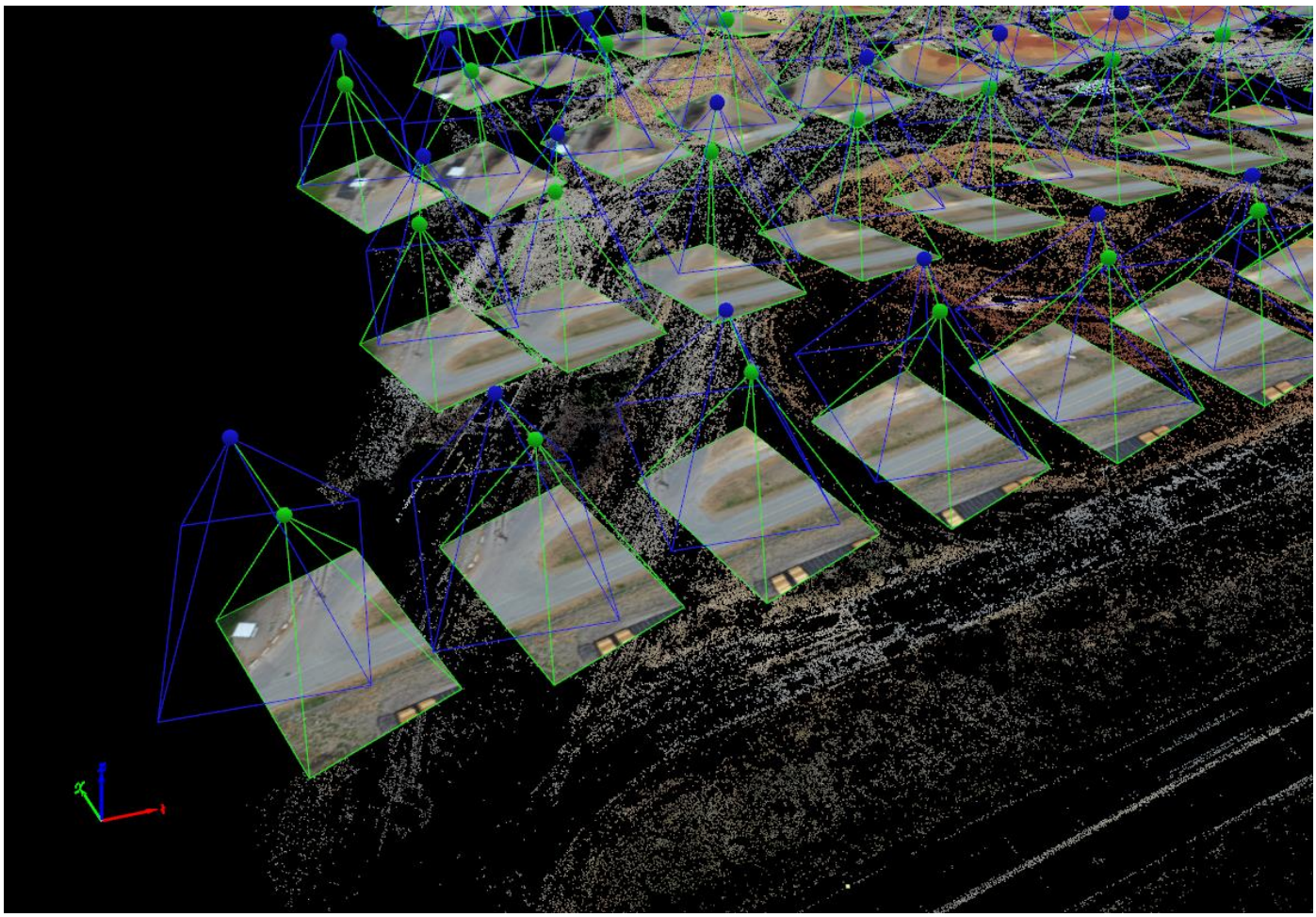
1. Photos
2. Videos
3. 360 Photos
4. Othomosaic
5. 3D Scan Of The Site

Orthomosaic of the Princeton BC pellet plant: This orthomosaic is composed of 426 photos stitched together

This is a zoom in view of the orthomosaic to better see the plant layout



Drone photos processing to produce pointcloud of the site



Drone photos processing individual images

Drone photo 01 at high elevation

Drone photo 02 at high elevation

Drone photo 03 at high elevation

Drone photo 04 at high elevation

Drone photo 05 at high elevation

Drone photo 06 at high elevation

Drone photo 01 at low elevation

Drone photo 02 at low elevation

Drone photo 03 at low elevation

Drone photo 04 at low elevation

Drone photo 05 at low elevation

Drone photo 06 at low elevation

Drone photo 07 at low elevation

Drone photo 08 at low elevation

Drone photo 09 at low elevation

Drone photo 10 at low elevation

Drone photo 01 at high elevation

Drone photo 02 at low elevation

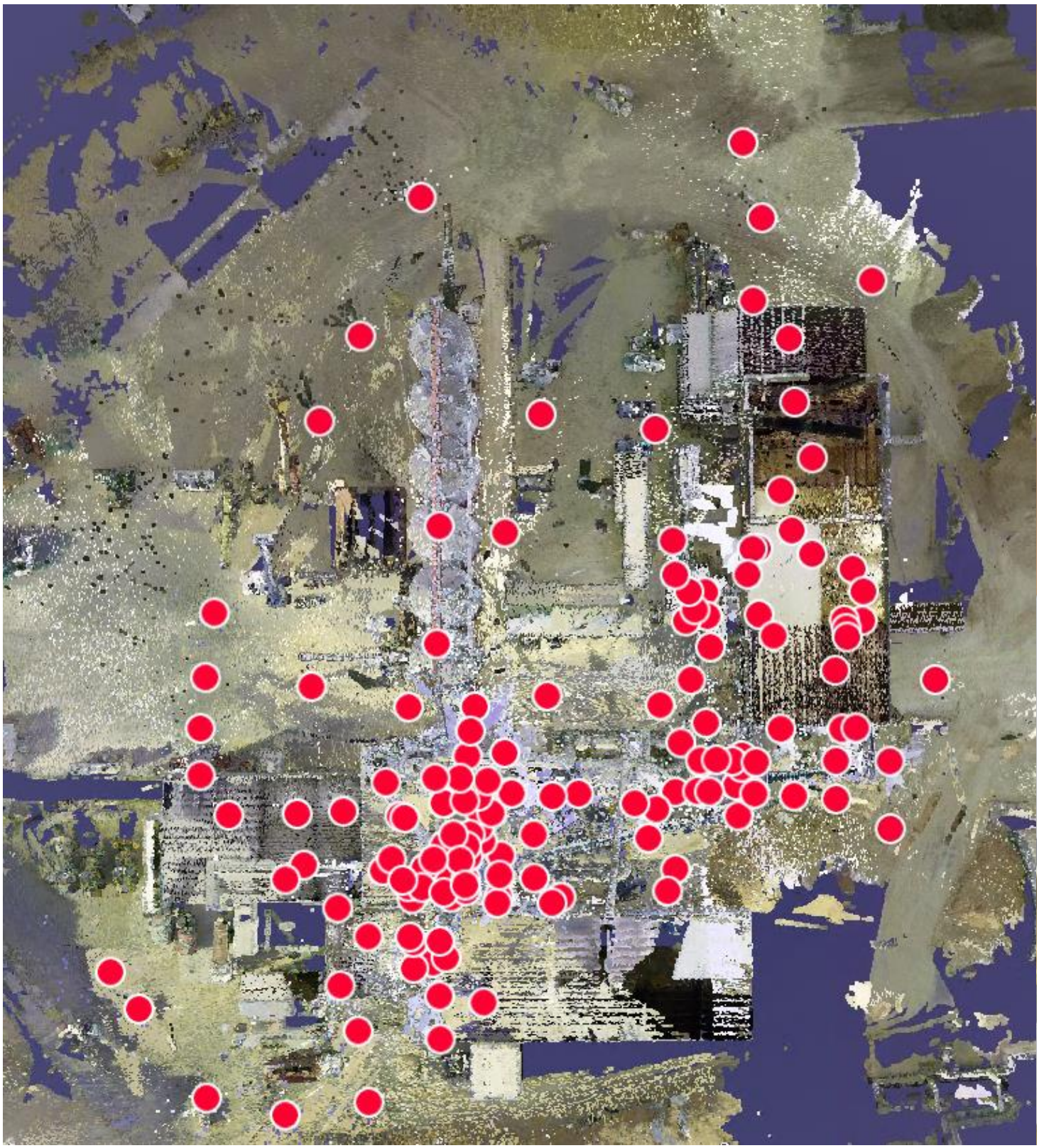
Drone photo 03 at low elevation

# Section 05-3D Scanning

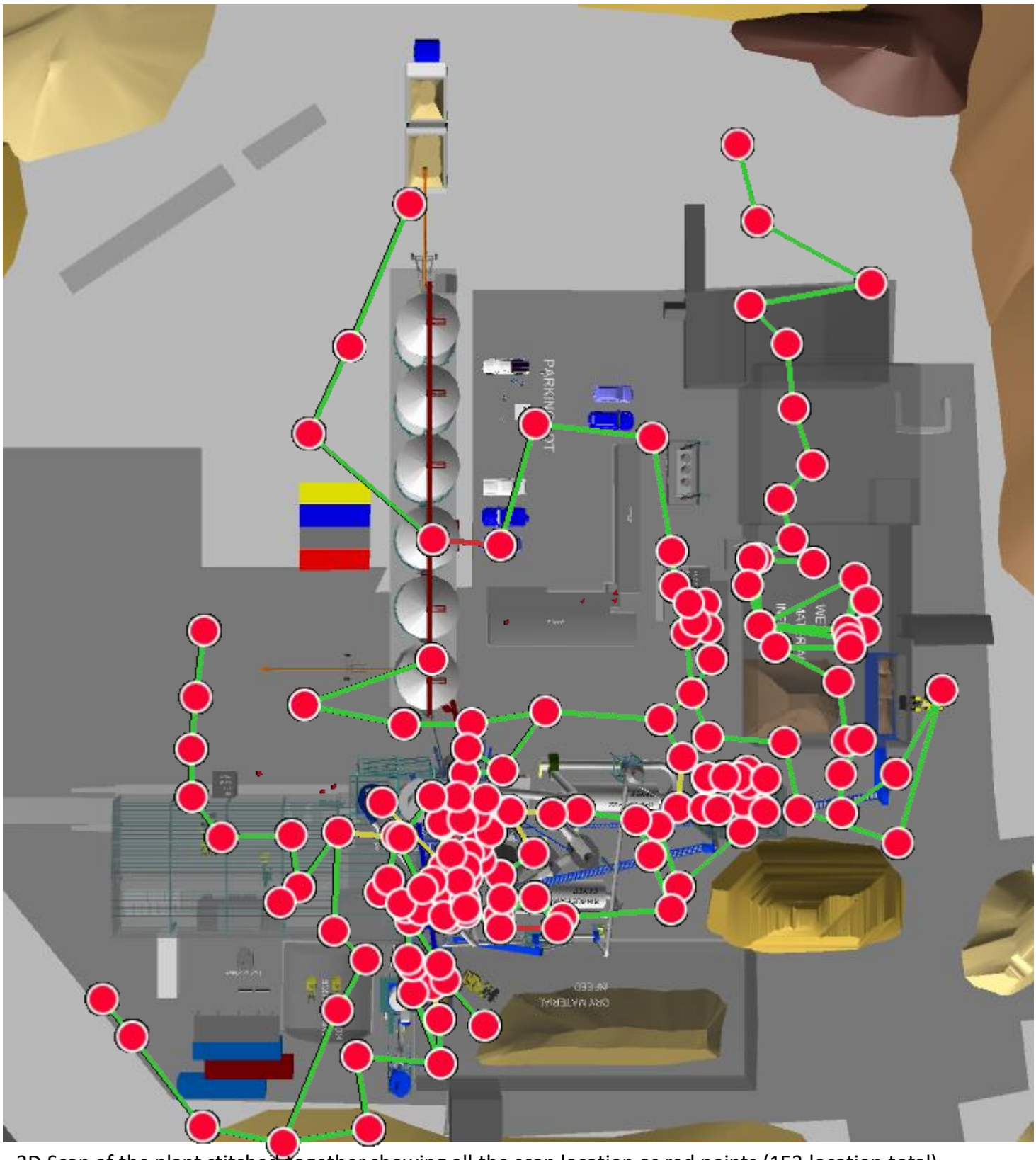
**Scanner:** Leica RTC 360

**Deliverables:**

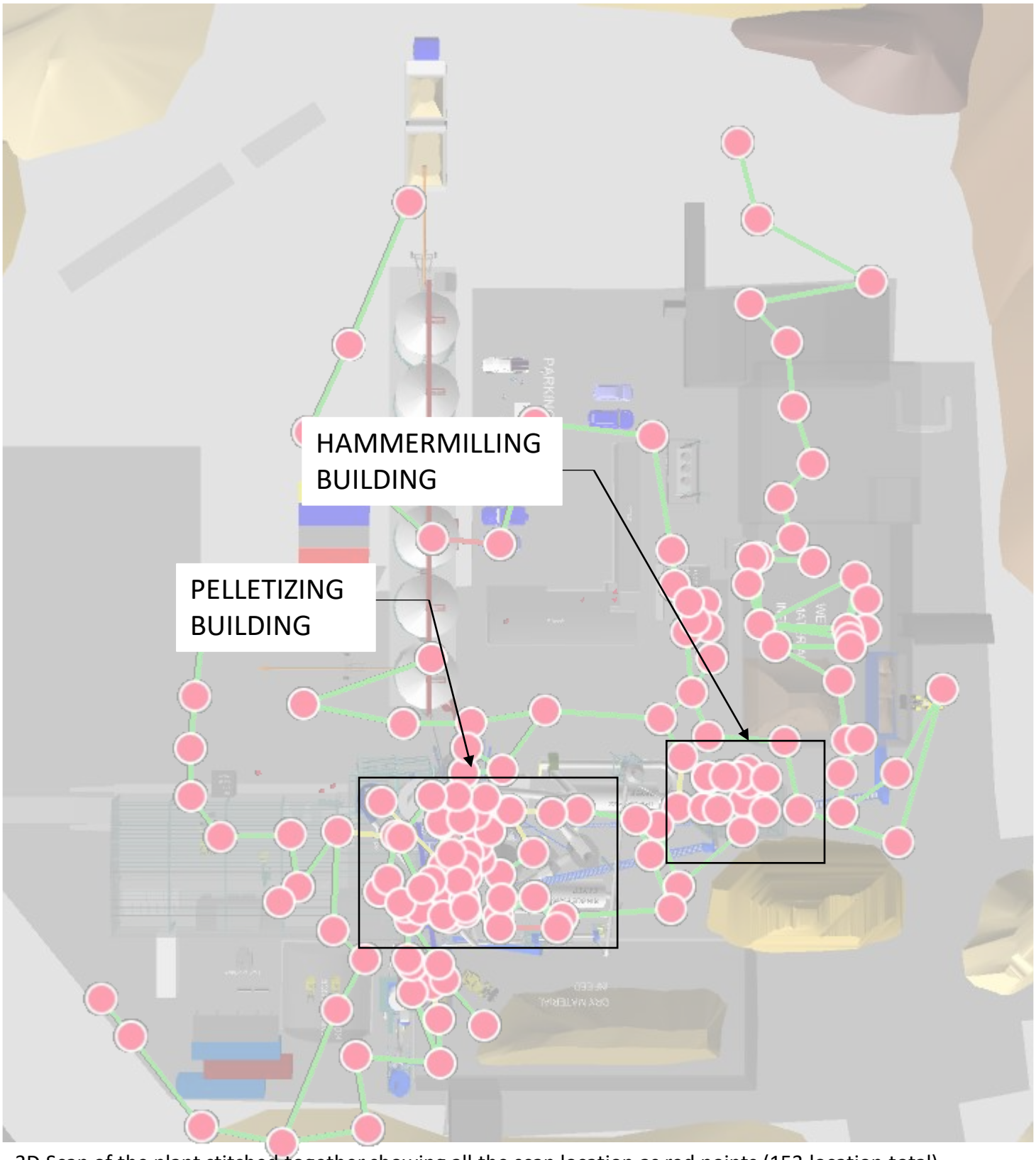
1. 3D Scan of the plant
    1. Pointcloud
    2. 360 photos



3D Scan of the plant stitched together showing all the scan location as red points (153 location total)

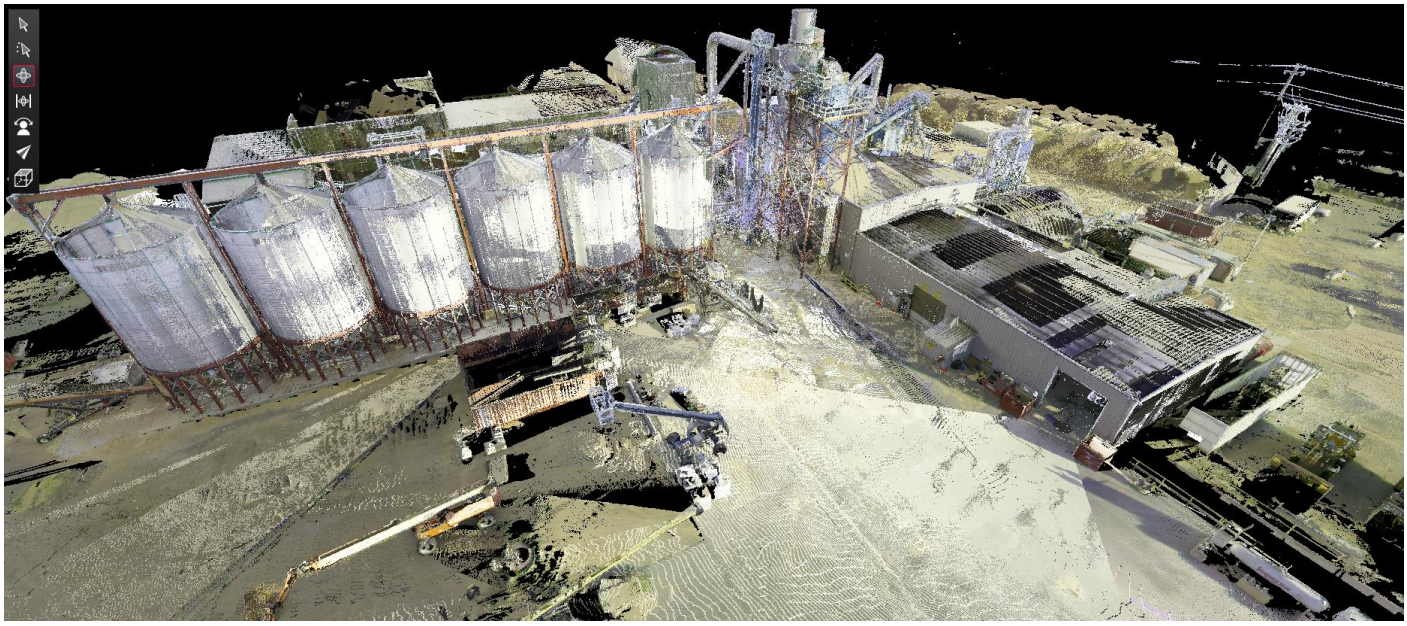



3D Scan of the plant stitched together showing all the scan location as red points (153 location total)

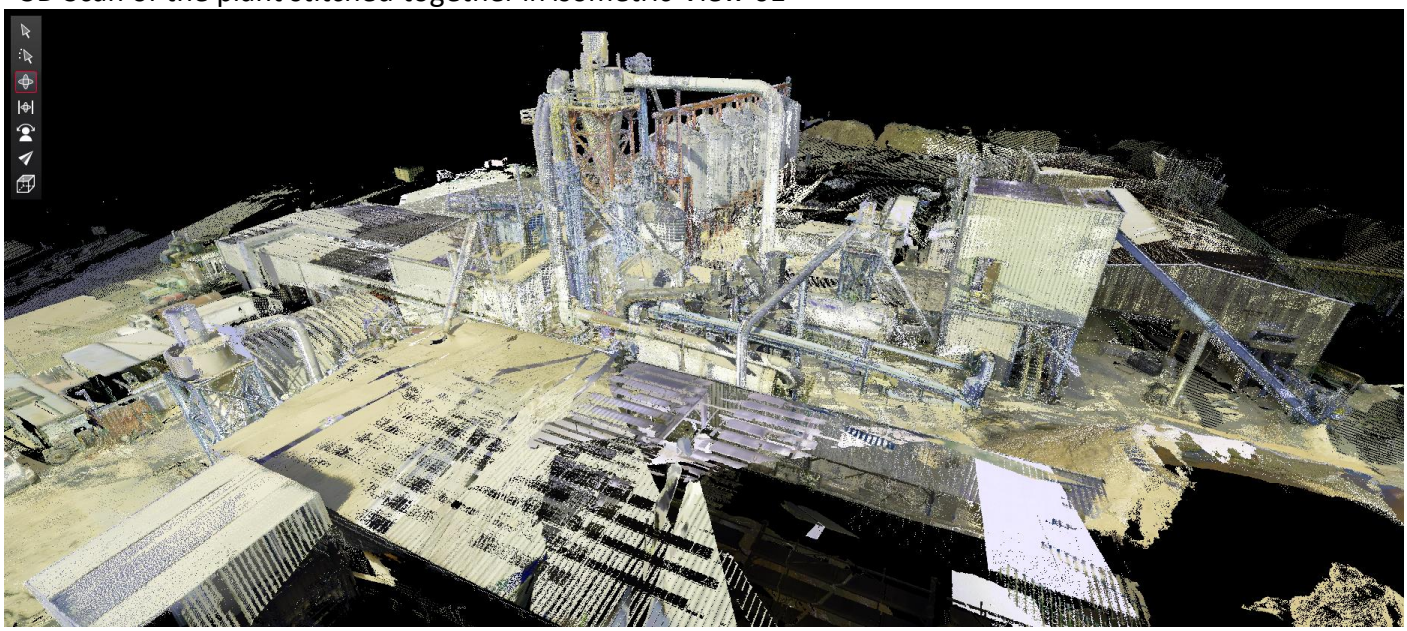



3D Scan of the plant stitched together showing all the scan location as red points (153 location total)

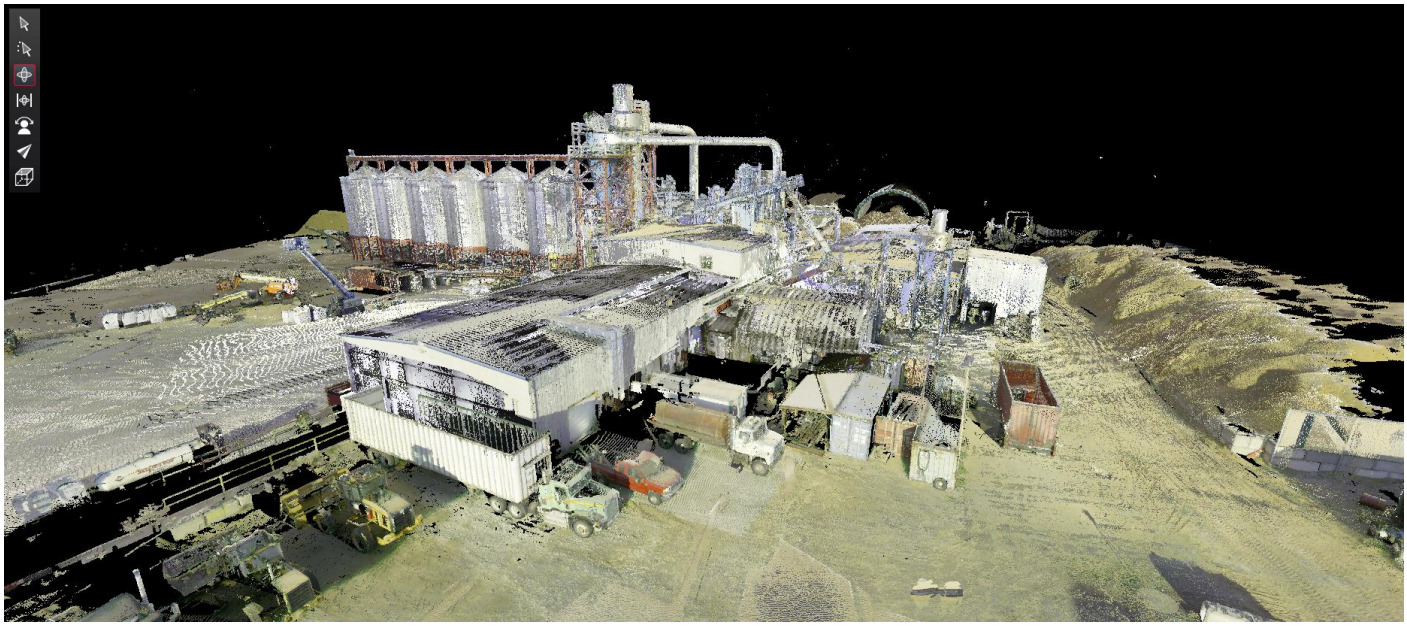
***These are two areas were the most numbers of scans were taken



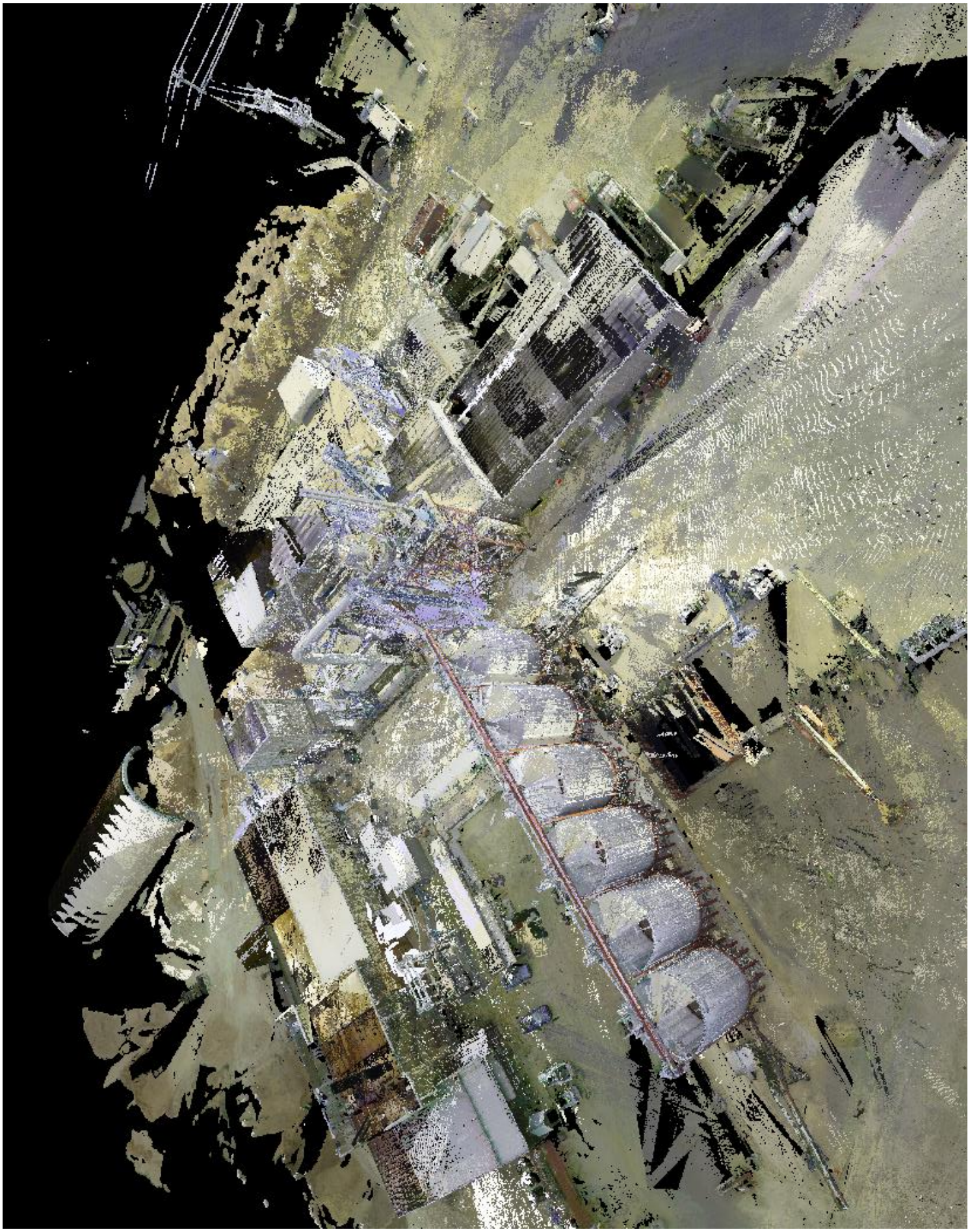
3D Scan of the plant stitched together in isometric-View 01



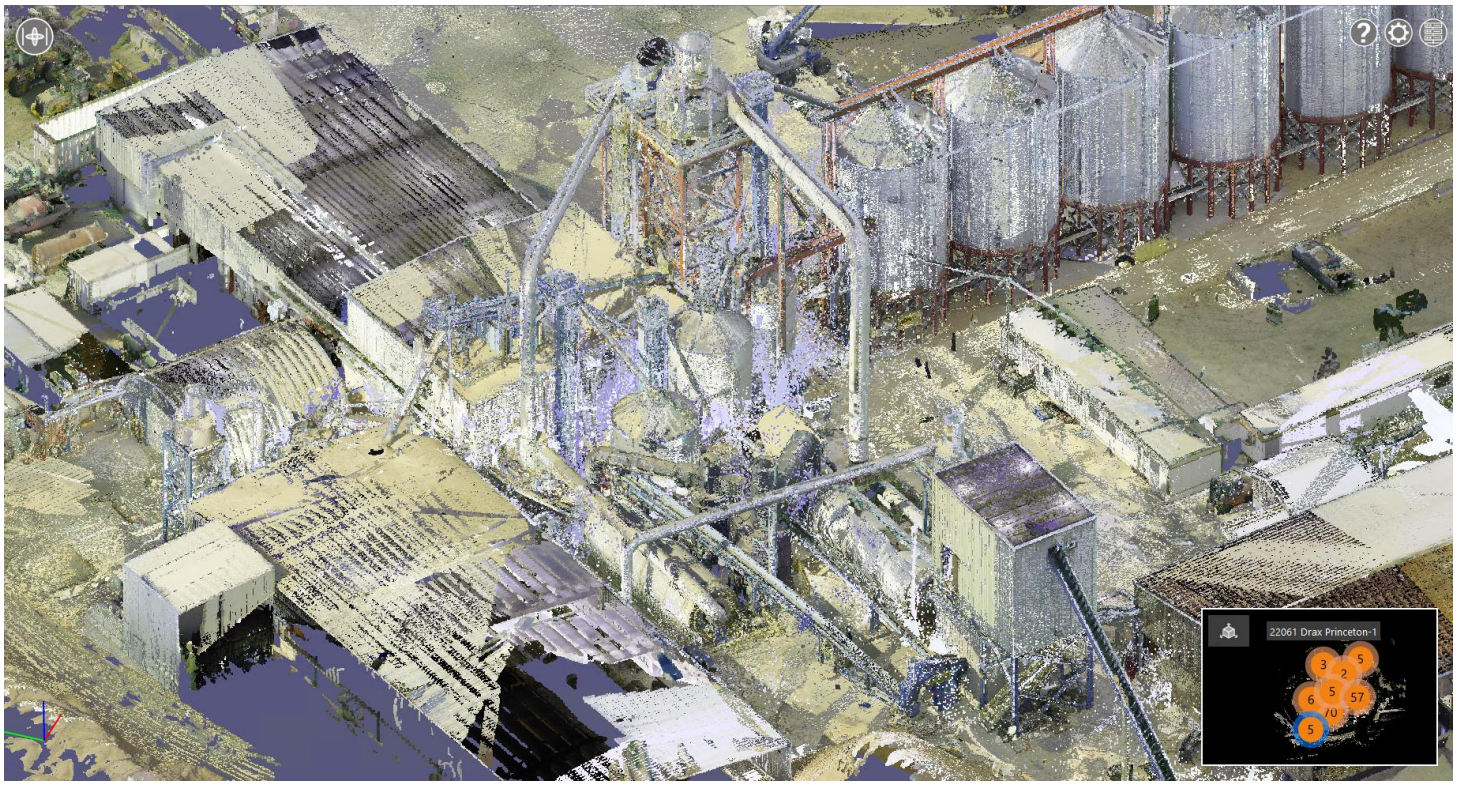
3D Scan of the plant stitched together in isometric-View 02



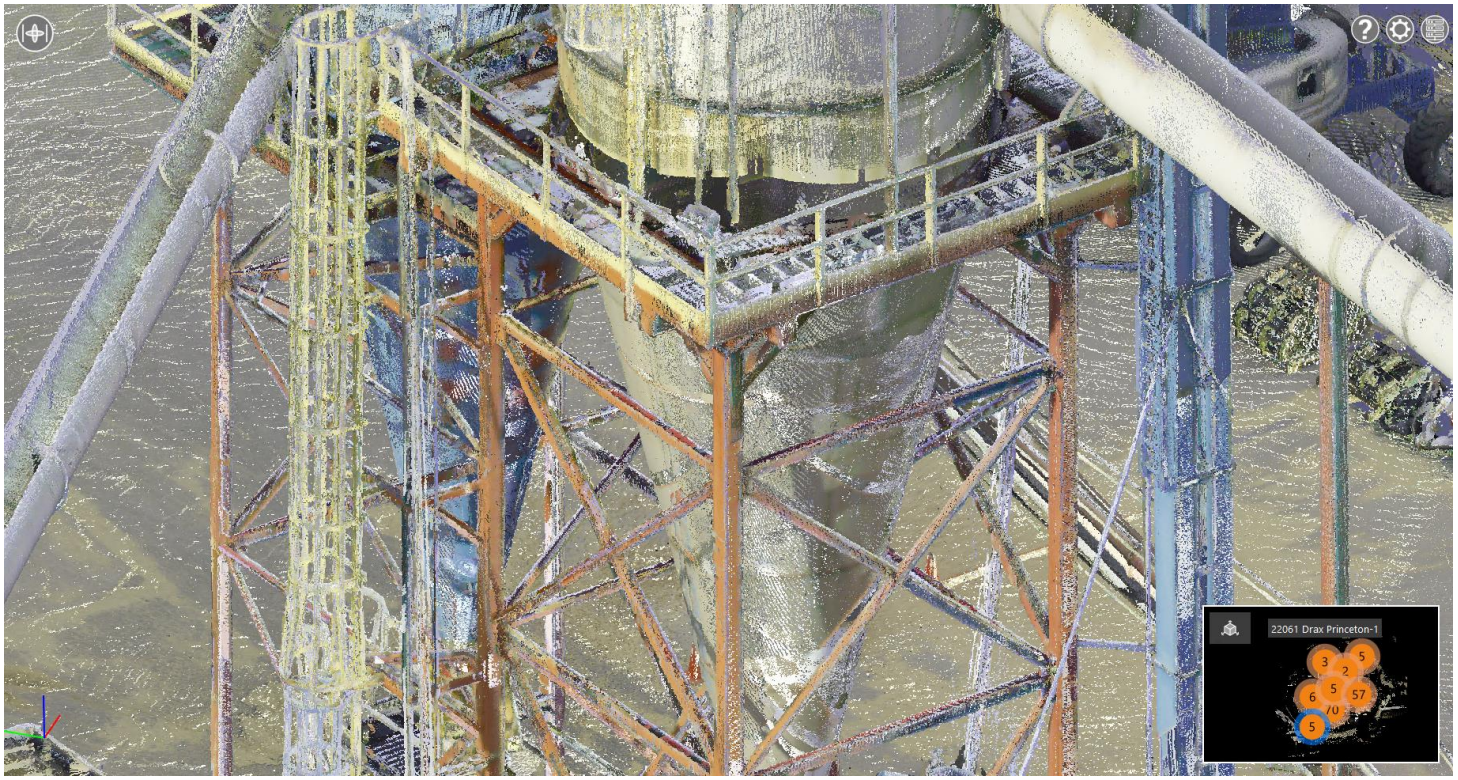
3D Scan of the plant stitched together in isometric-View 03



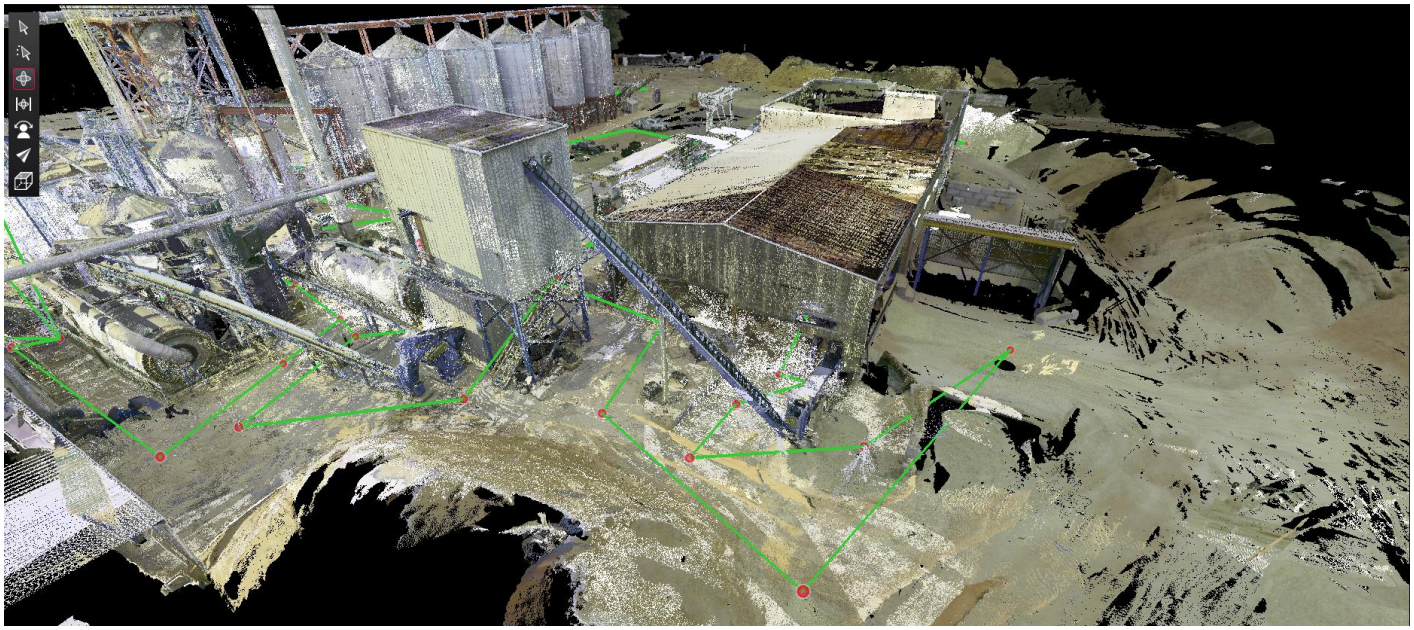
3D Scan of the plant stitched together in isometric-View 04



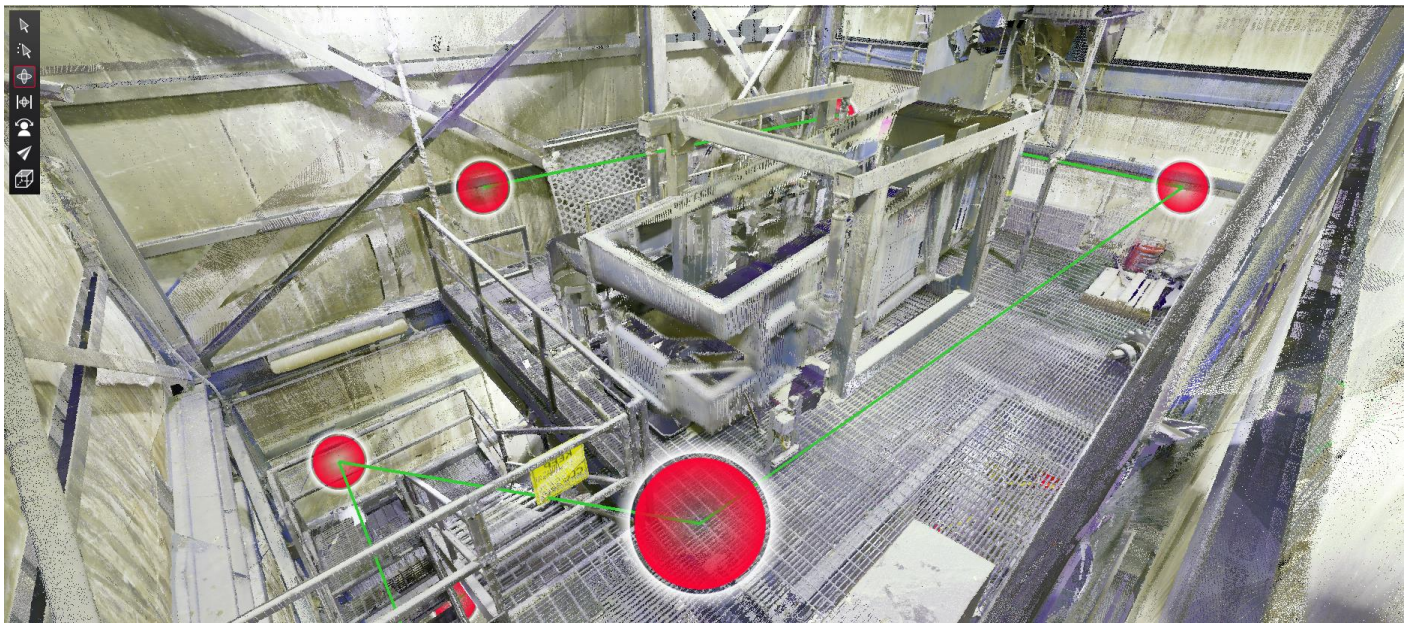

3D Scan of the plant stitched together in isometric view (Zoom into equipment layout)



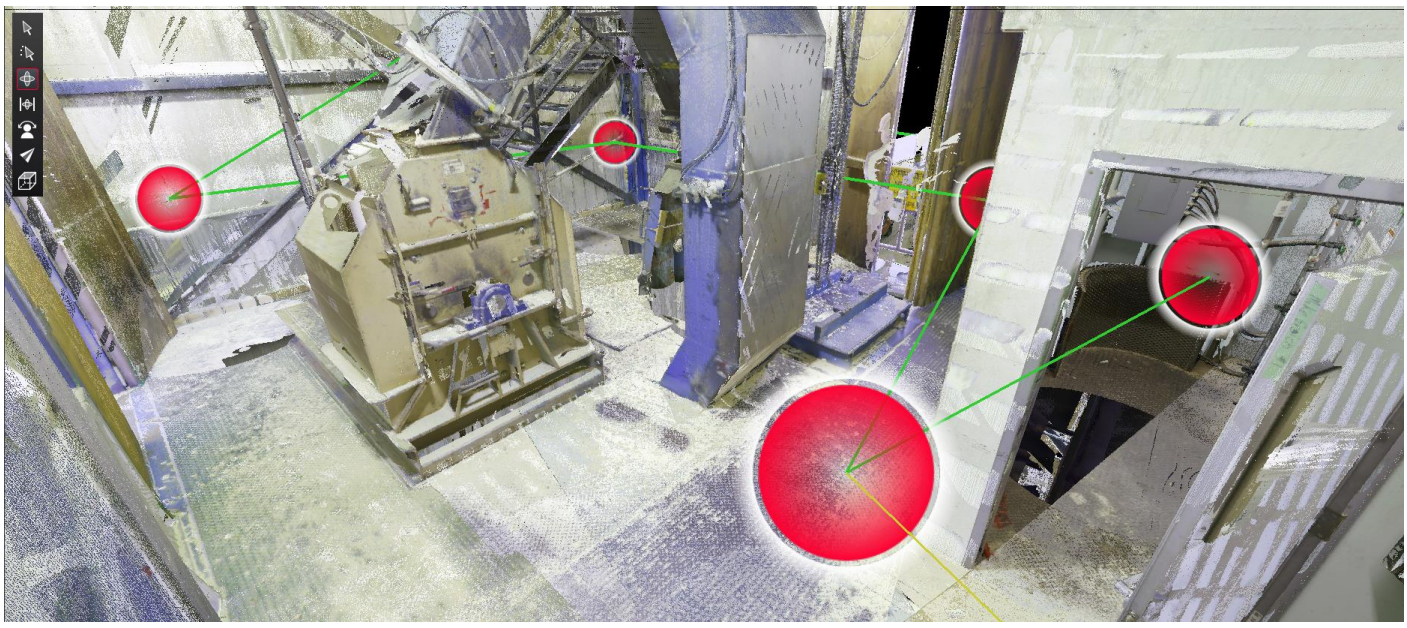

3D Scan of the plant stitched together in top view (Zoom into structural steel support)



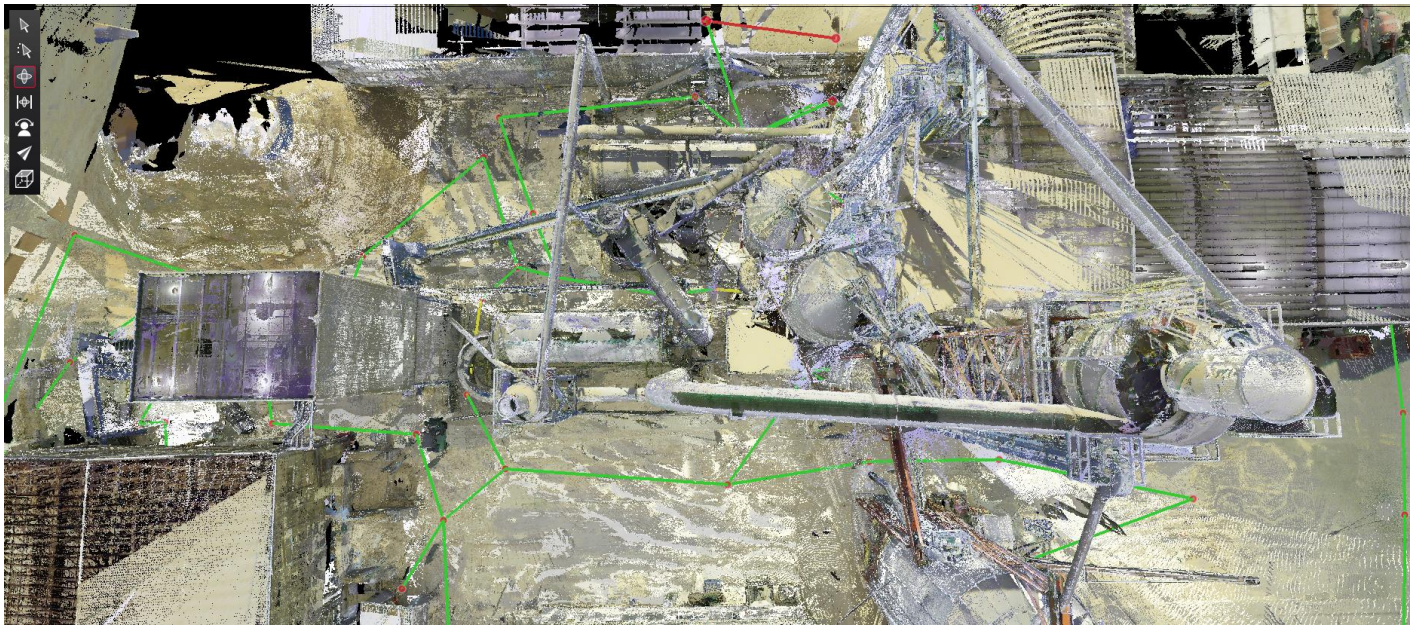
3D Scan of the plant in the wet material infeed area with the scan locations and the post processing links



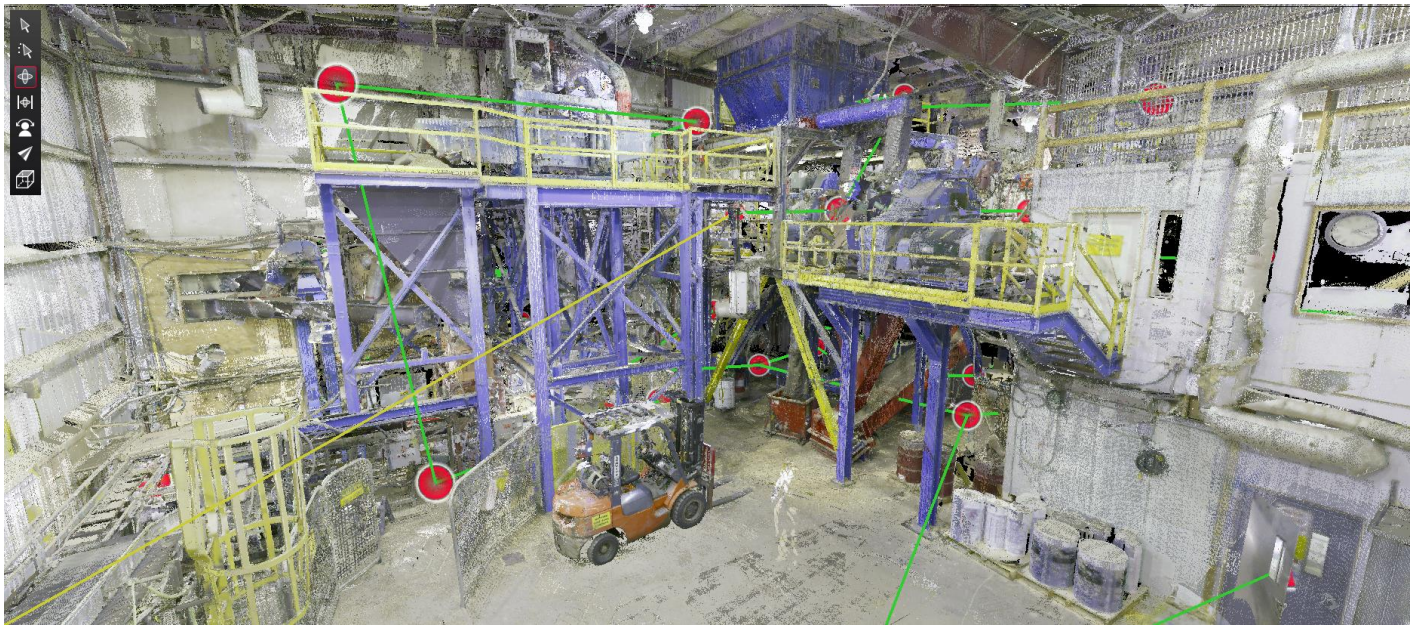
3D Scan of the plant by the BM&M screen with the scan locations and the post processing links



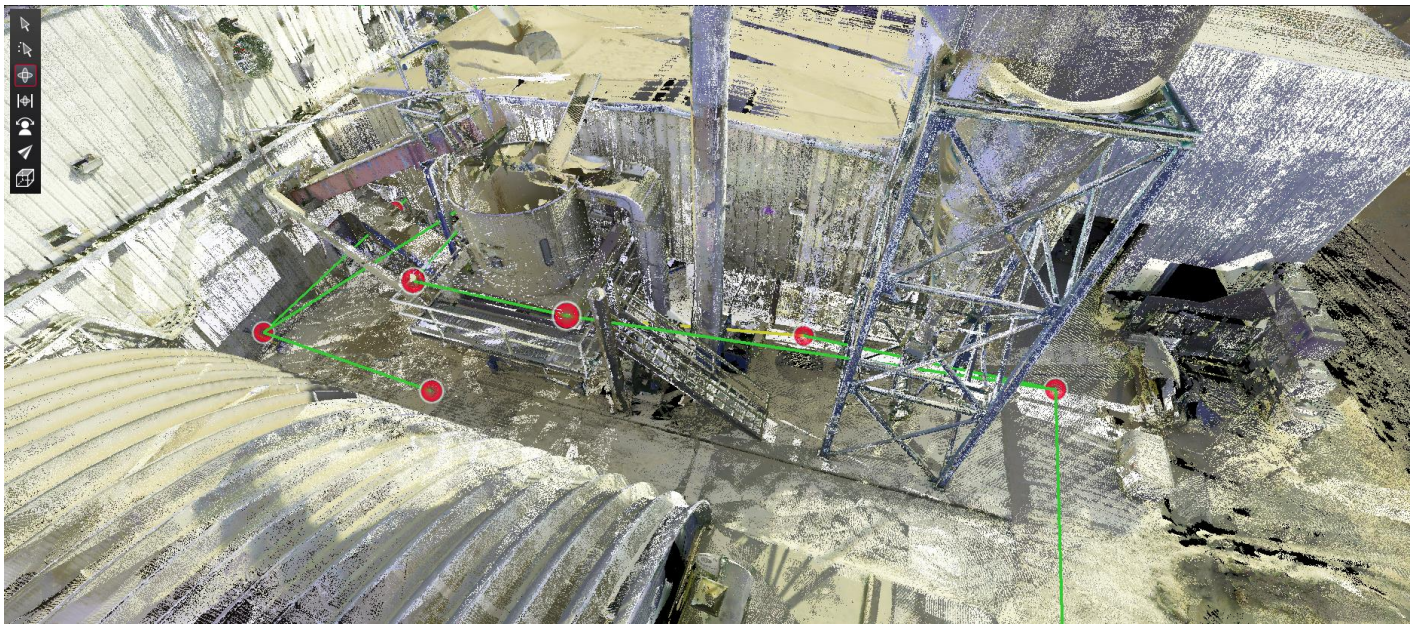
3D Scan of the plant in the hammermill building with the scan locations and the post processing links



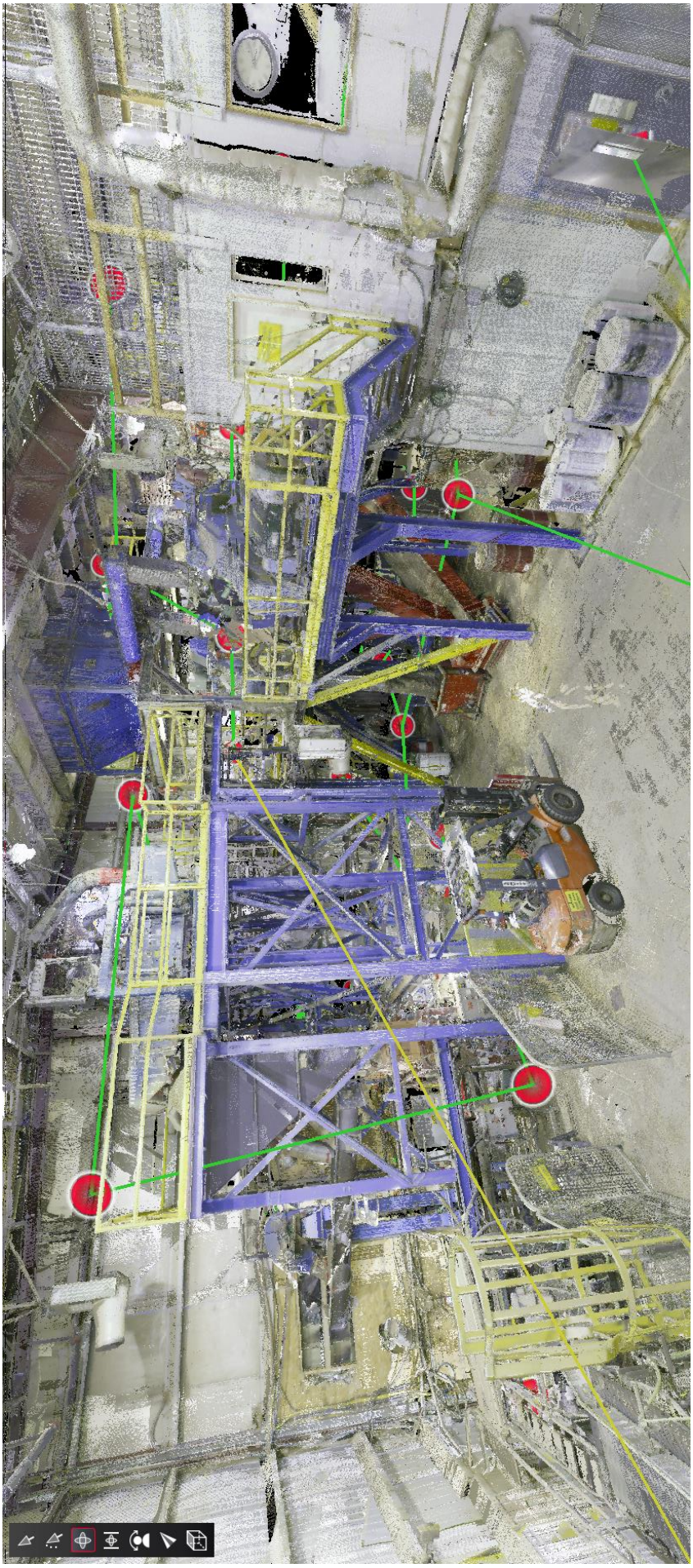
3D Scan of the plant in the drying area with the scan locations and the post processing links

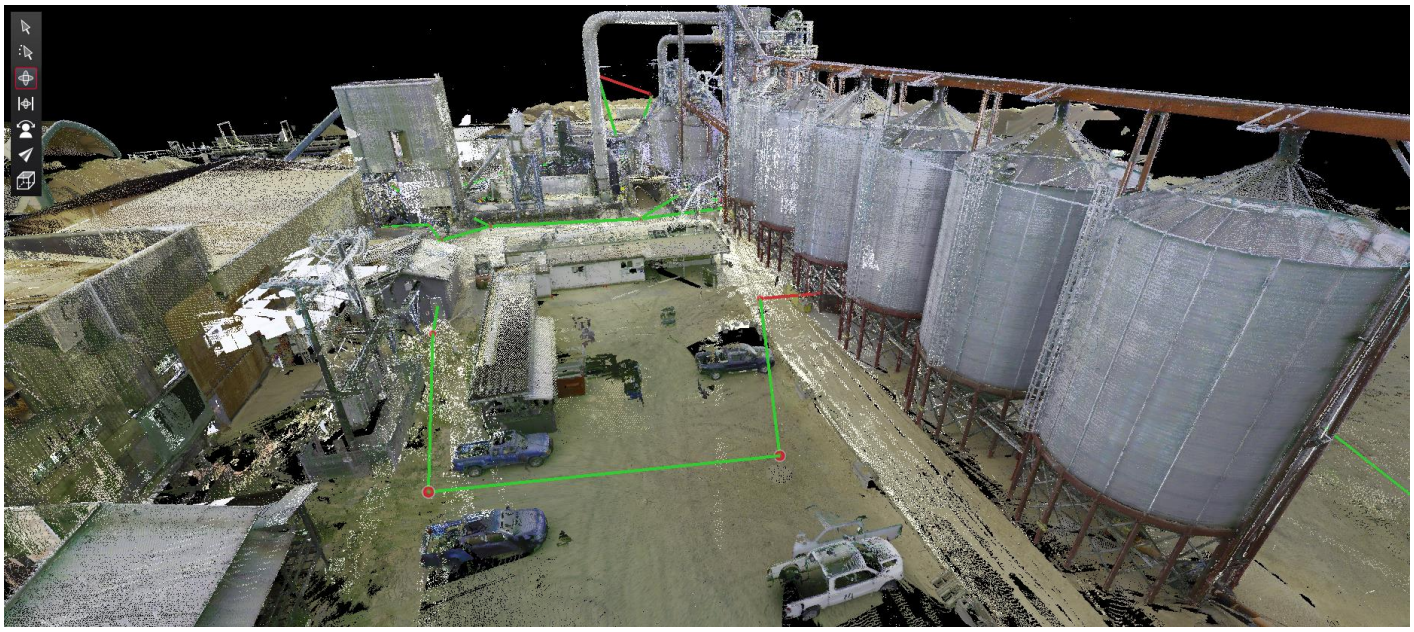


3D Scan of the plant in the pelletizing area with the scan locations and the post processing links



3D Scan of the plant in the pellet cooling area with the scan locations and the post processing links





3D Scan of the plant in the pelletizing area with the scan locations and the post processing links

Prashanth using manlift to 3D scan the plant from high elevation-Capturing from far away

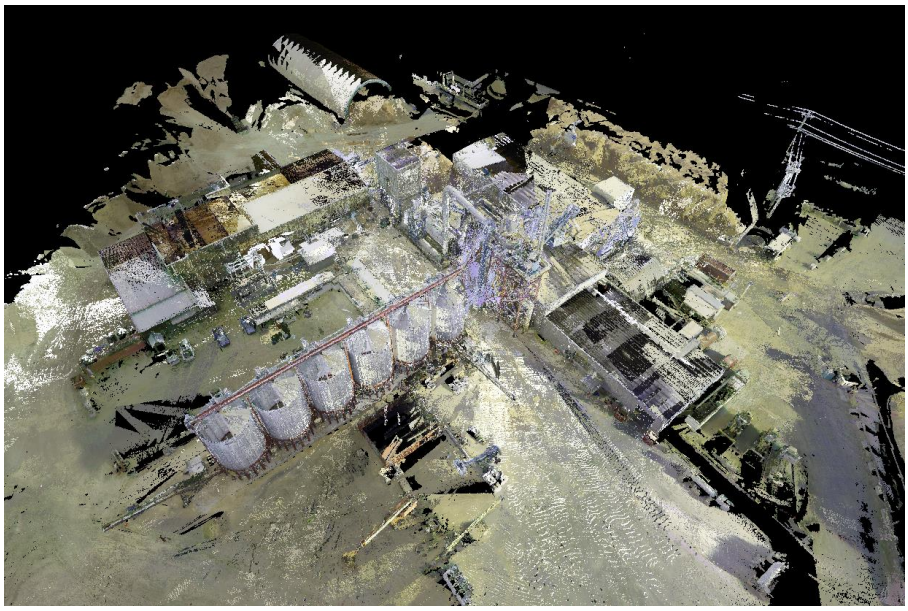

Prashanth using manlift to 3D scan the plant from high elevation-Capturing close up

# Section 06-3D Modelling

## Capture
Site Data

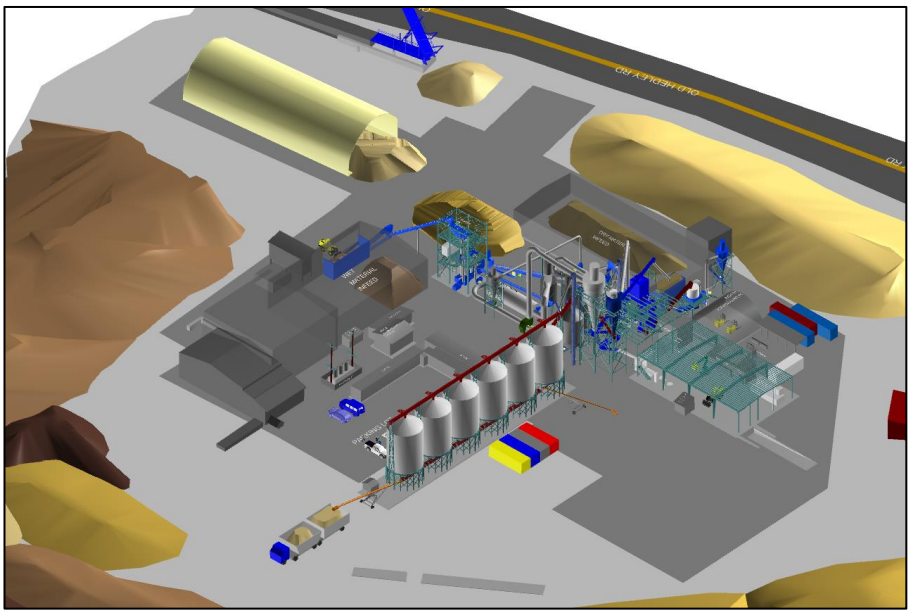
(3 Days)

## Construct
Point Cloud



(30 Hours)

## Create
3D Model



(3 Weeks)

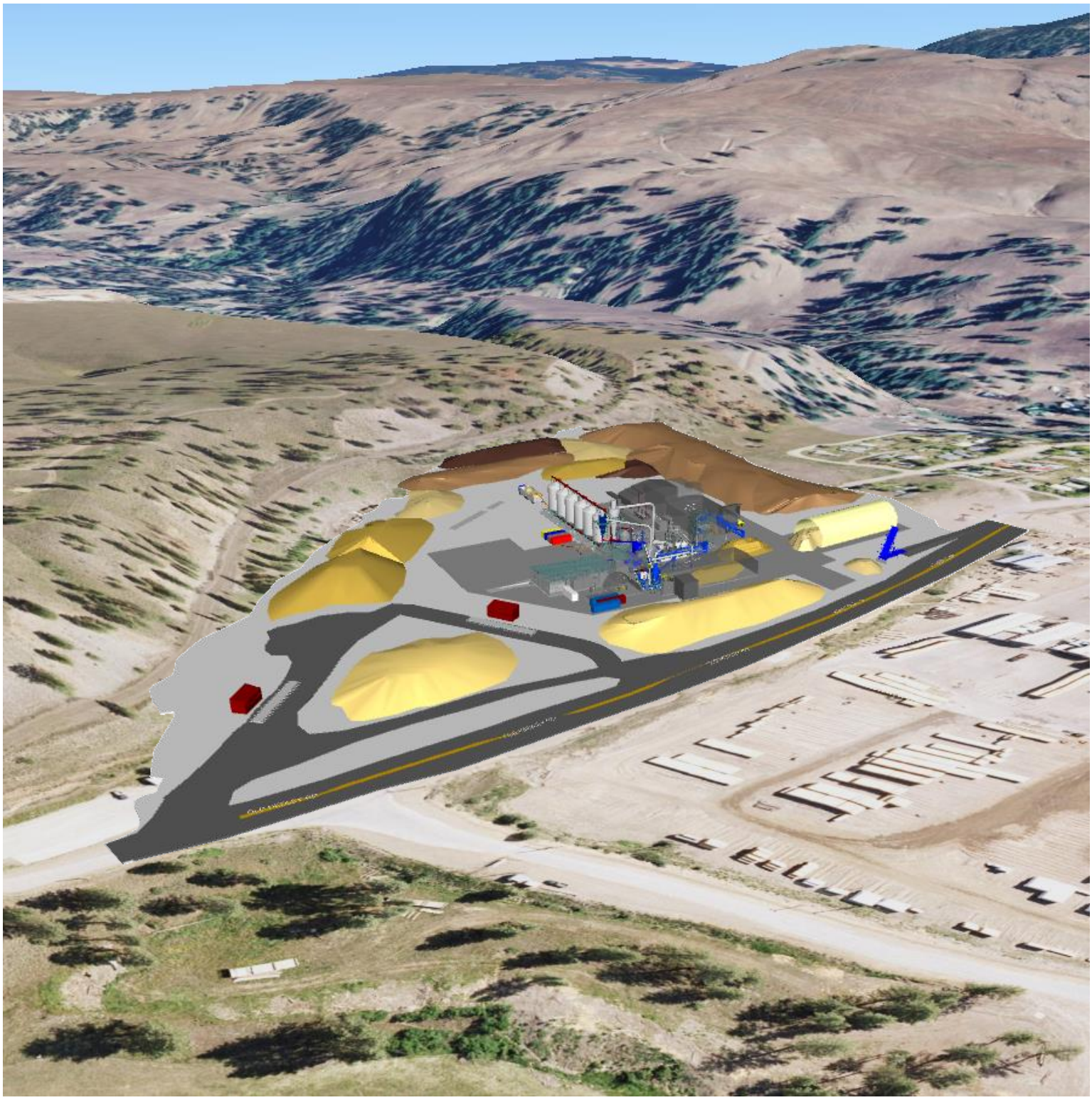
AUTODESK®
ADVANCE STEEL

AUTODESK®
RECAP™

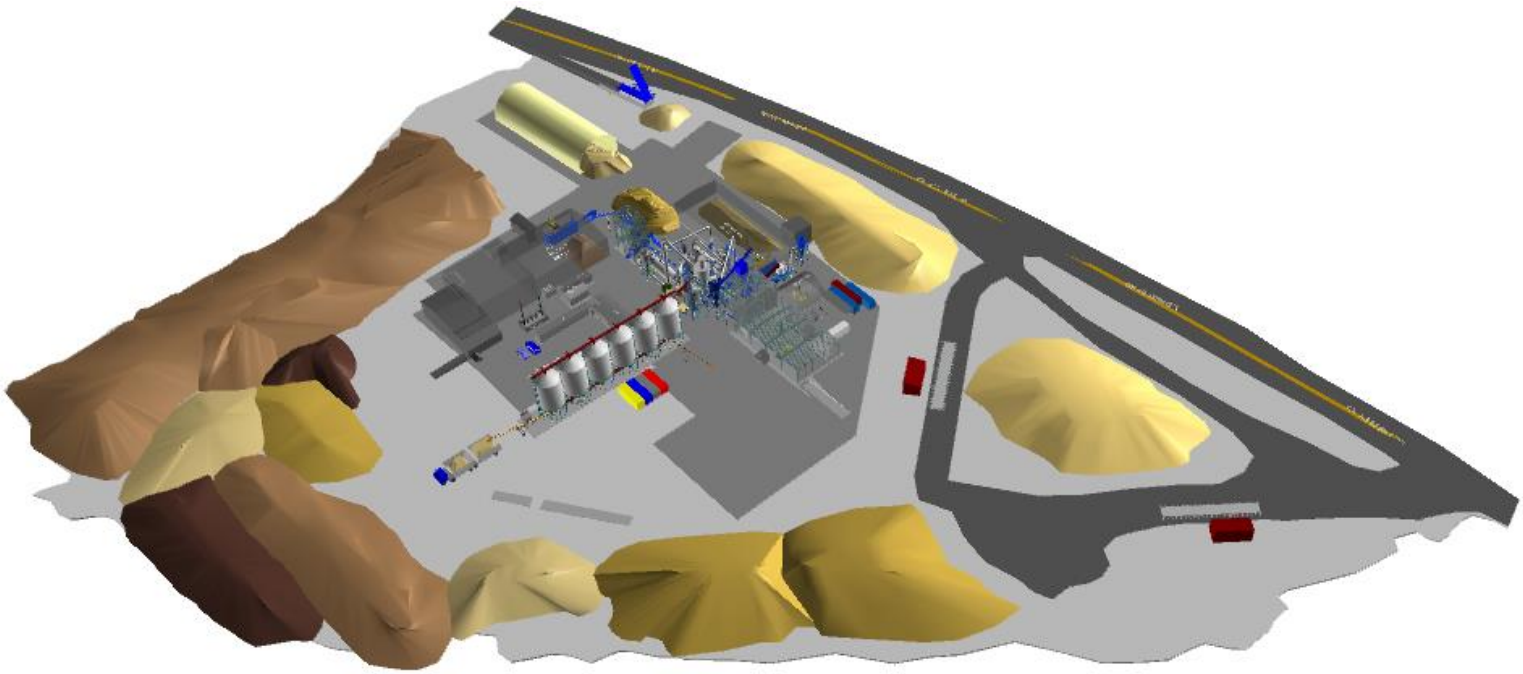
AUTODESK®
NAVISWORKS®


3D model overlay on site

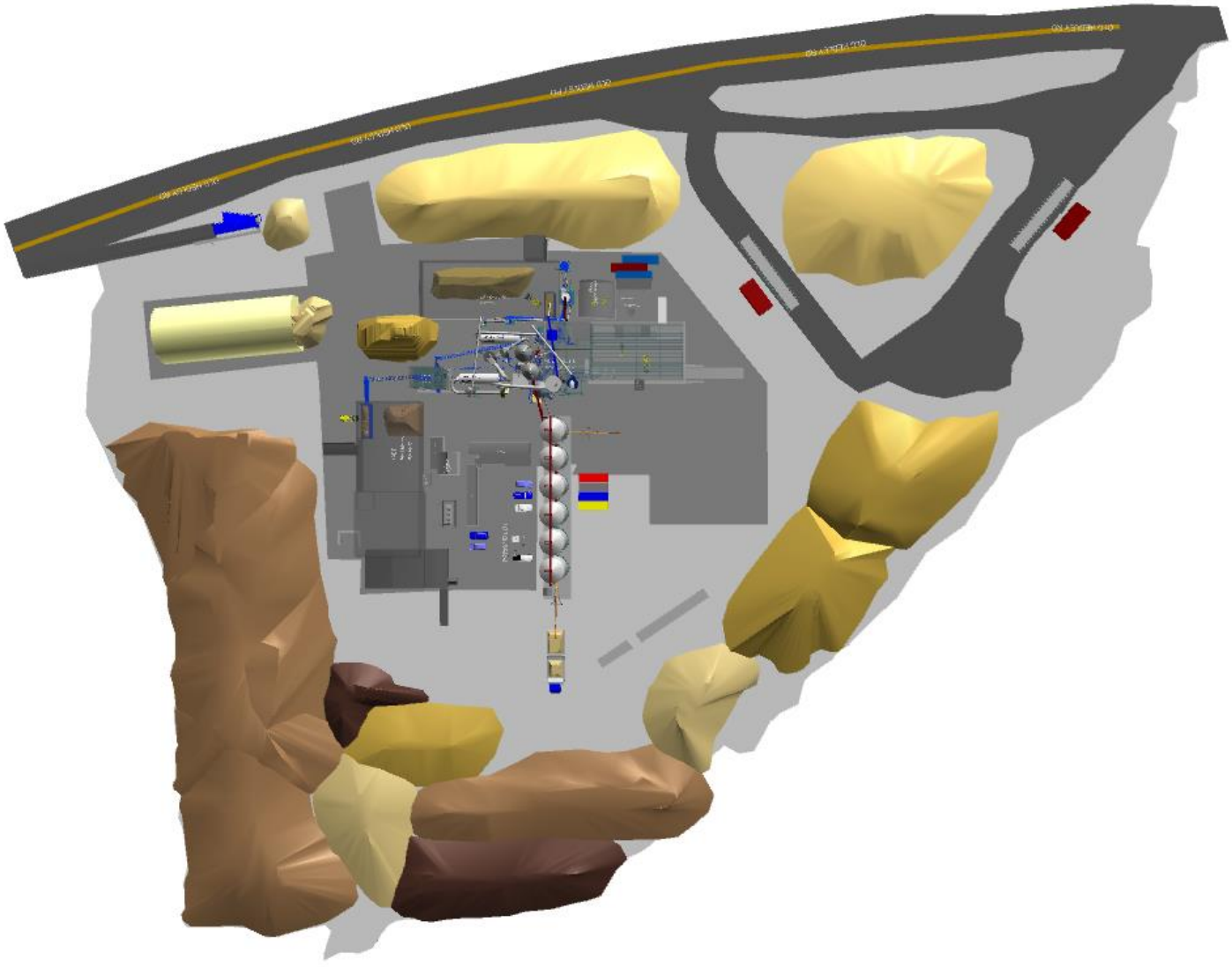

3D model overlay on site



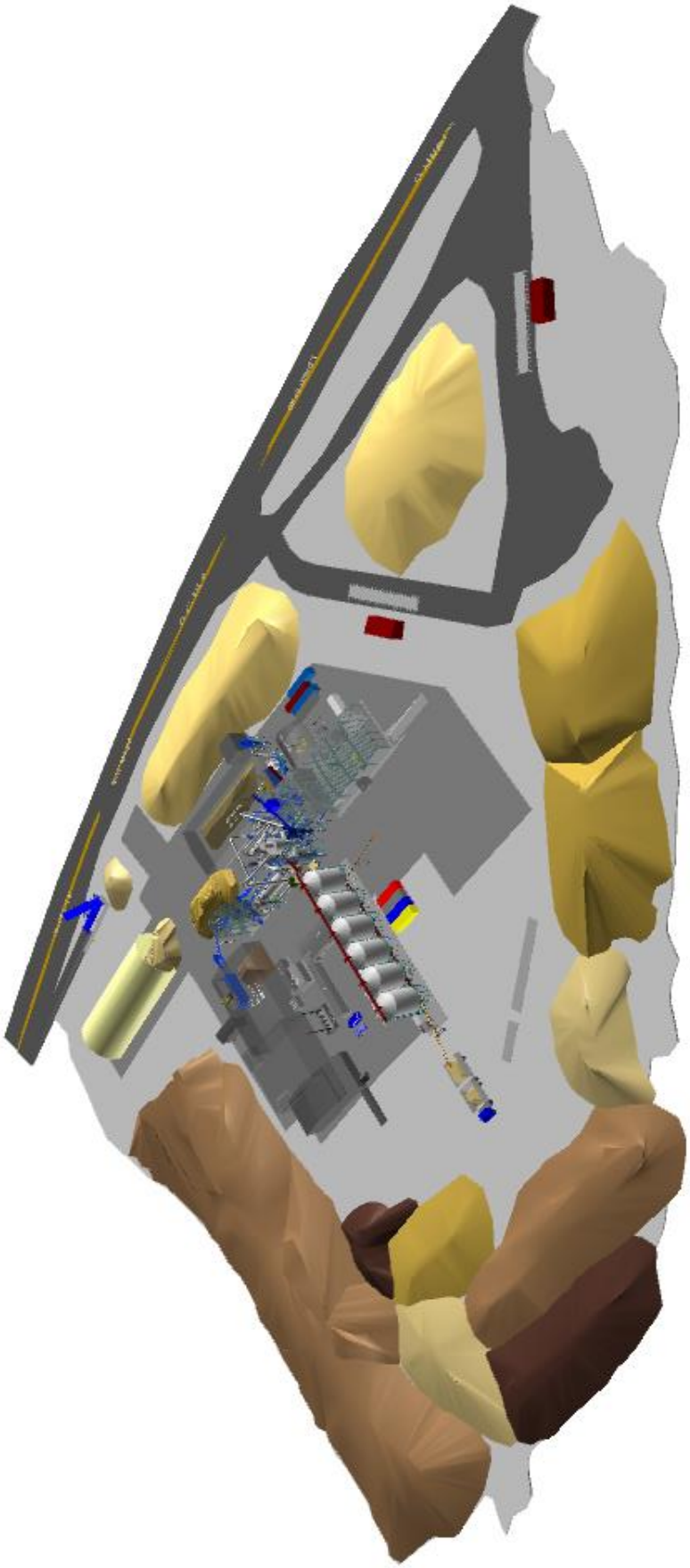
3D model overlay on site



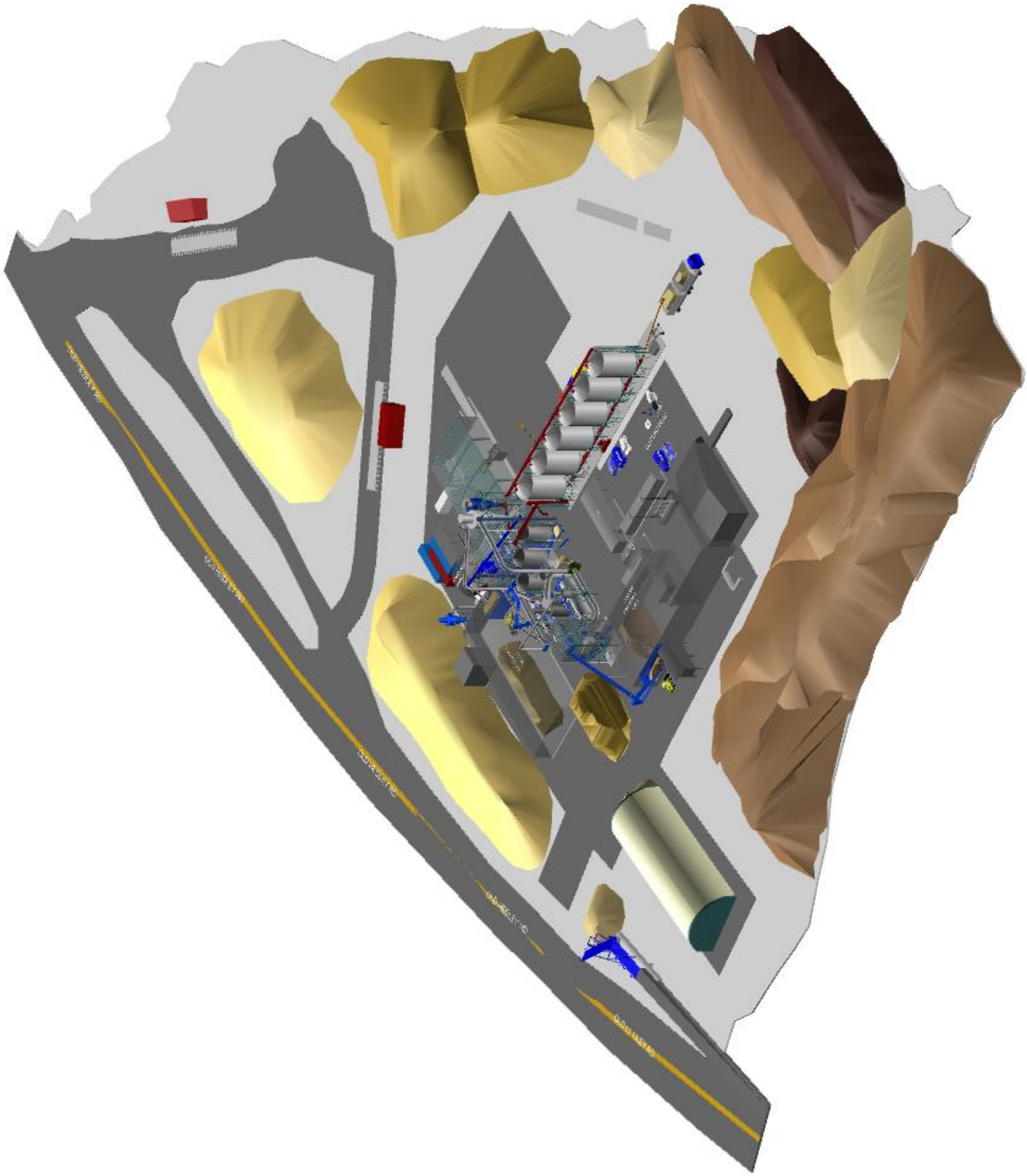
3D model of the plant and site in isometric-View 01



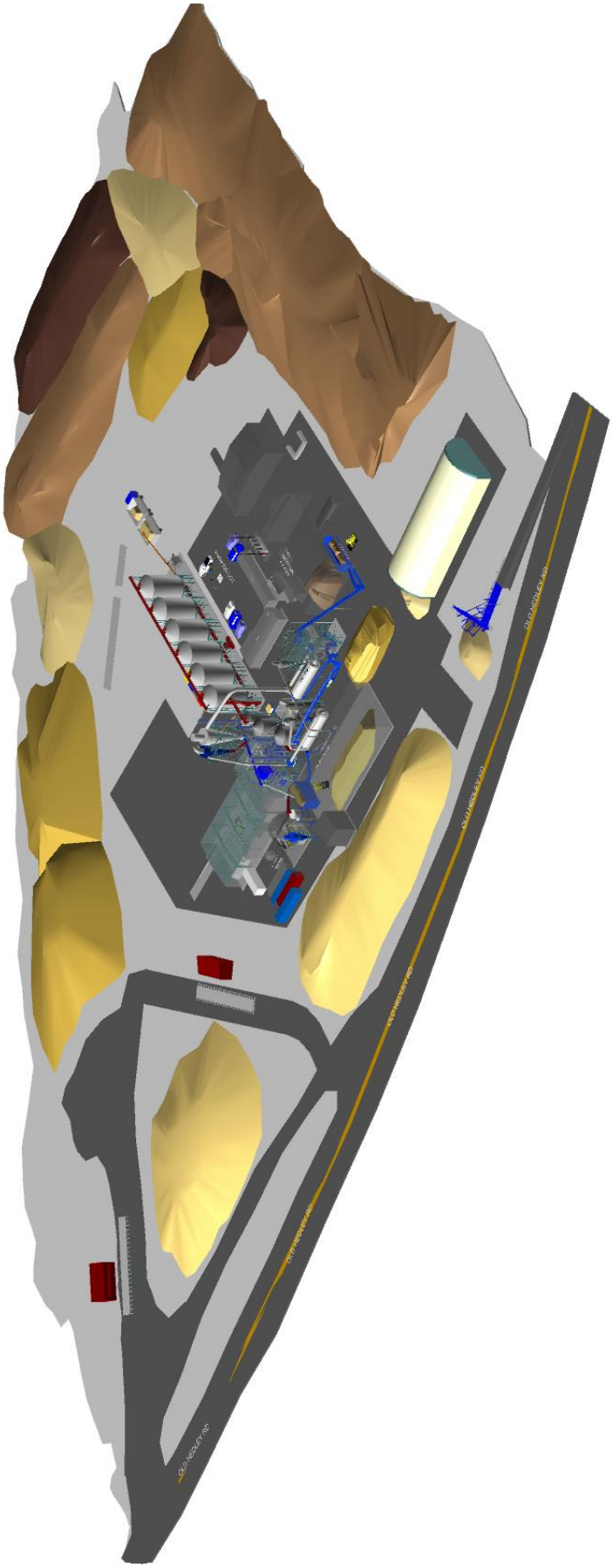
3D model of the plant and site in top view



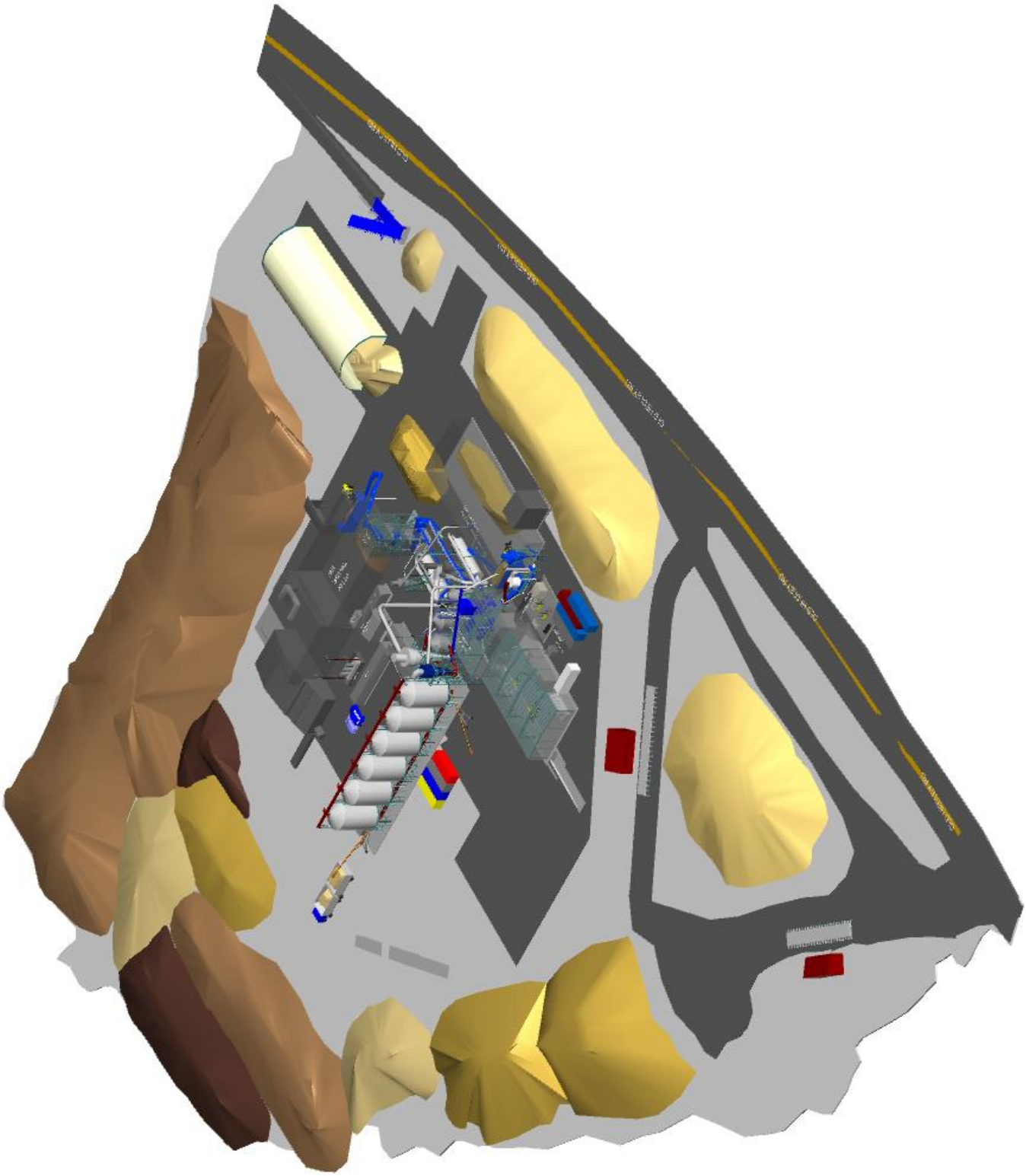
3D model of the plant and site in isometric-View 01



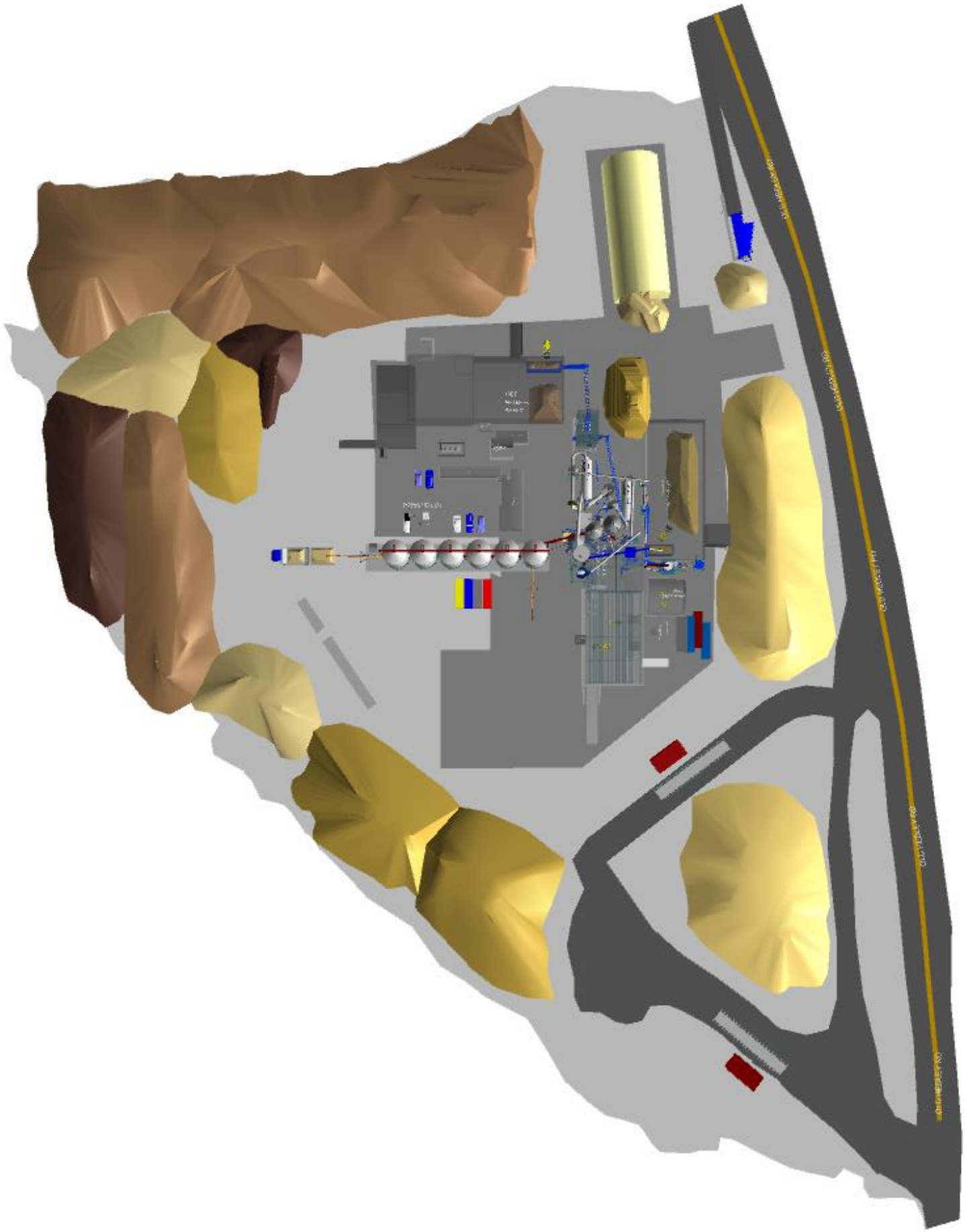
3D model of the plant and site in isometric-View 02



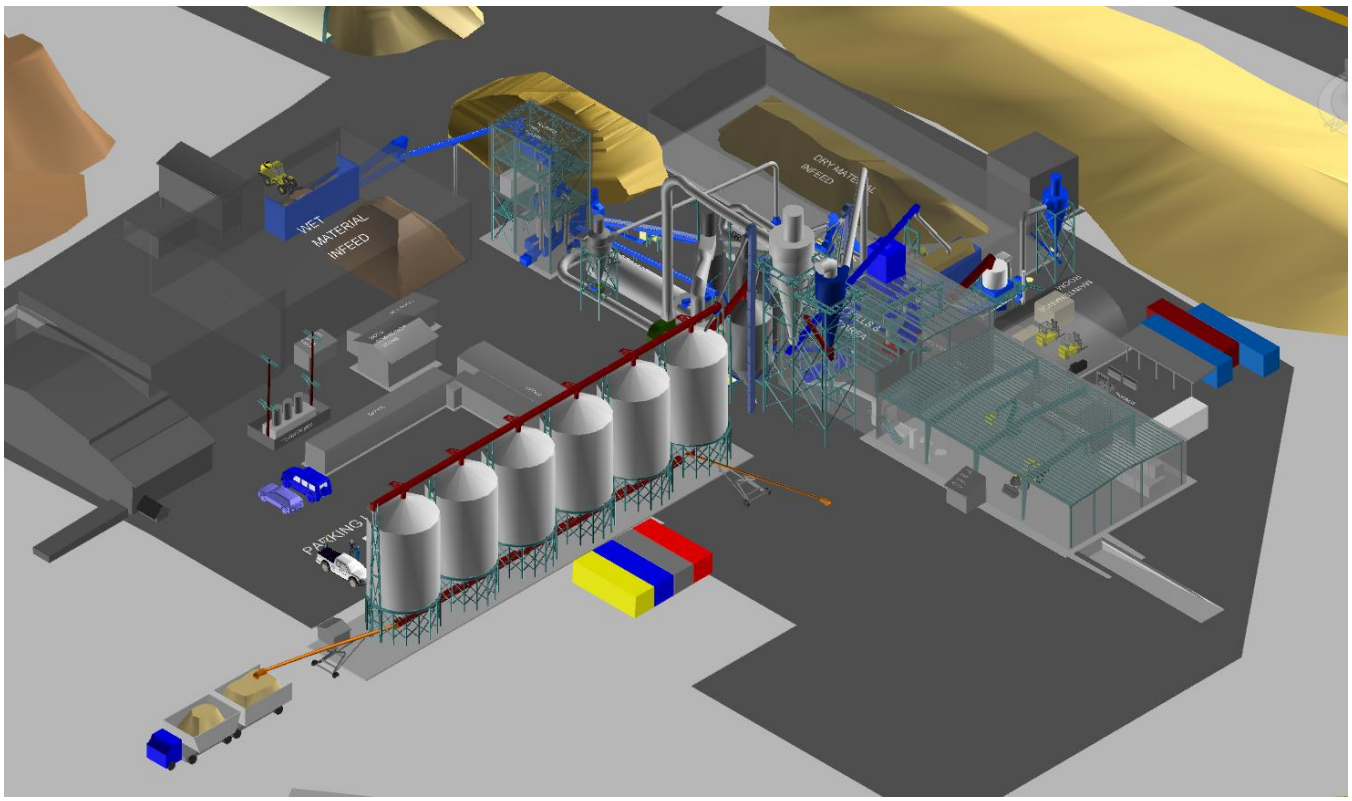
3D model of the plant and site in isometric-View 03



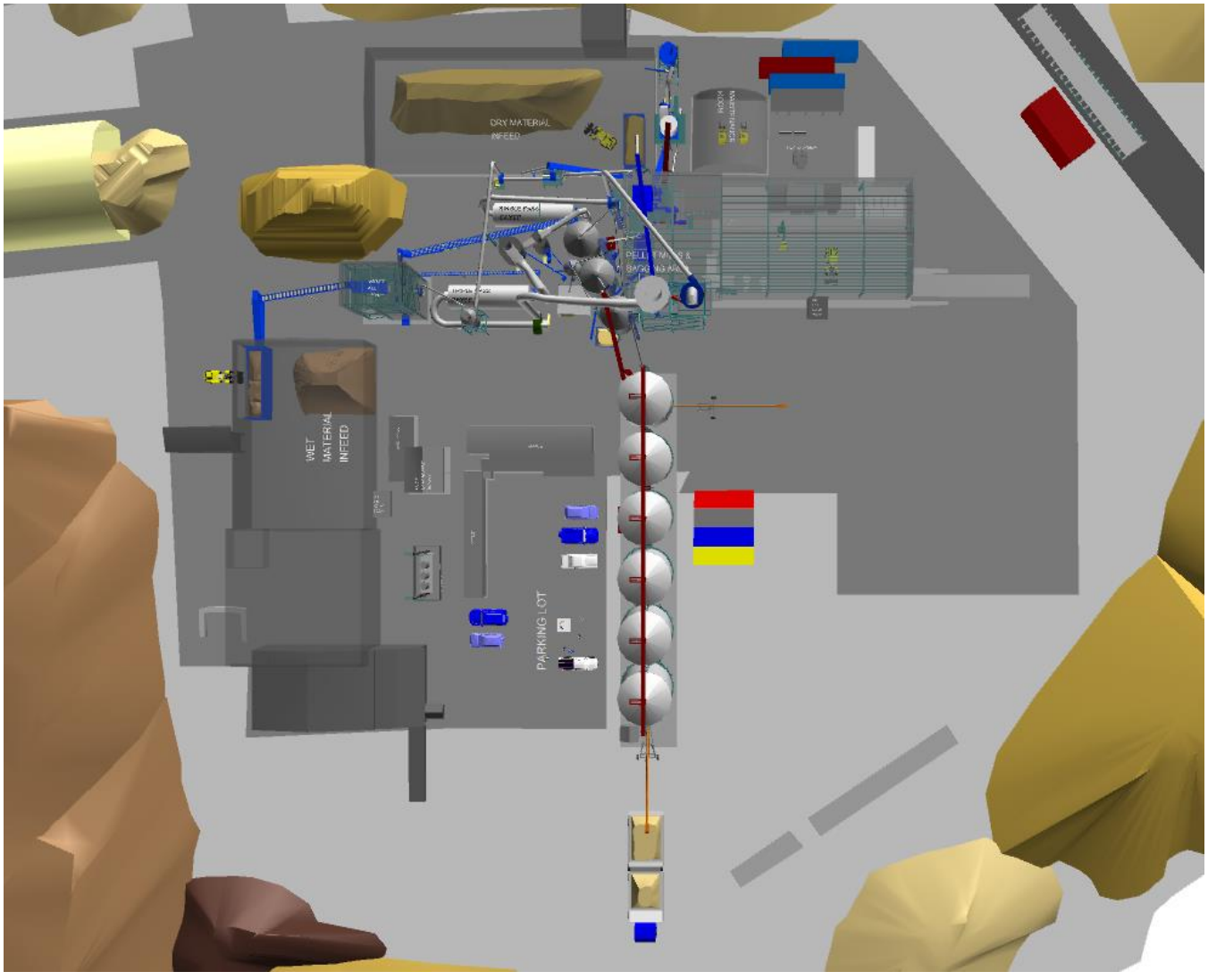
3D model of the plant and site in isometric-View 04



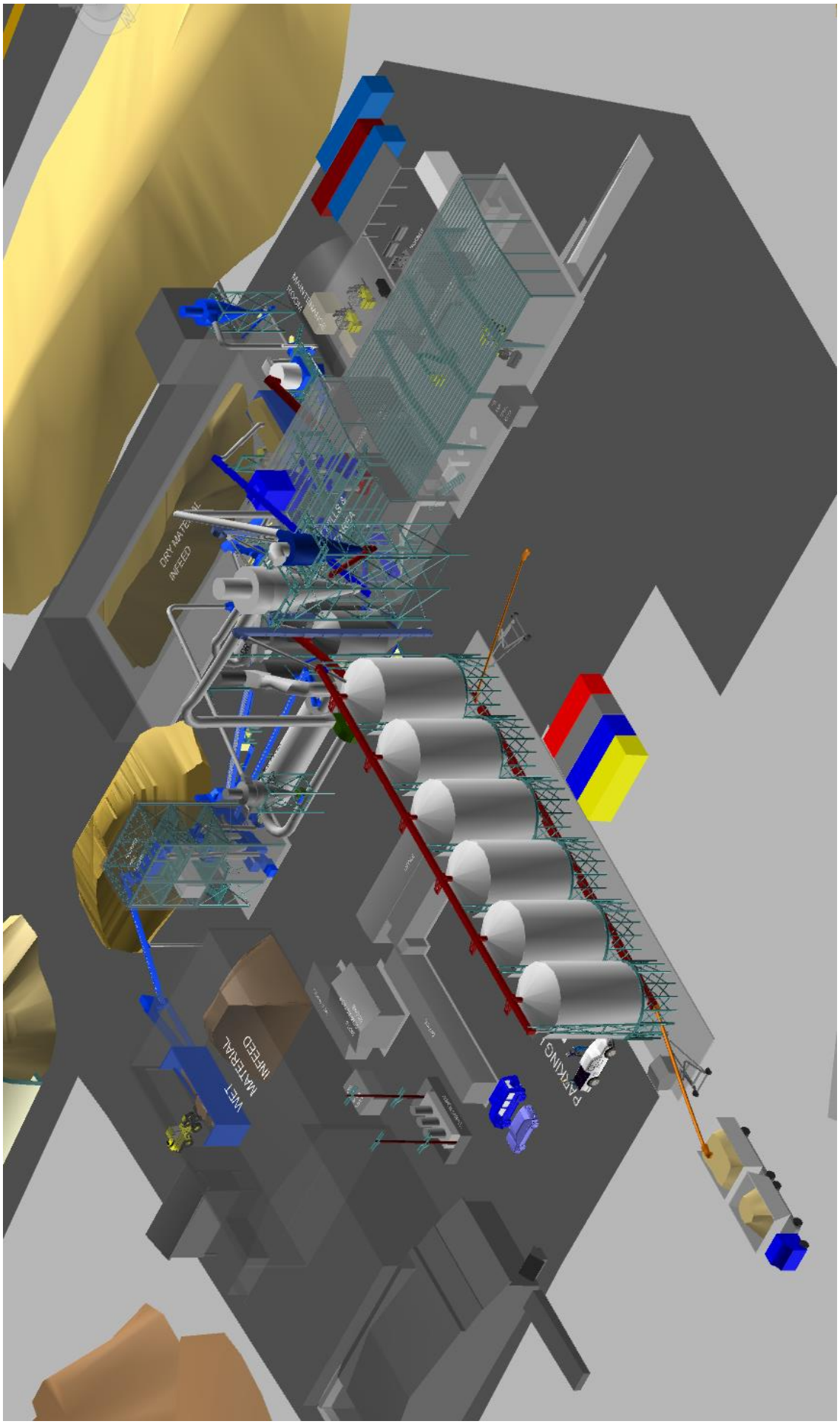
3D model of the plant and site in top view



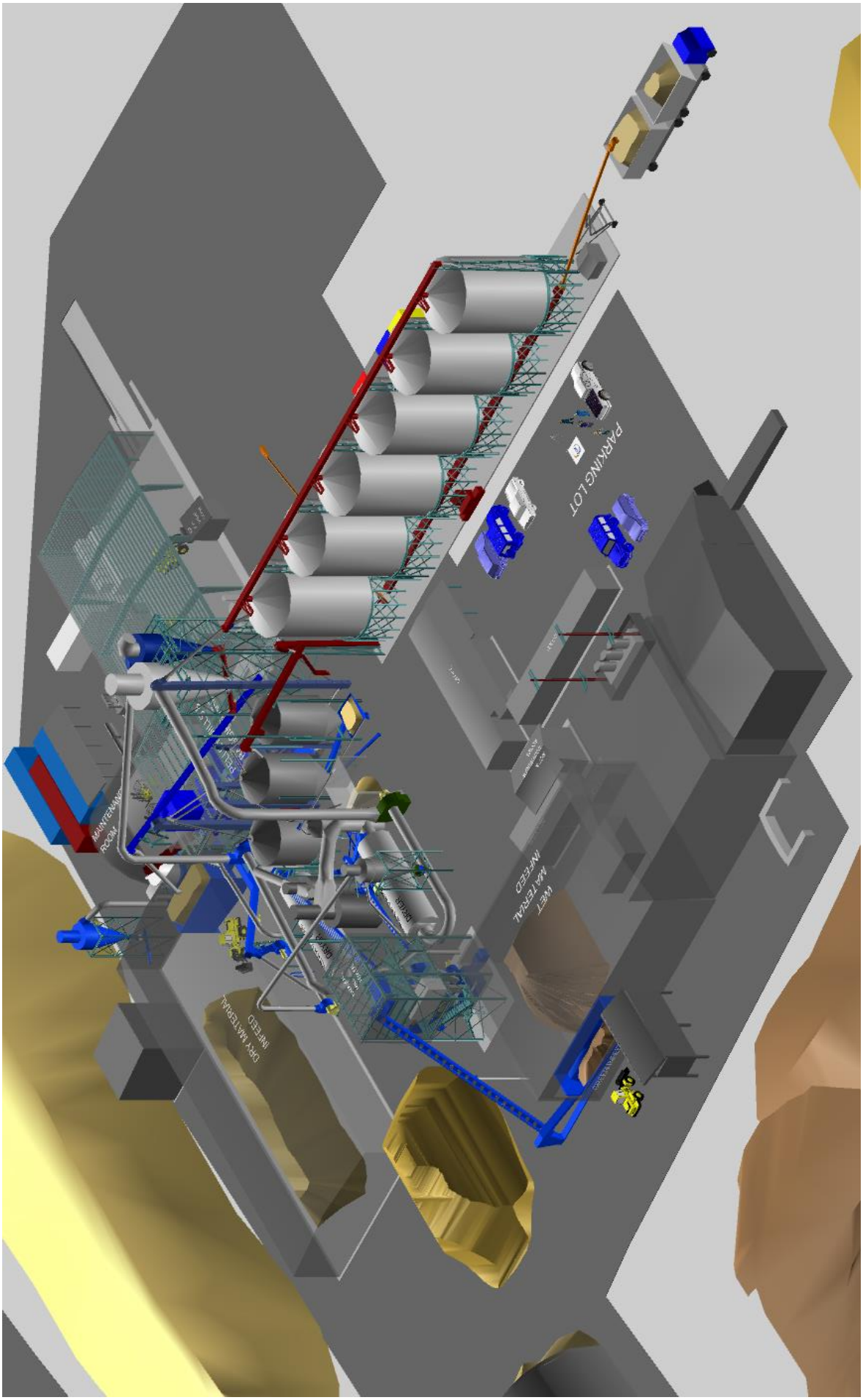

3D model of the plant in isometric-View 01



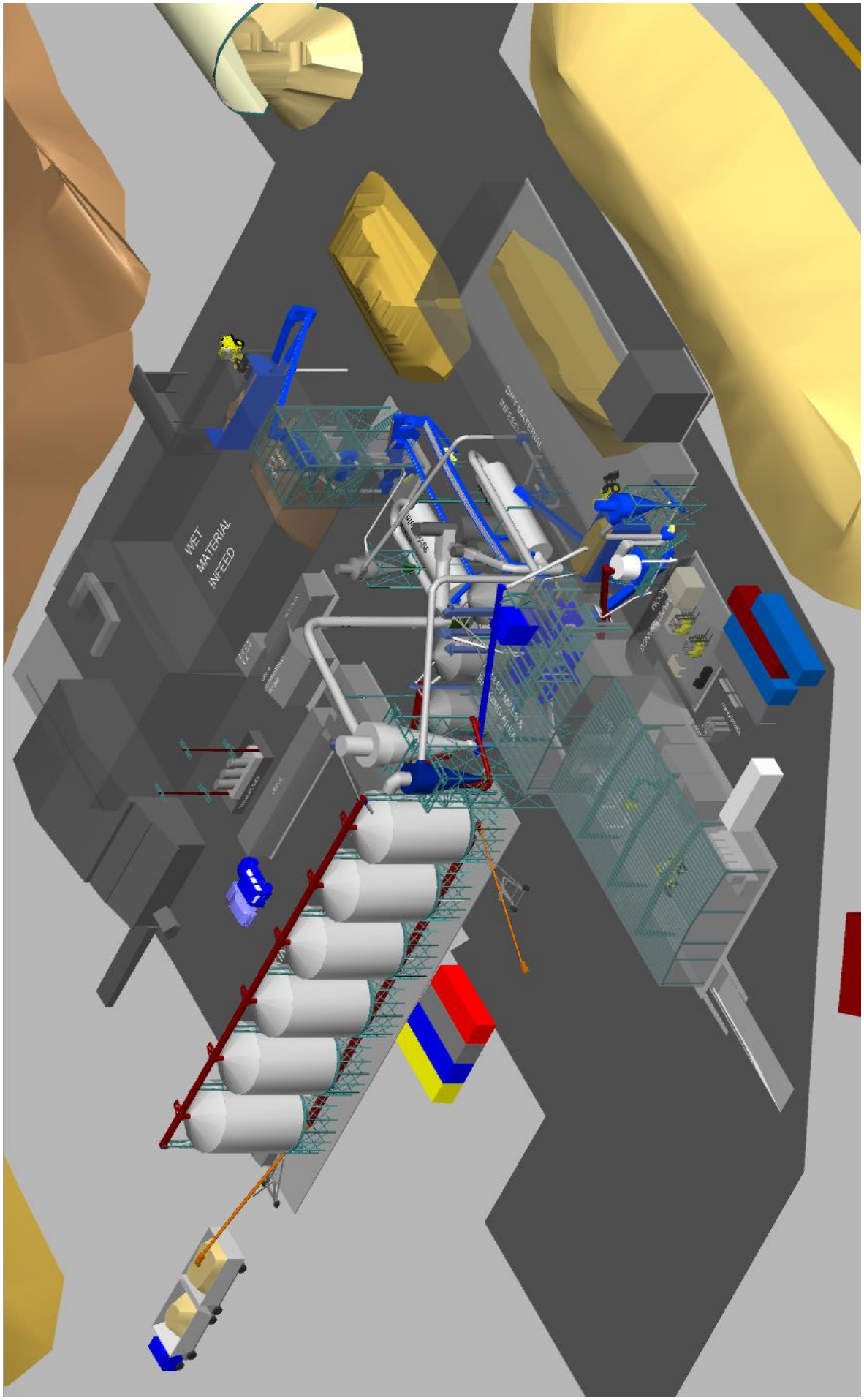

3D model of the plant in top view



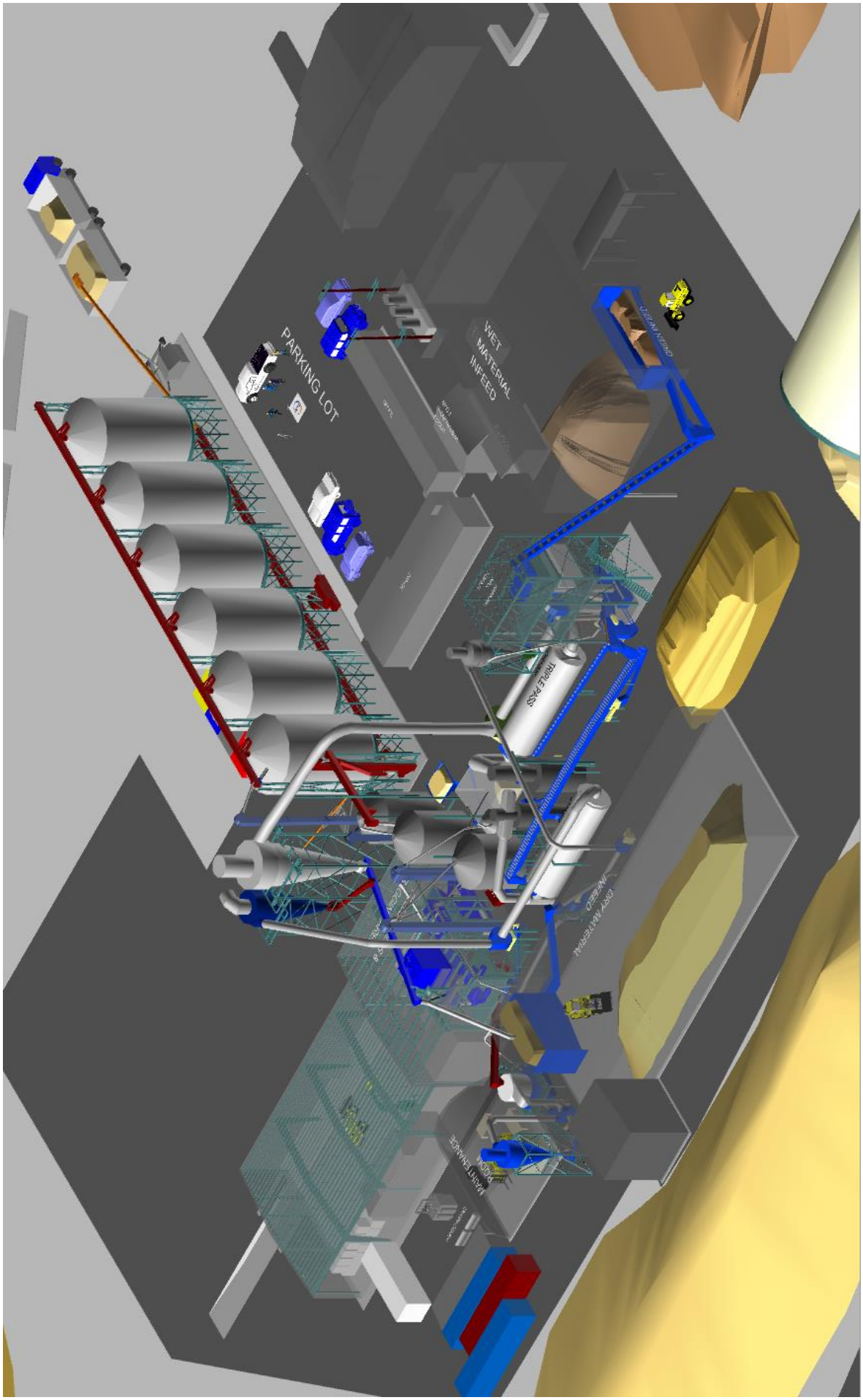

3D model of the plant in isometric-View 01



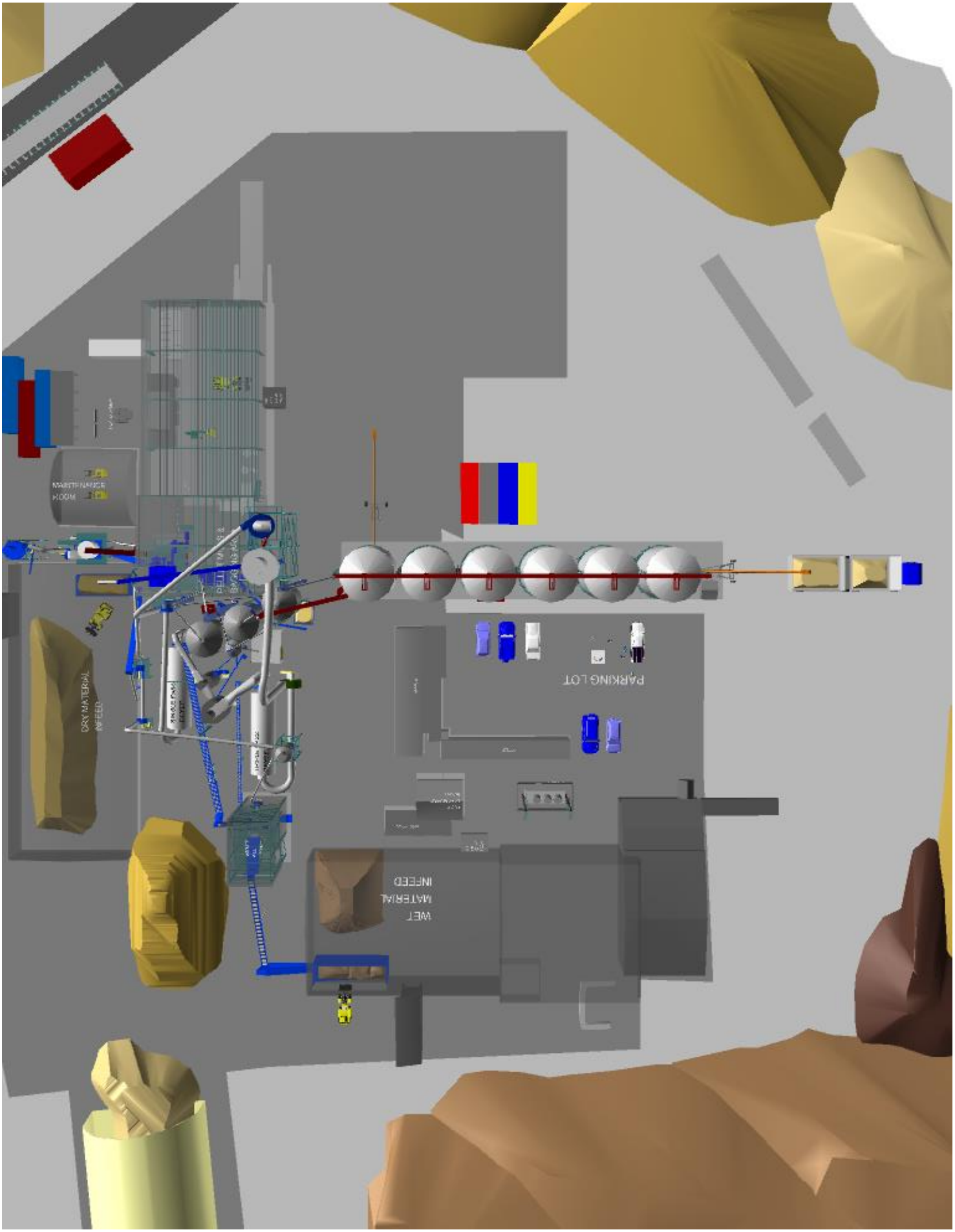

3D model of the plant in isometric-View 02



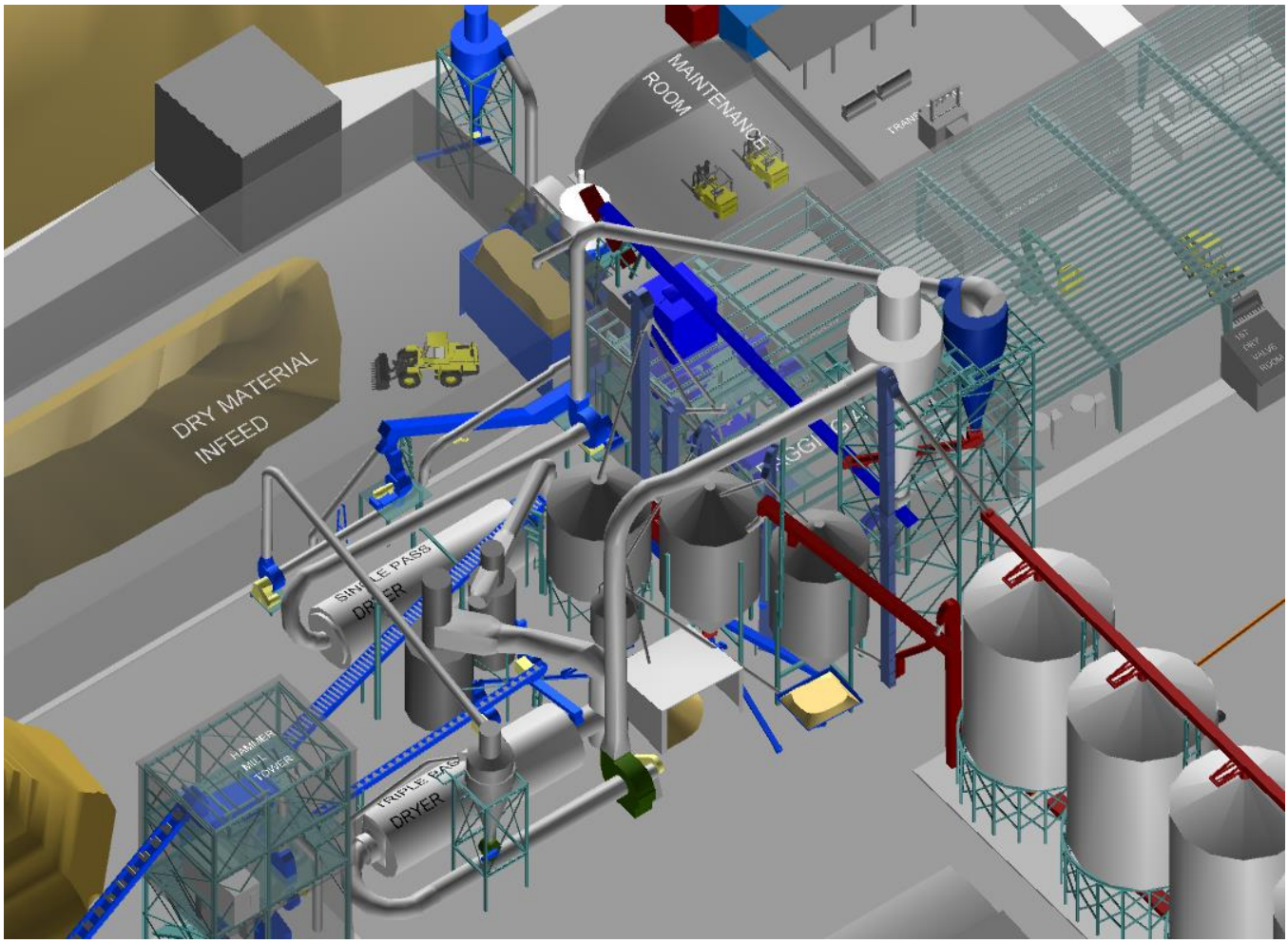

3D model of the plant in isometric-View 03



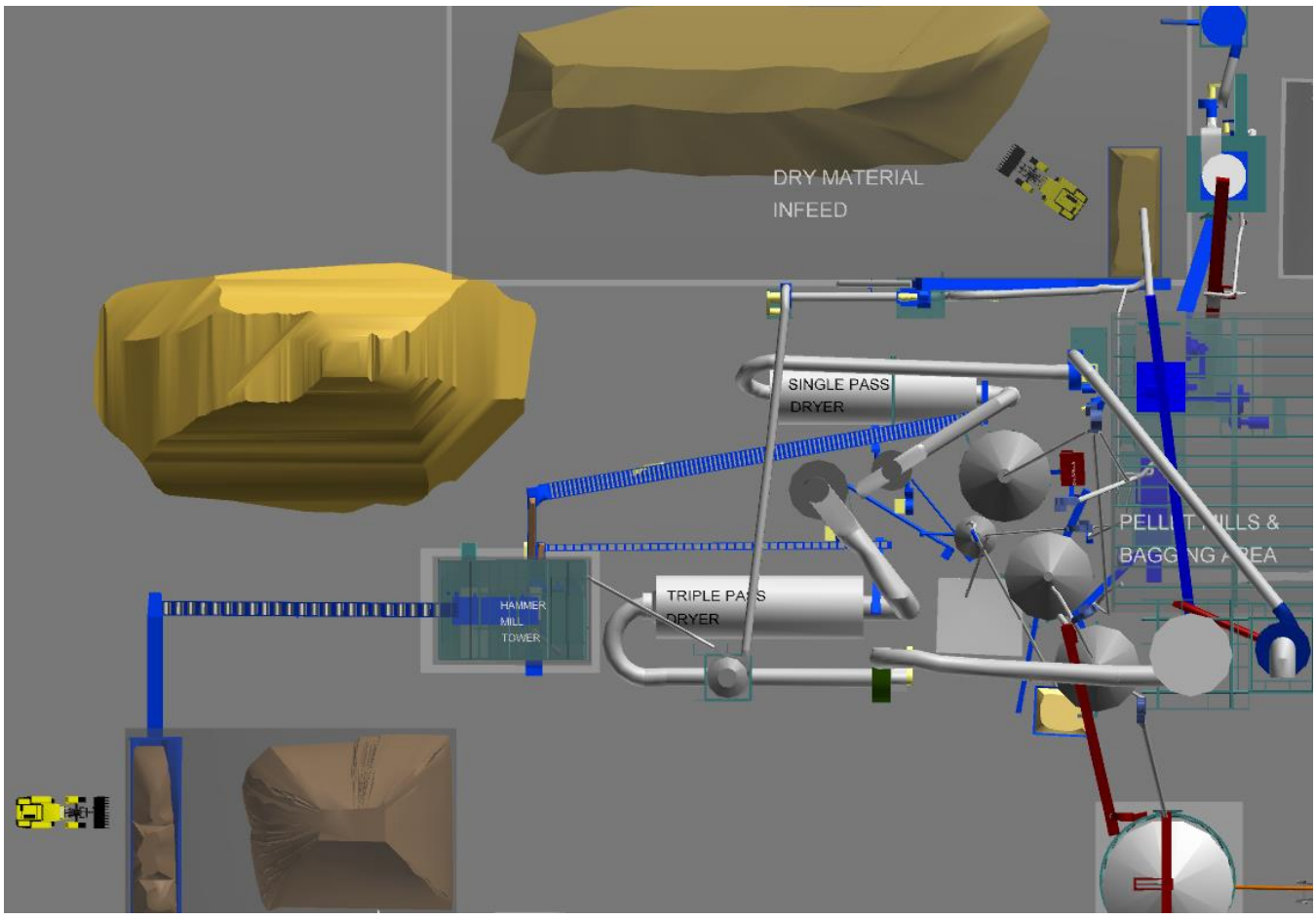

3D model of the plant in isometric-View 04



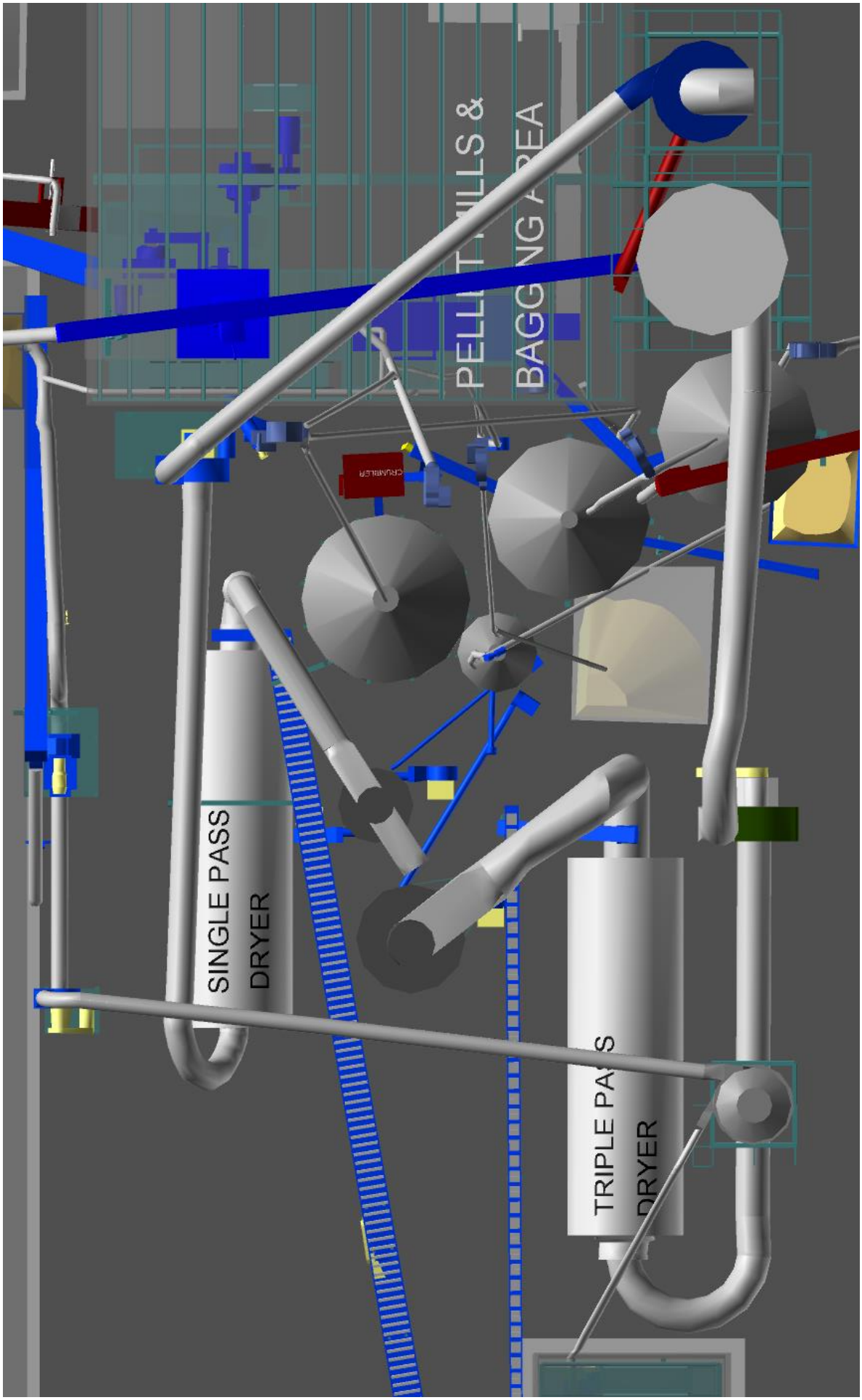

3D model of the plant in top view



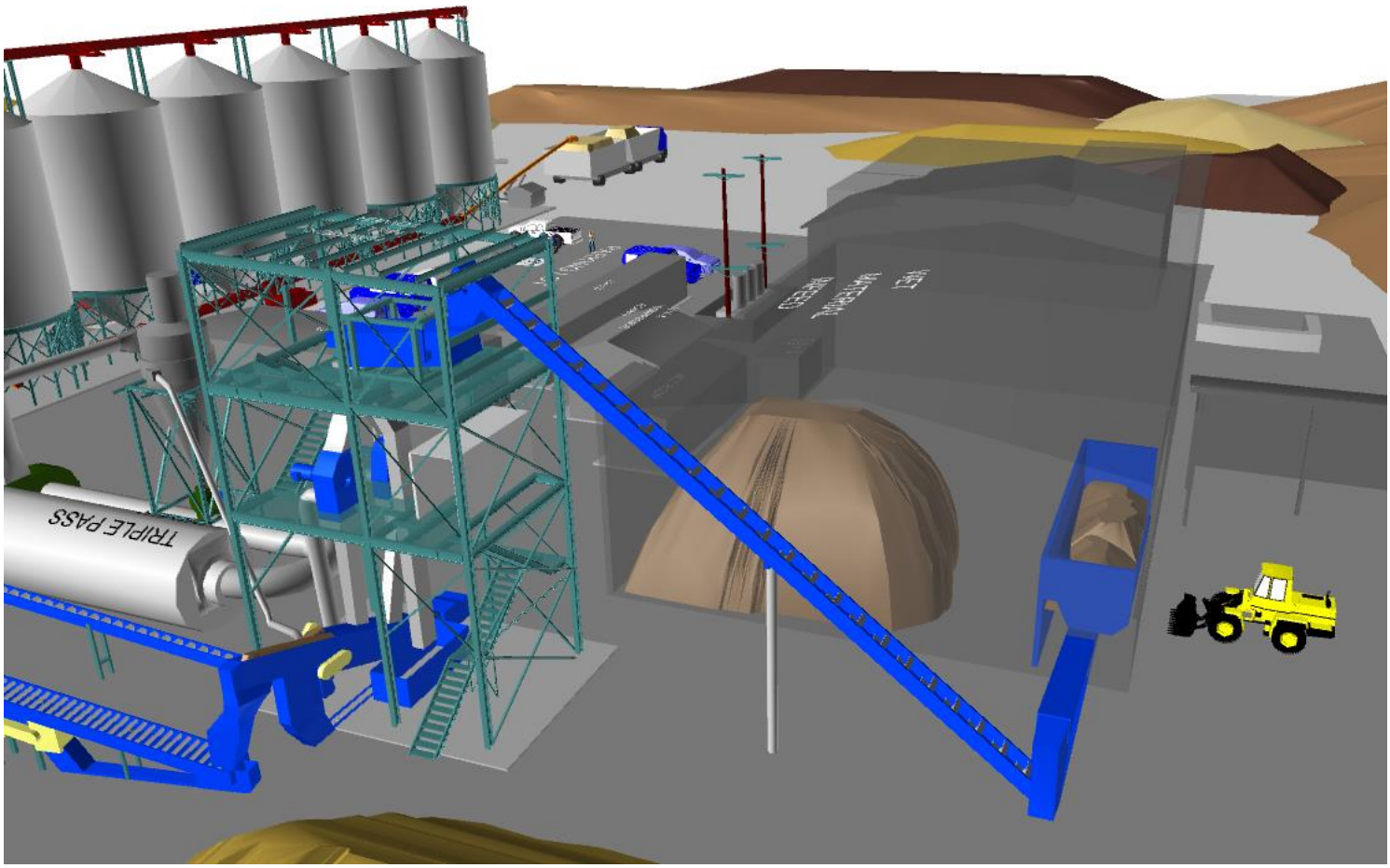

3D model of the equipment layout in isometric view



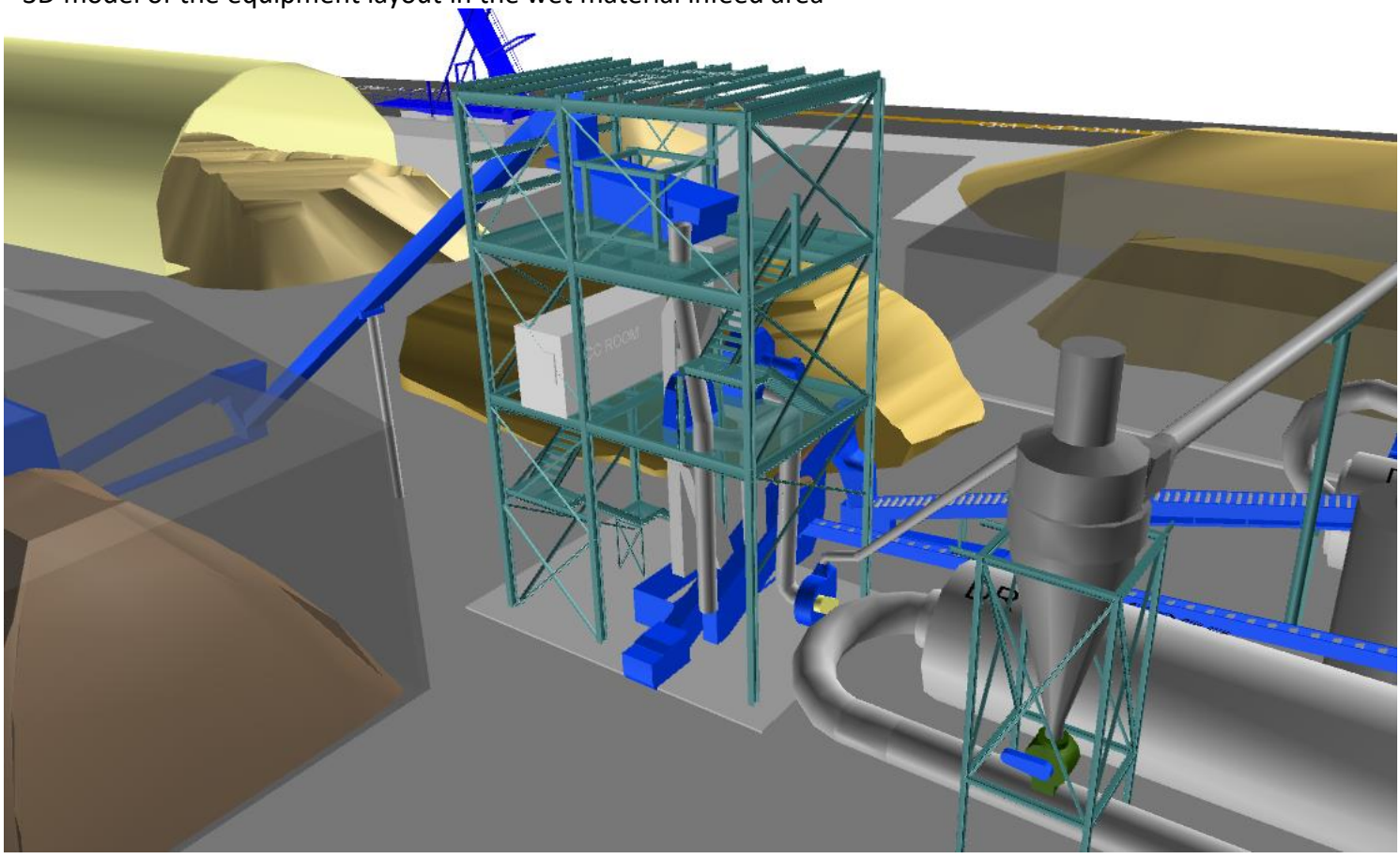

3D model of the equipment layout in top view



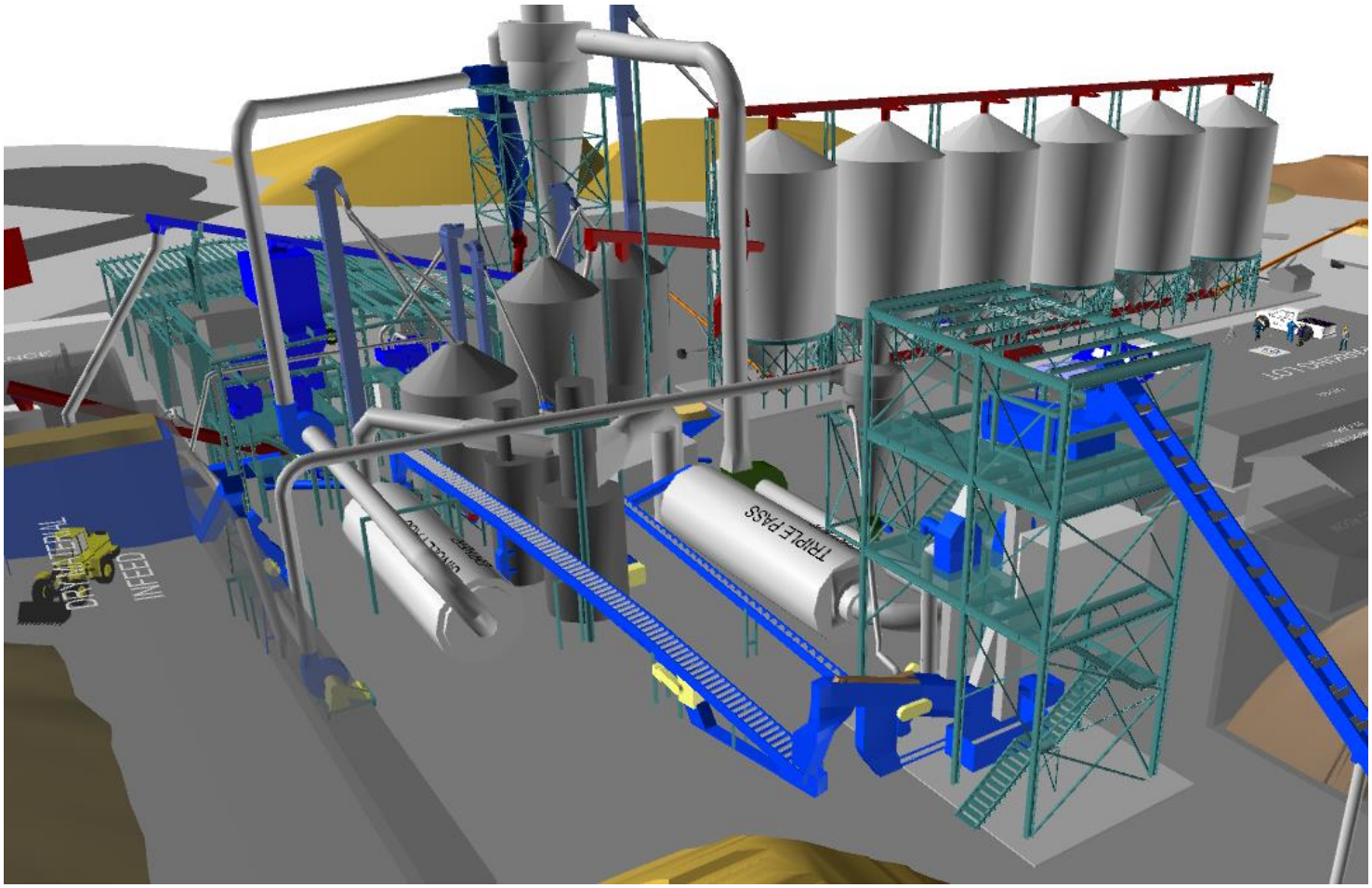

3D model of the equipment layout in top view



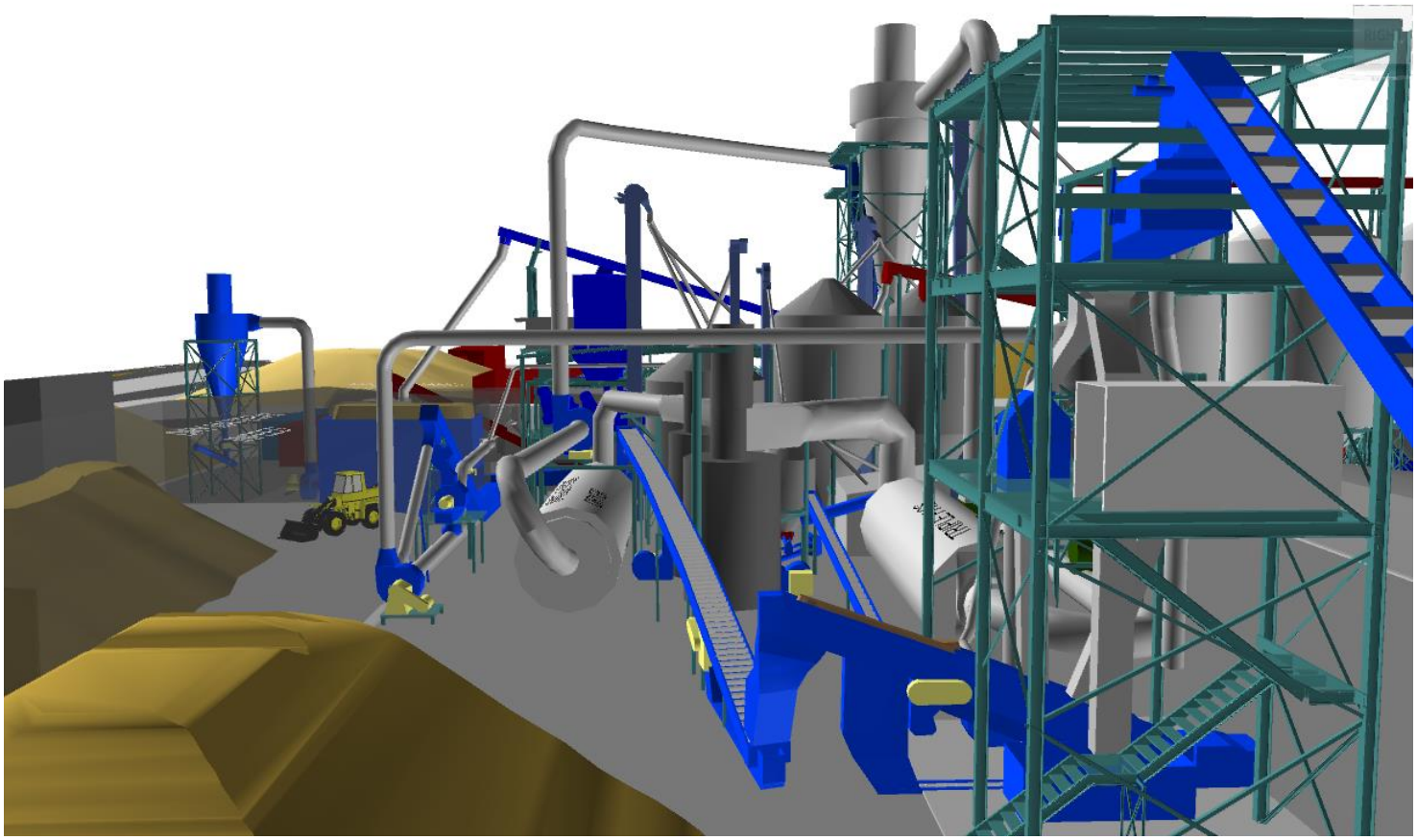

3D model of the equipment layout in the wet material infeed area



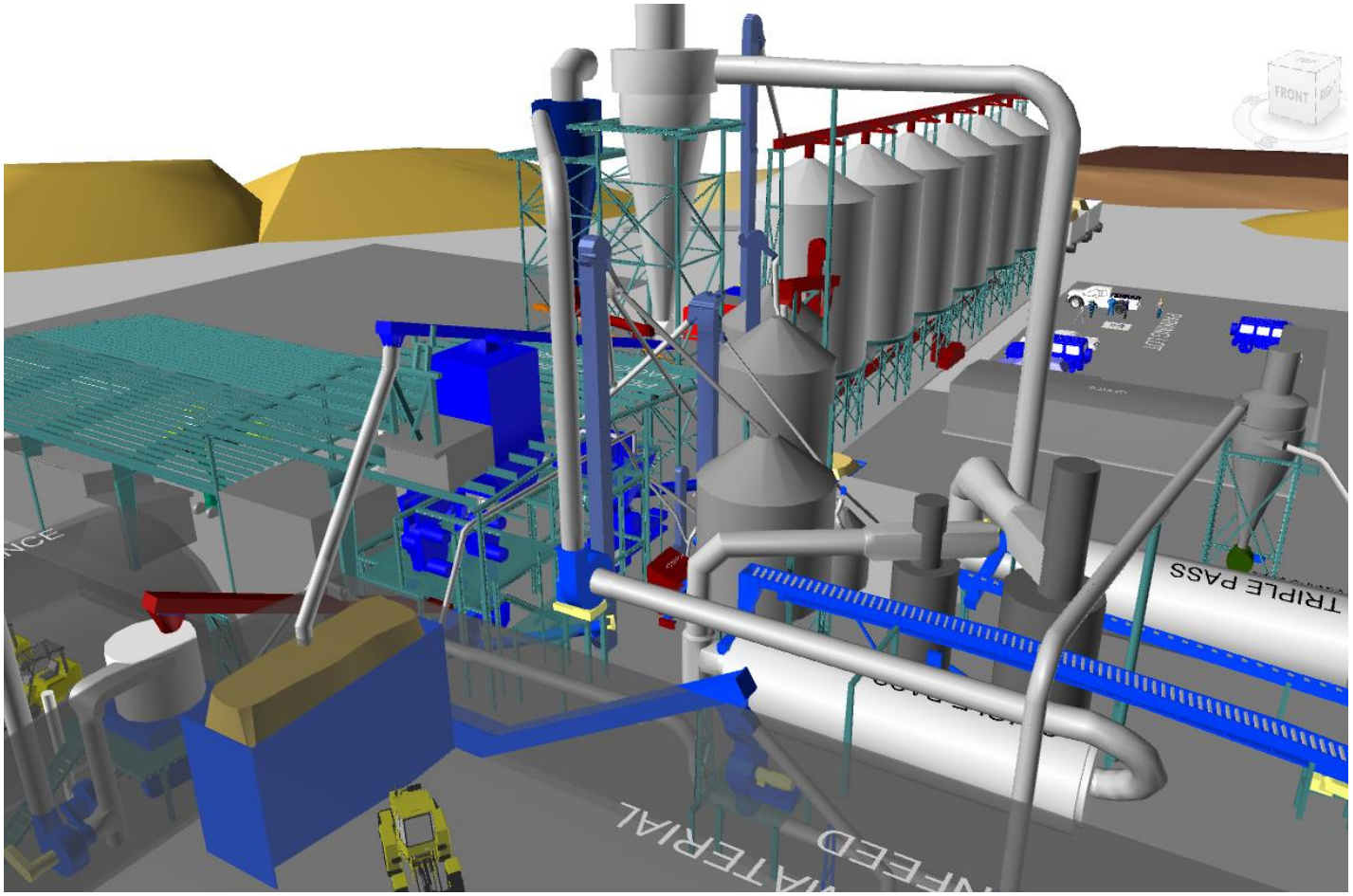
3D model of the equipment layout by the hammermill tower



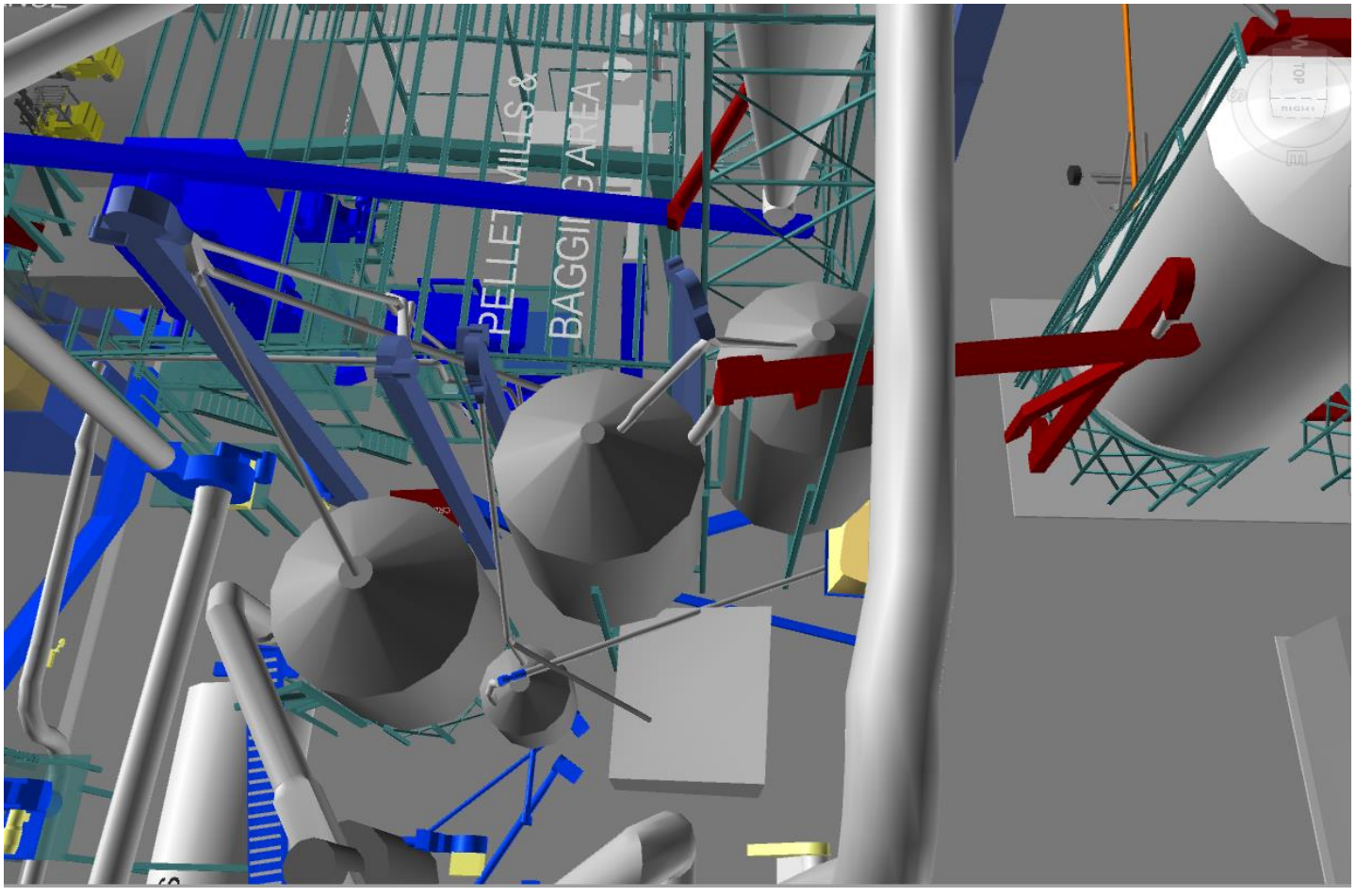

3D model of the equipment layout in the drying area



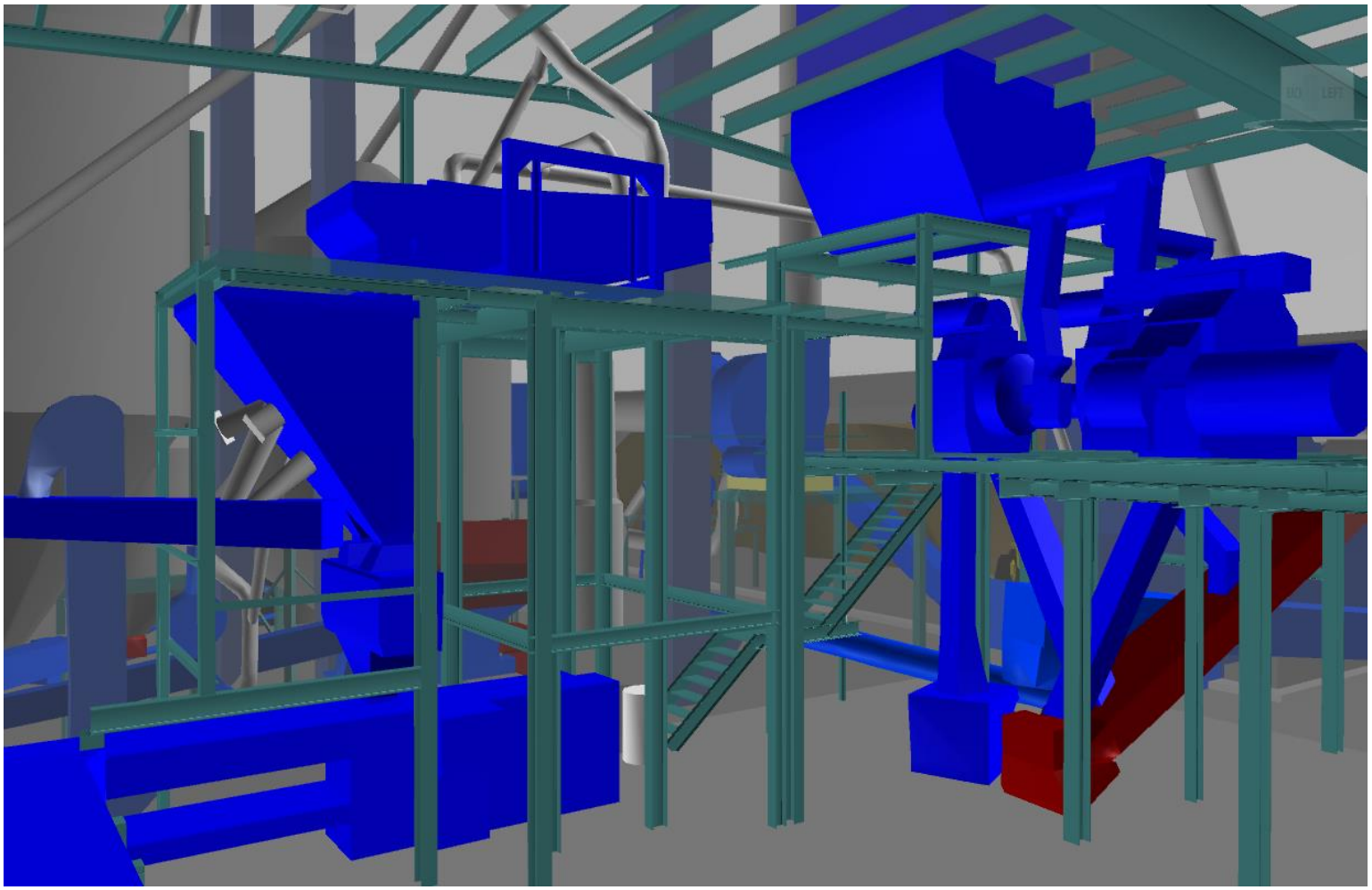
3D model of the equipment layout by the hammermill tower outfeed



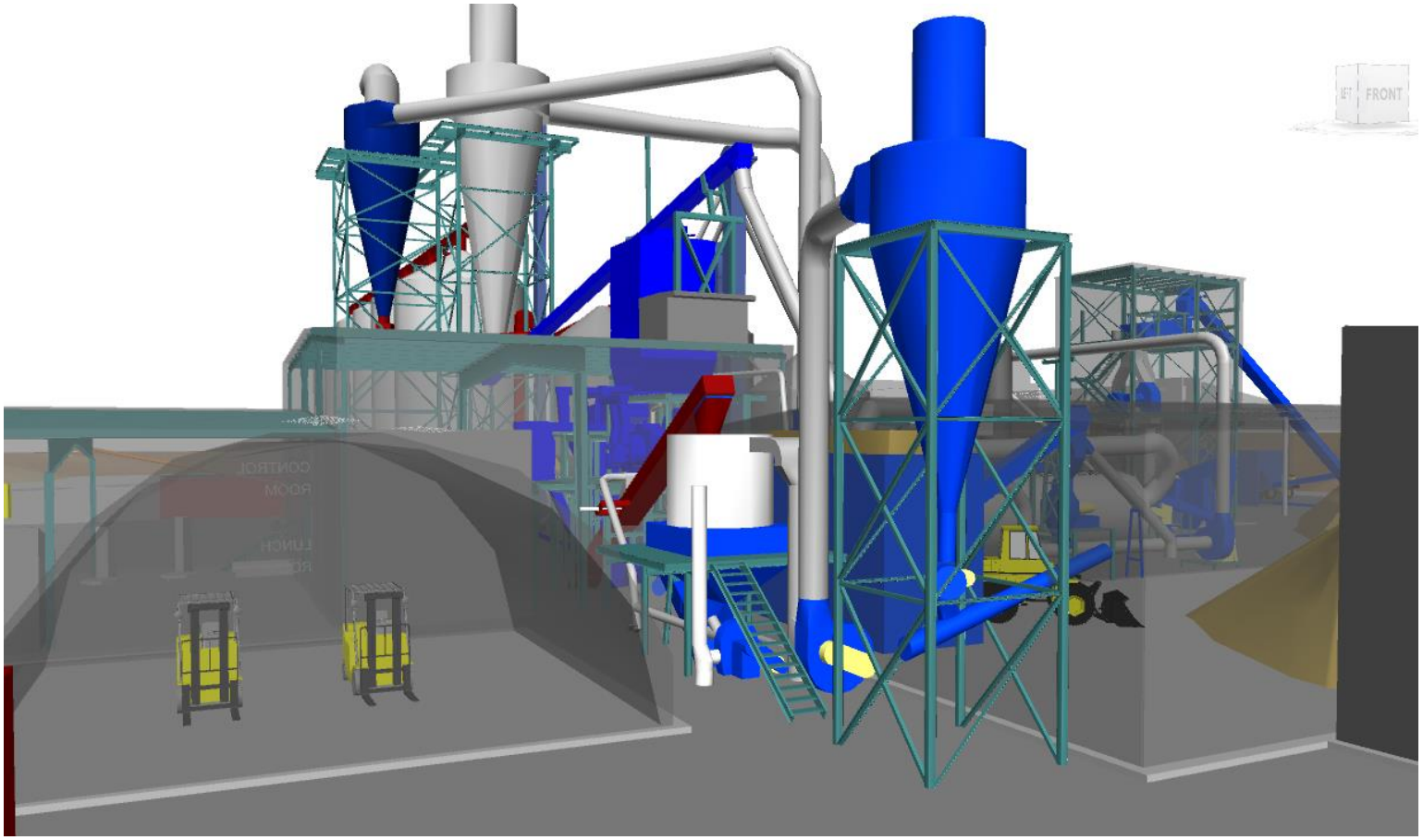

3D model of the equipment layout in the dry infeed area



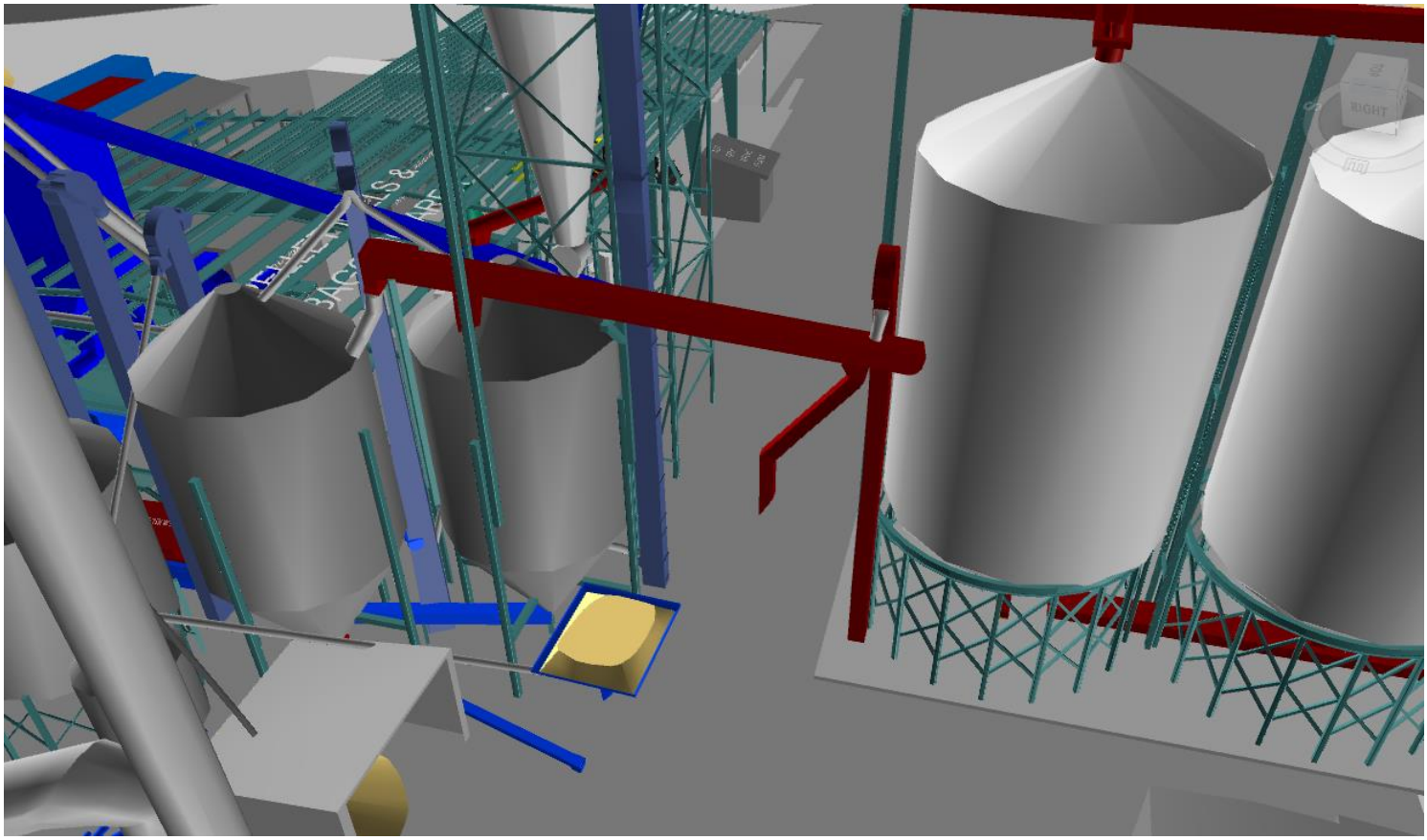
3D model of the equipment layout by the pellet distribution and storage area



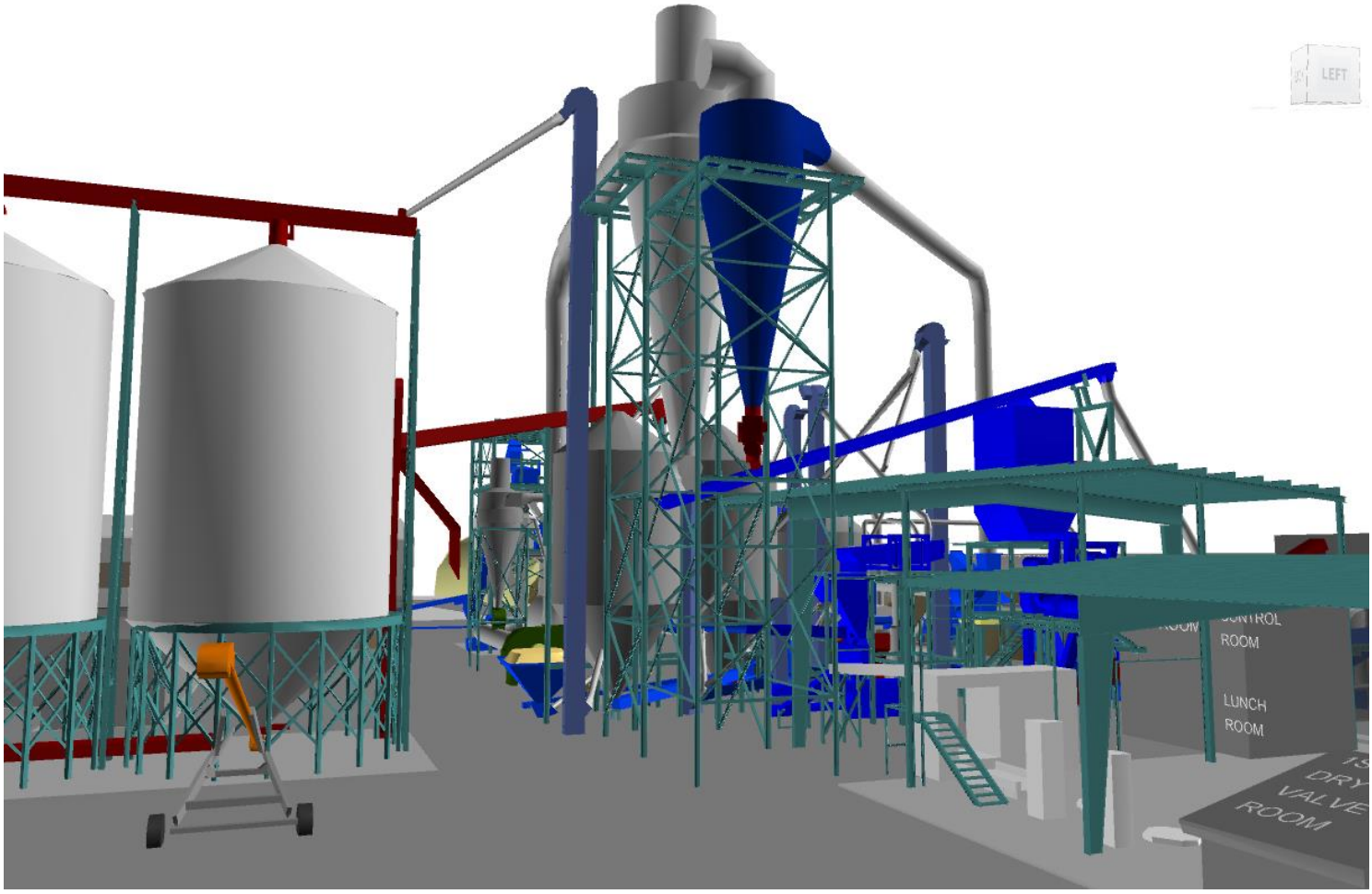
3D model of the equipment layout in the pelletizing area



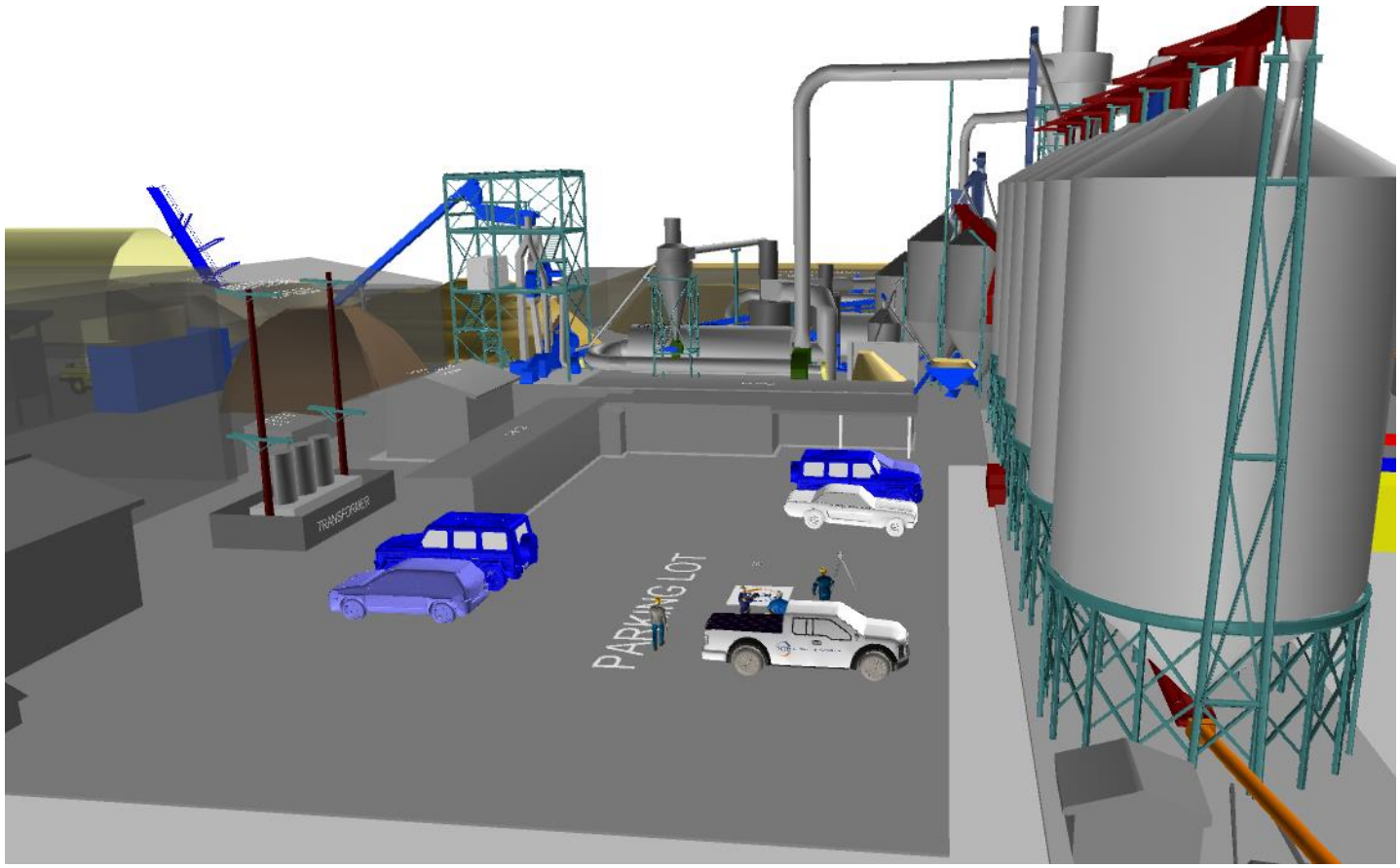

3D model of the equipment layout by the pellet cooling area



3D model of the equipment layout in the pellet truck loading area



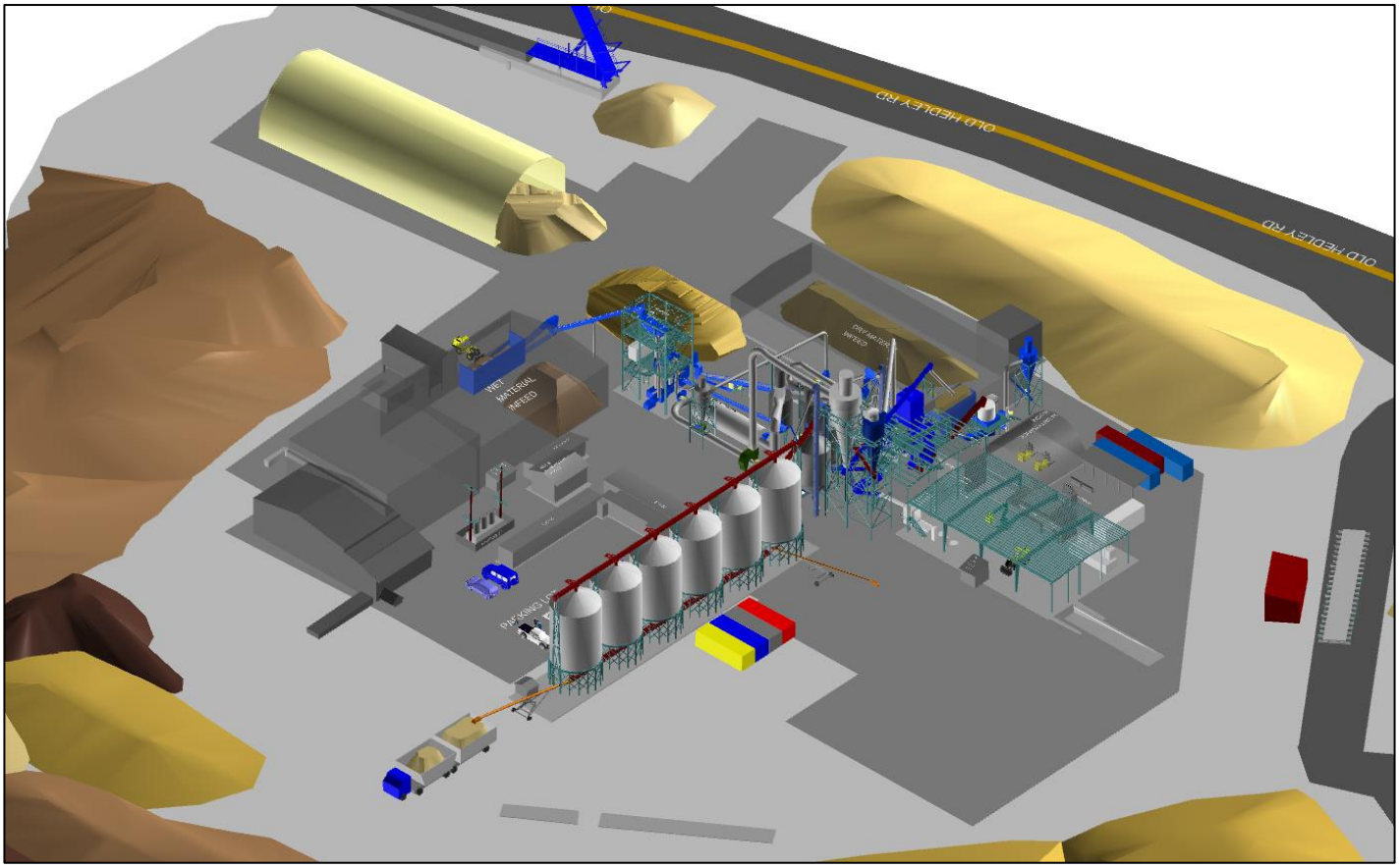

3D model of the equipment layout in the pellet truck loading area




3D model of the office and parking lot

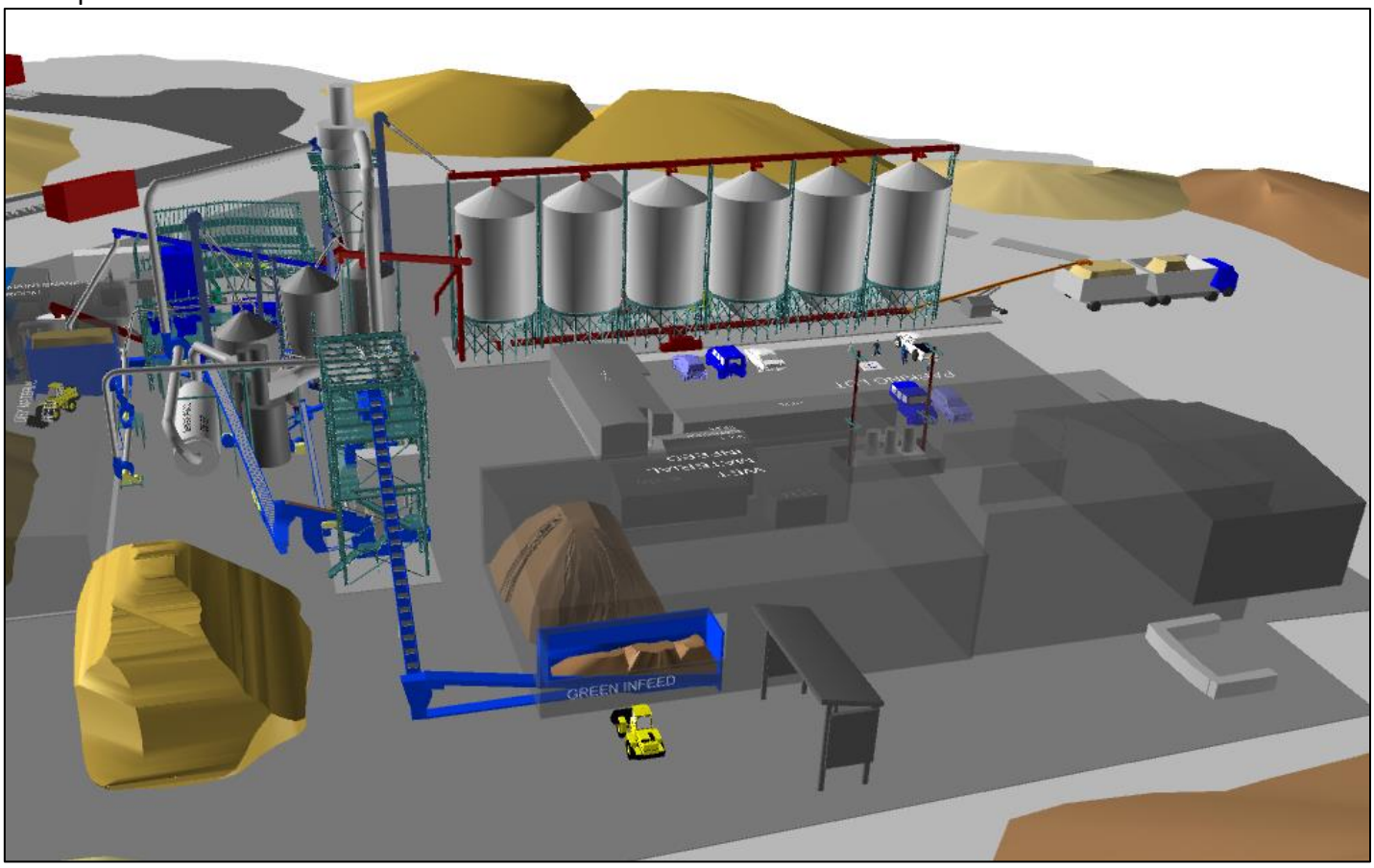

3D model of KTC team doing 3D laser scanning and flying the drone on site

Site photo



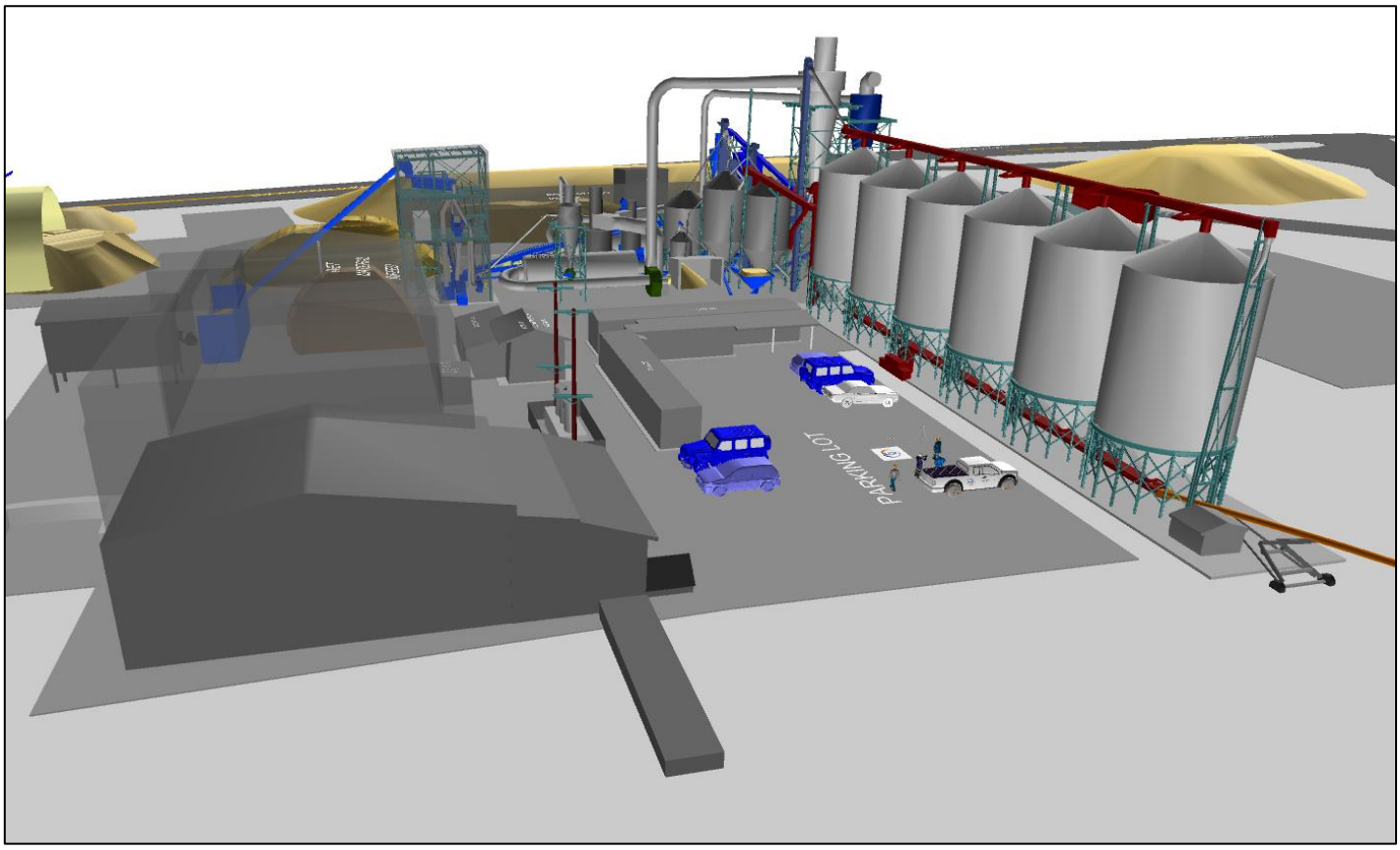

3D model created from 3D scan

Site photo



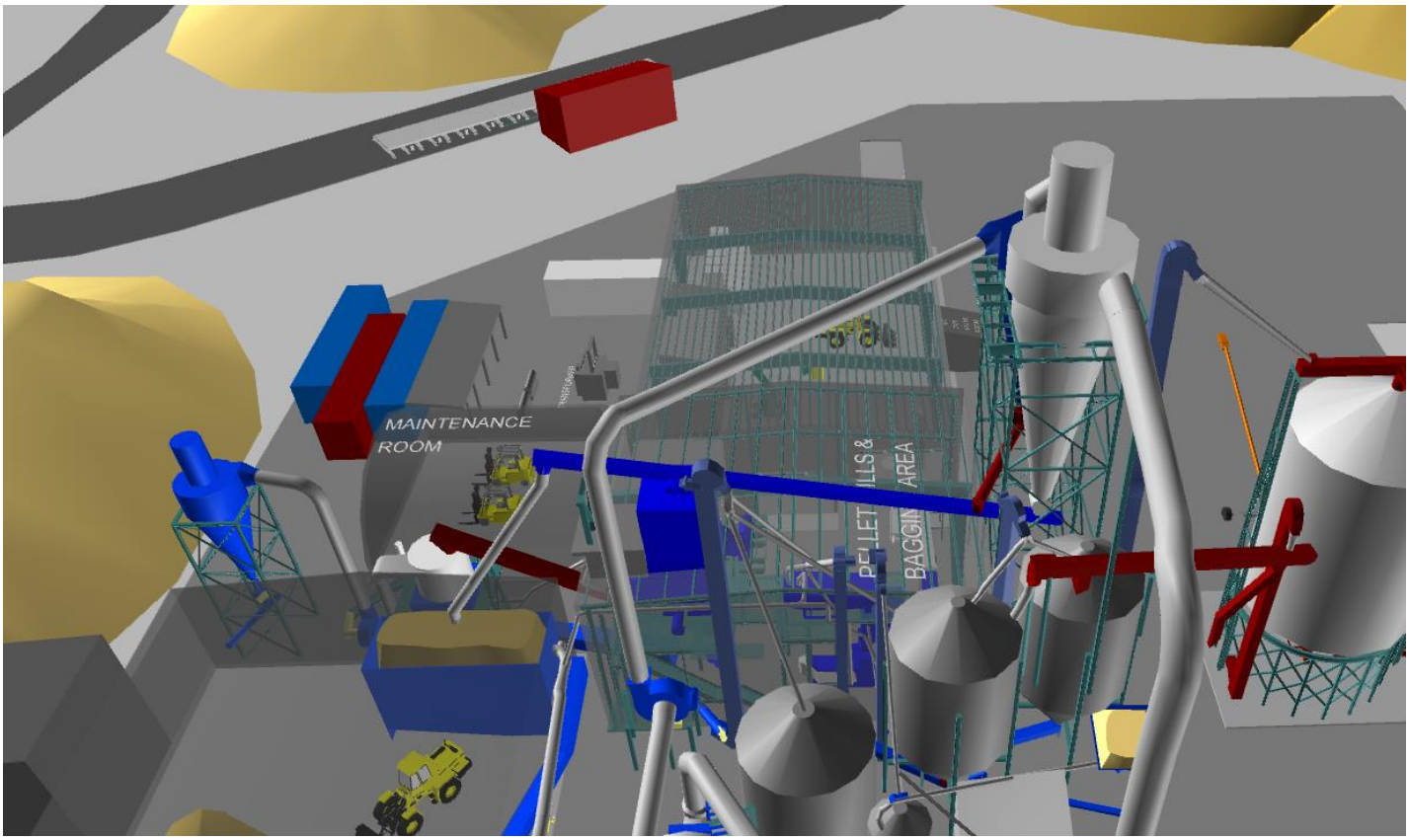

3D model created from 3D scan

Site photo



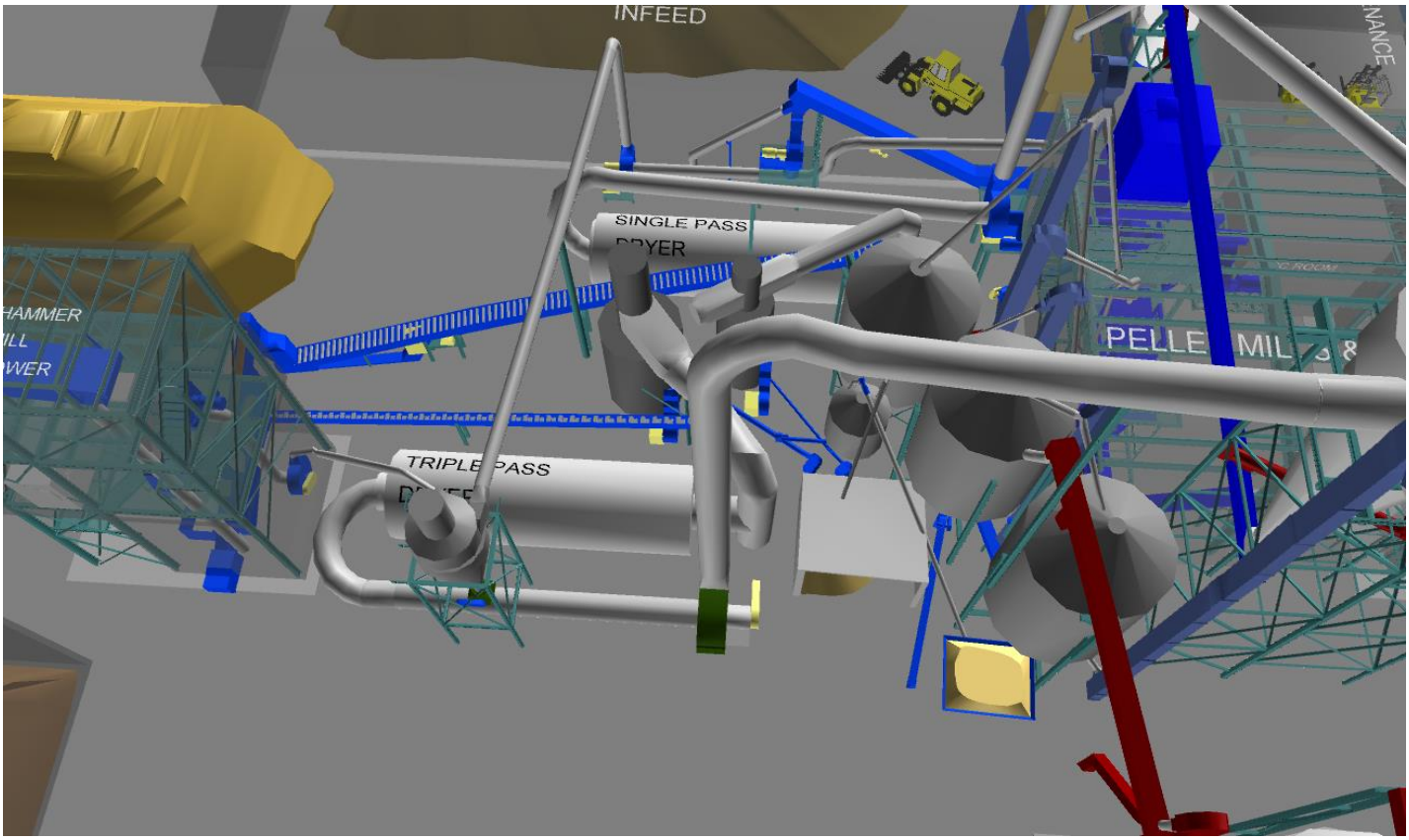

3D model created from 3D scan

Site photo

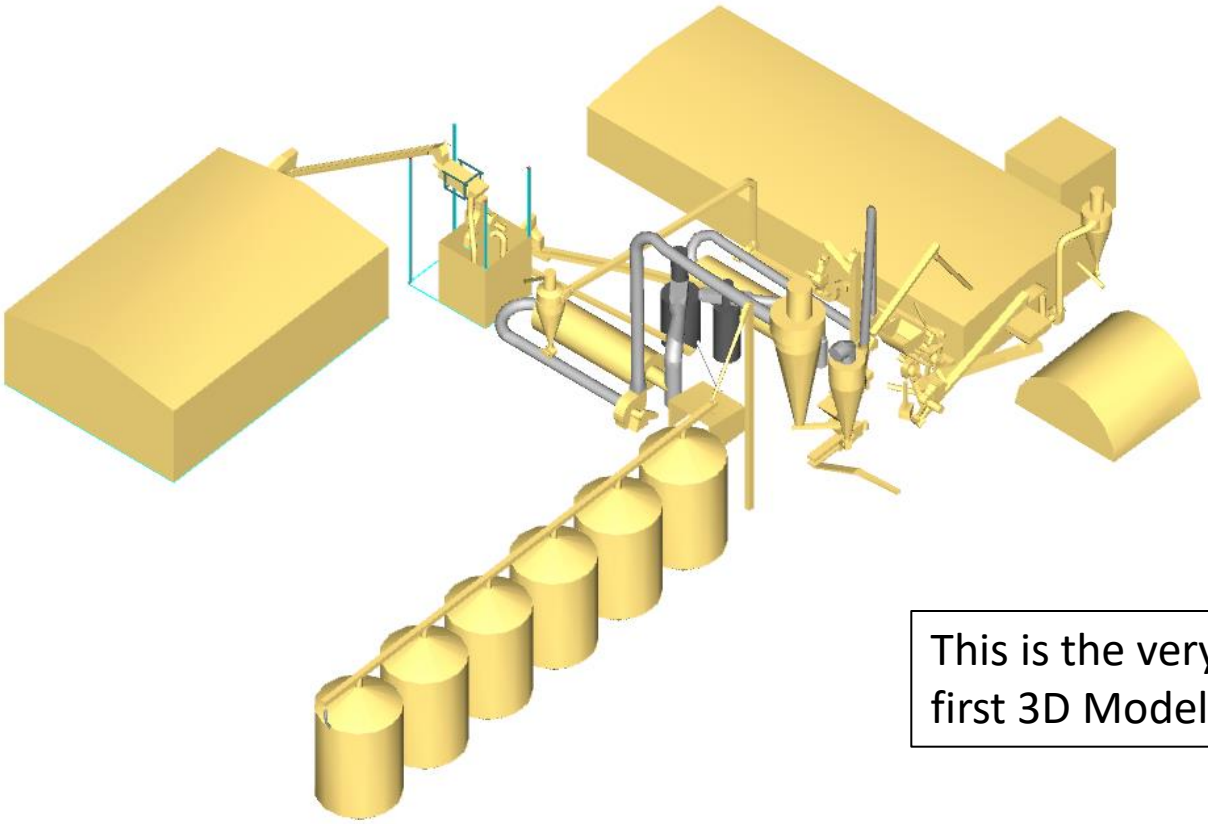



3D model created from 3D scan

Site photo

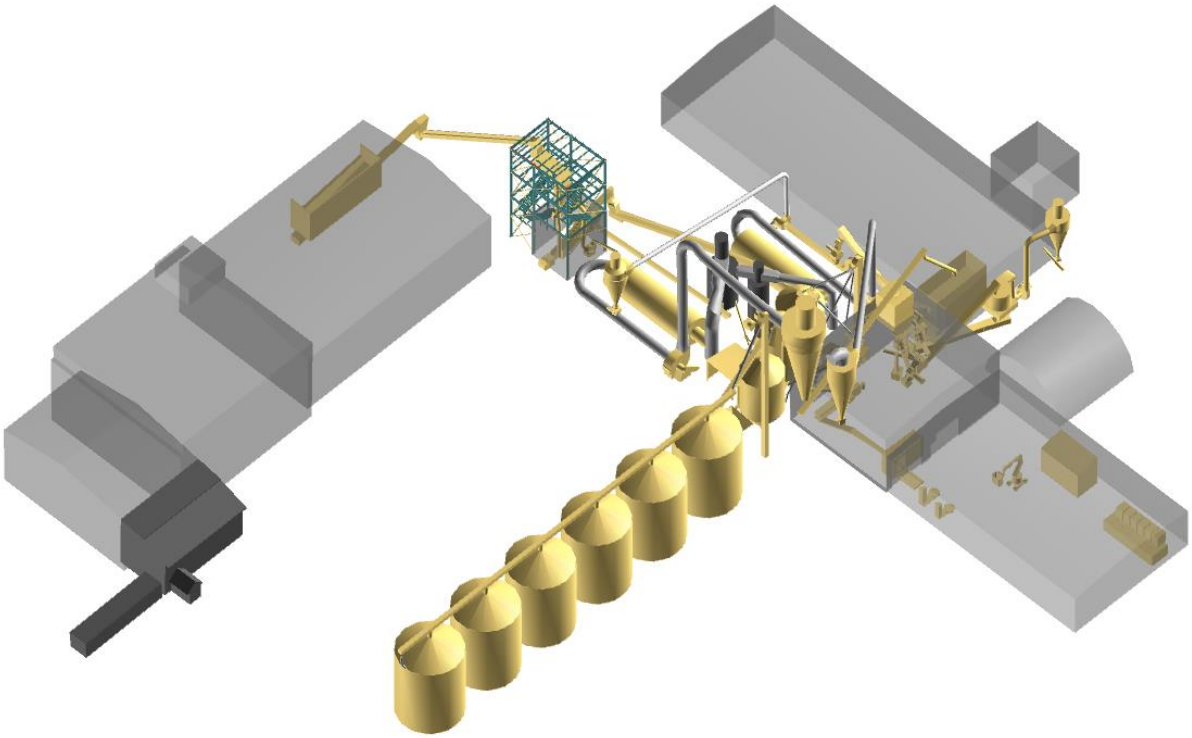



3D model created from 3D scan

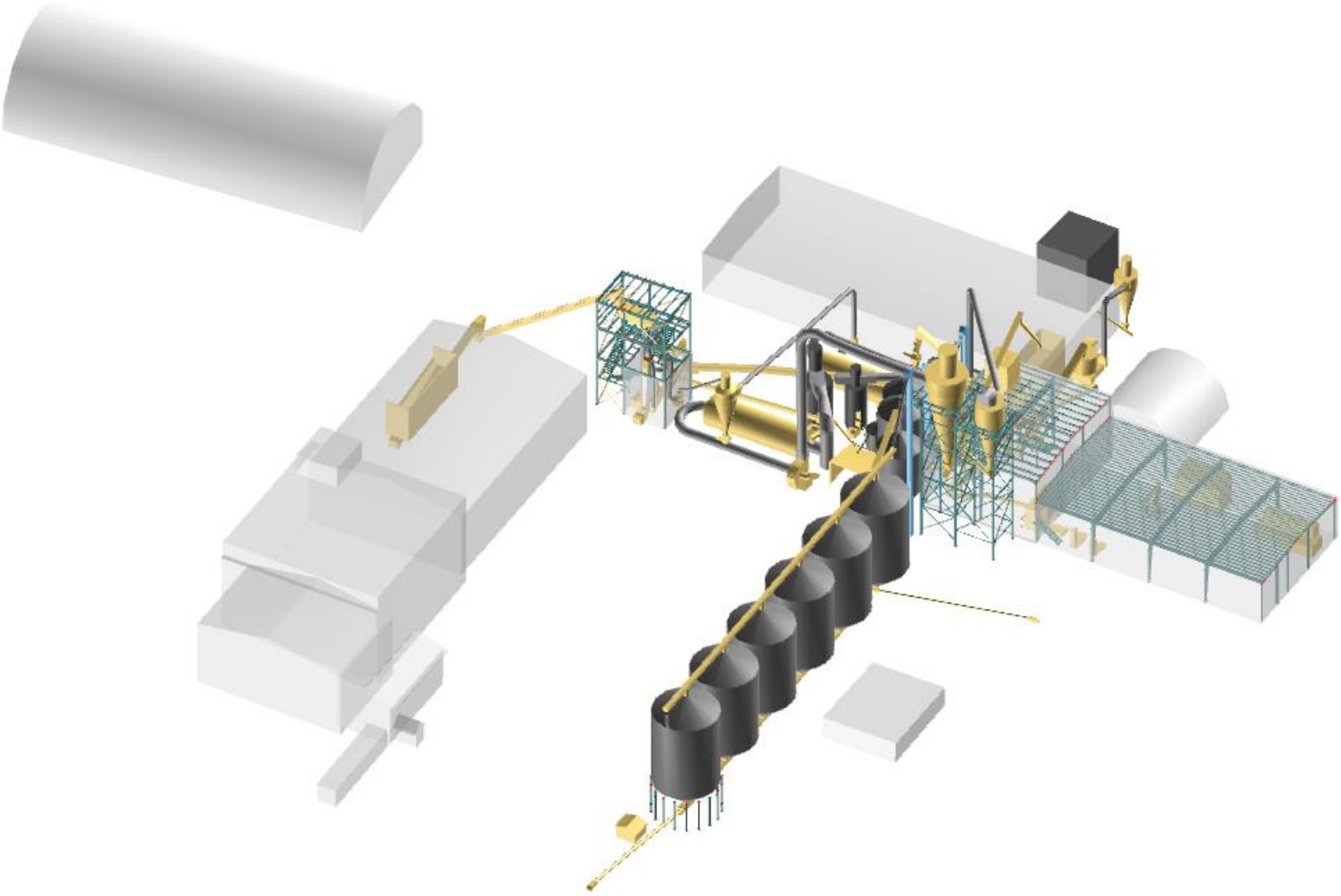


This is the very first 3D Model

**Version 01**



**Version 02**



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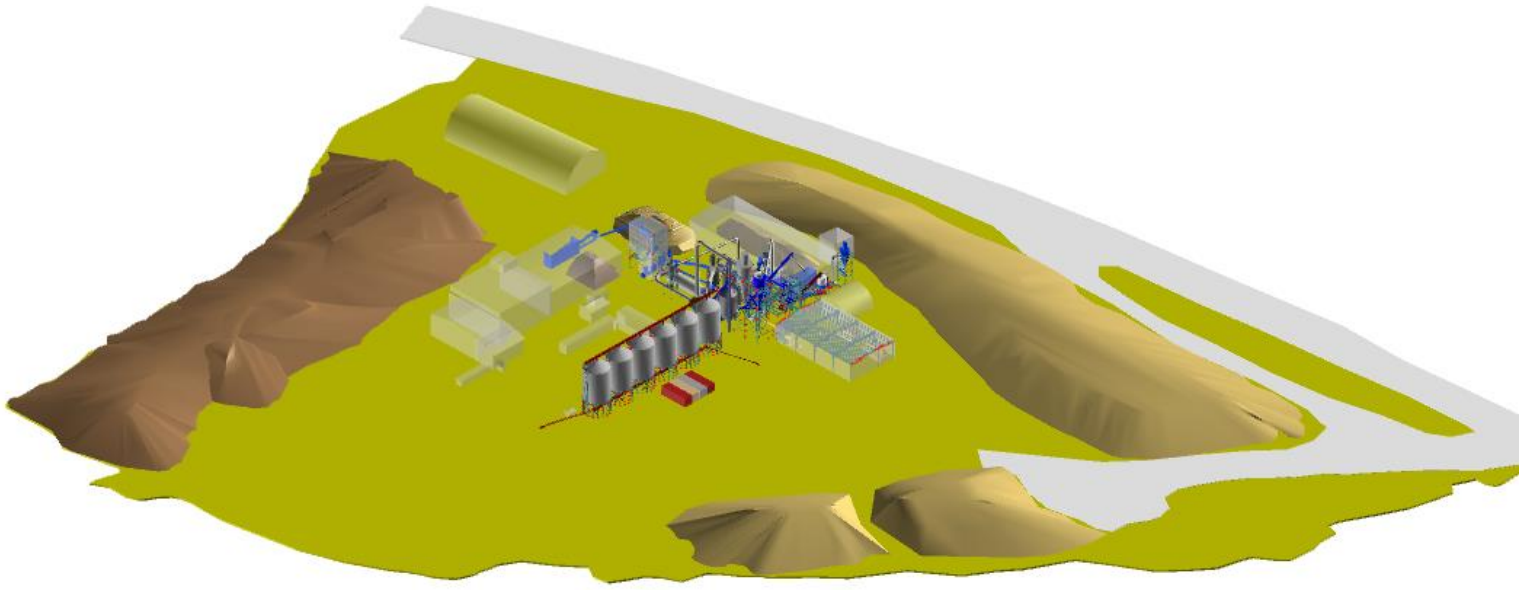
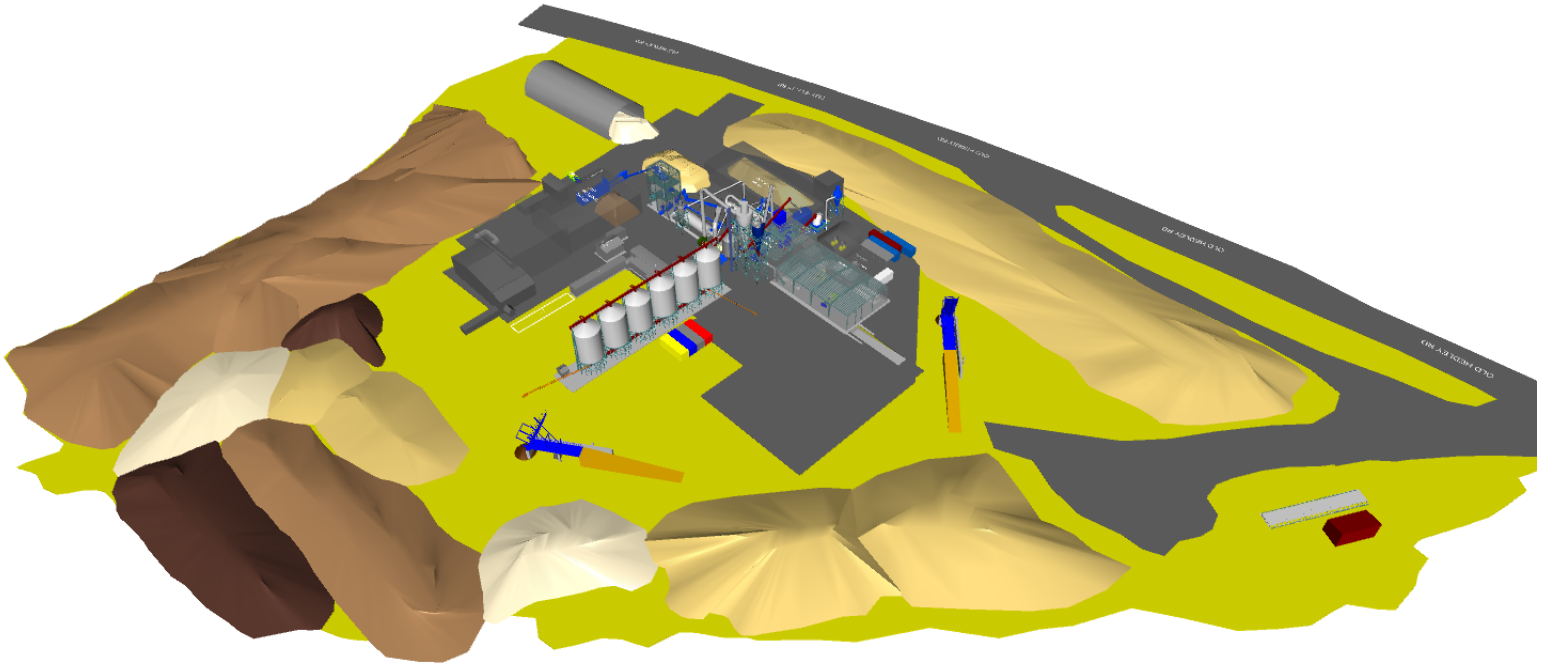
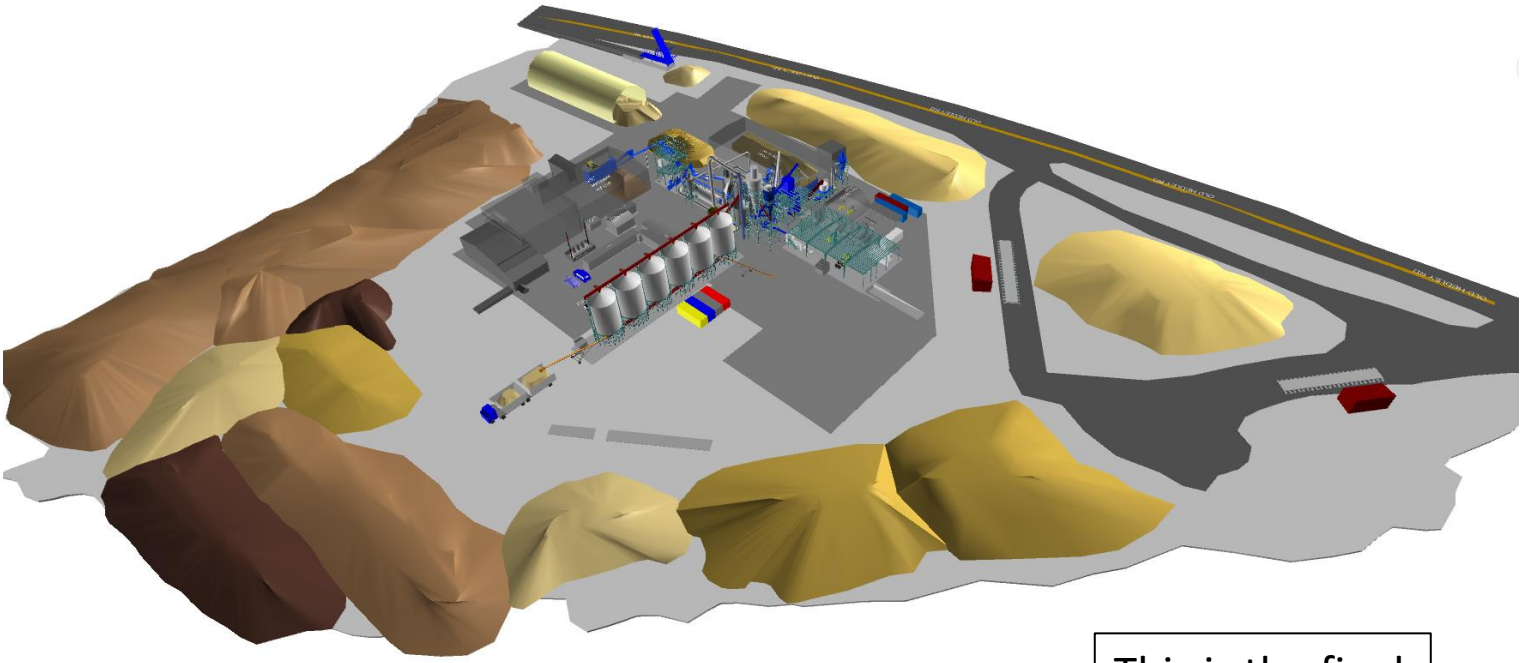


**Version 04**



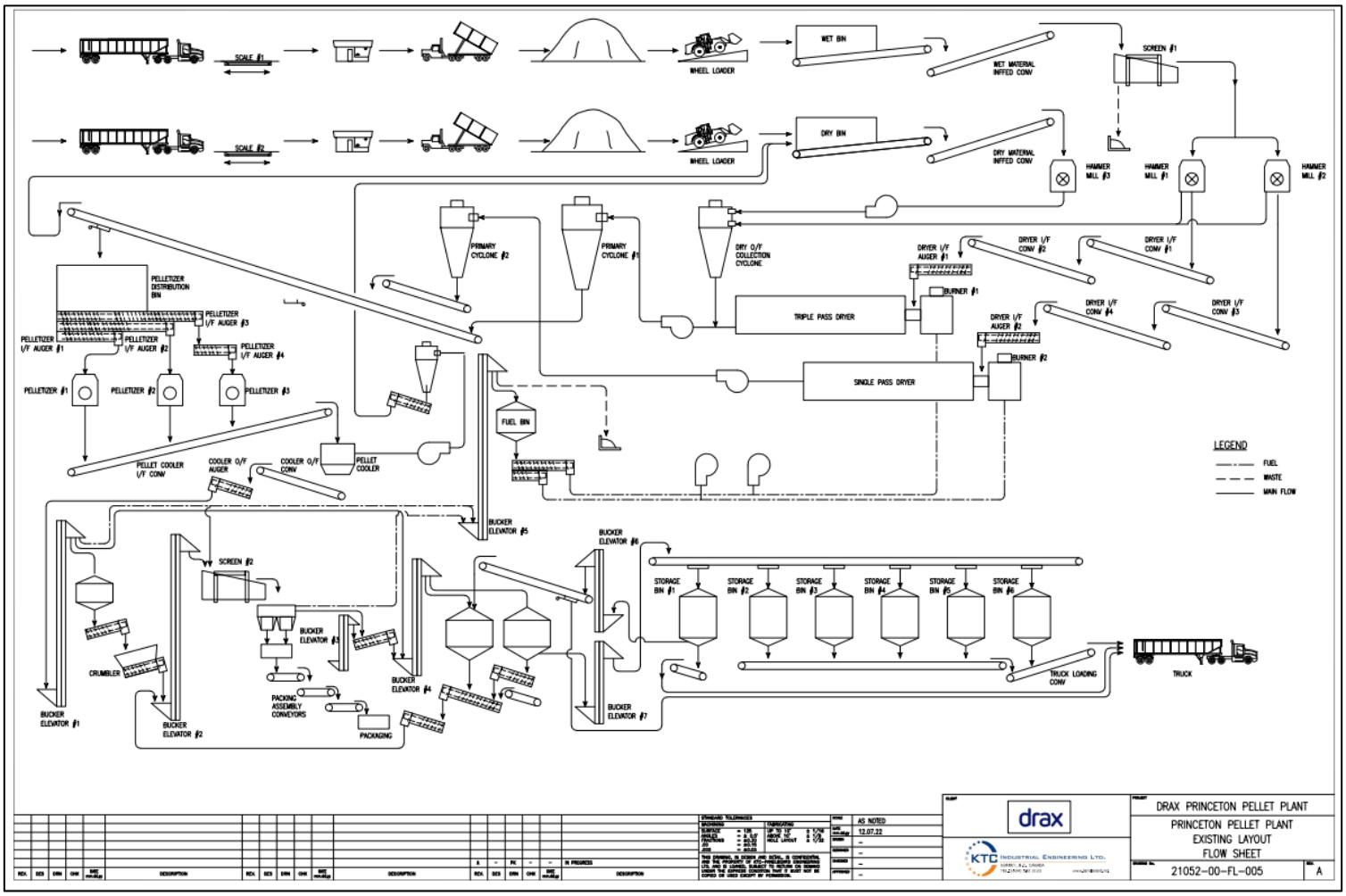
**Version 05**

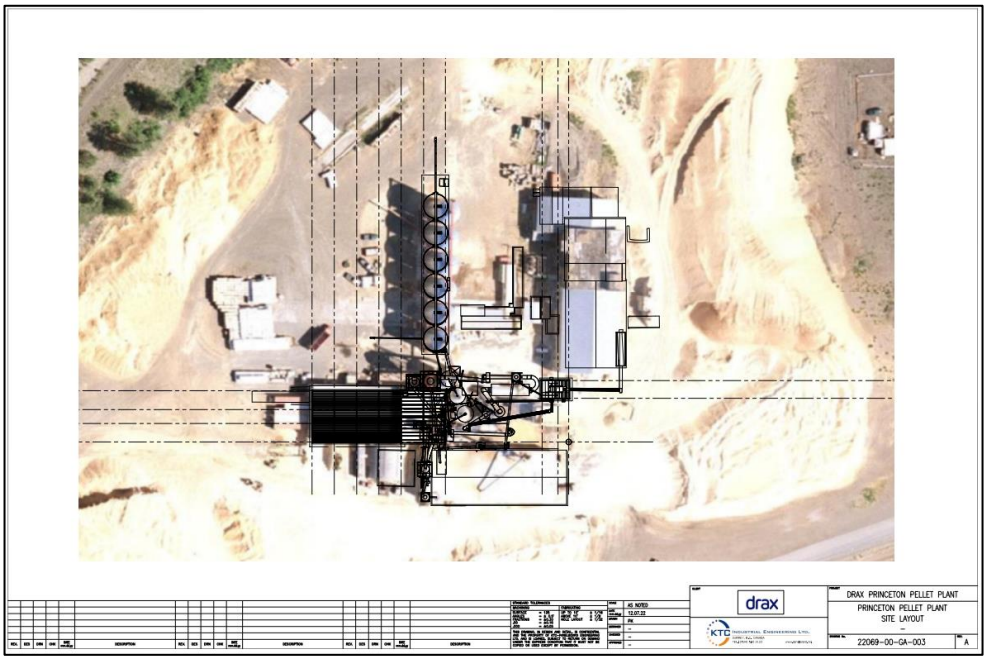


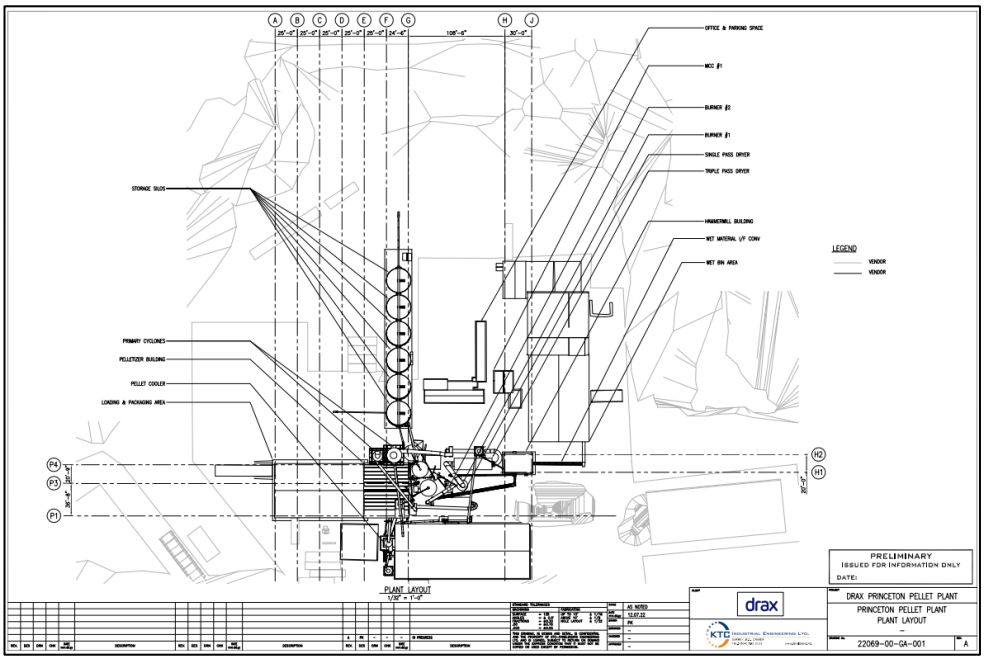
This is the final 3D Model

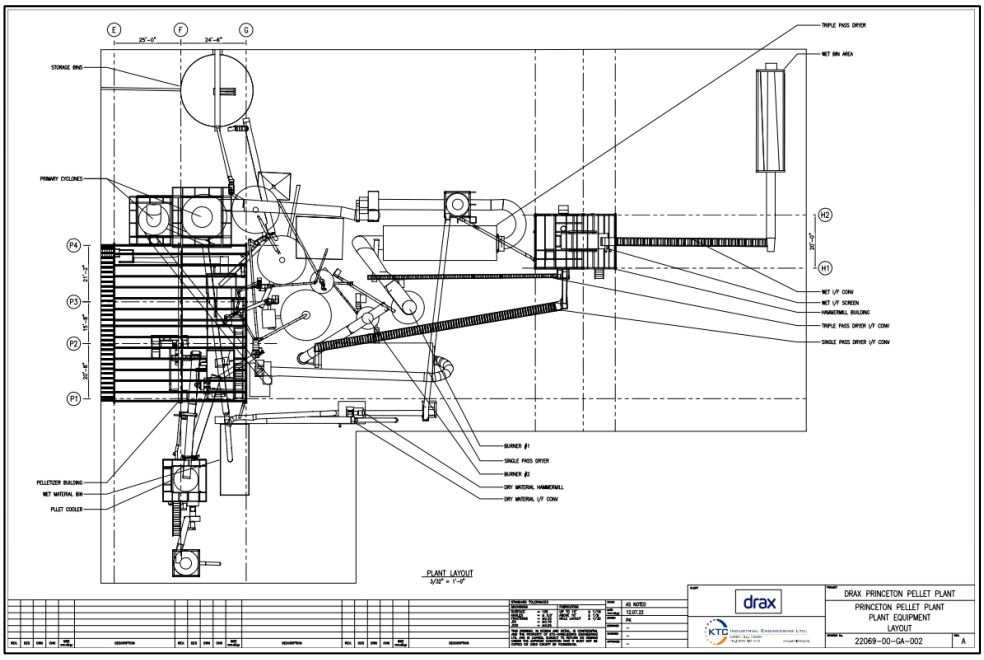
**Version 06**

# Section 07-Engineering Documentation


SCALE #1
SCALE #2
WHEEL LOADER
WHEEL LOADER
WET BIN
DRY BIN
WET MATERIAL INFEED CONV
DRY MATERIAL INFEED CONV
SCREEN #1
HAMMER MILL #3
HAMMER MILL #1
HAMMER MILL #2
PRIMARY CYCLONE #2
PRIMARY CYCLONE #1
DRY O/F COLLECTION CYCLONE
DRYER I/F AUGER #1
DRYER I/F CONV #2
DRYER I/F CONV #1
BURNER #1
TRIPLE PASS DRYER
DRYER I/F AUGER #2
DRYER I/F CONV #4
DRYER I/F CONV #3
BURNER #2
SINGLE PASS DRYER
PELLETIZER DISTRIBUTION BIN
PELLETIZER I/F AUGER #1
PELLETIZER I/F AUGER #2
PELLETIZER I/F AUGER #3
PELLETIZER I/F AUGER #4
PELLETIZER #1
PELLETIZER #2
PELLETIZER #3
FUEL BIN
PELLET COOLER I/F CONV
COOLER O/F AUGER
COOLER O/F CONV
PELLET COOLER
LEGEND
FUEL
WASTE
MAIN FLOW
BUCKET ELEVATOR #5
BUCKET ELEVATOR #6
SCREEN #2
STORAGE BIN #1
STORAGE BIN #2
STORAGE BIN #3
STORAGE BIN #4
STORAGE BIN #5
STORAGE BIN #6
BUCKET ELEVATOR #3
CRUMBLER
BUCKET ELEVATOR #4
TRUCK LOADING CONV
TRUCK
PACKING ASSEMBLY CONVEYORS
BUCKET ELEVATOR #1
BUCKET ELEVATOR #2
PACKAGING
BUCKET ELEVATOR #7
drax
KTC INDUSTRIAL ENGINEERING LTD.
AS NOTED
12.07.22
DRAX PRINCETON PELLET PLANT
PRINCETON PELLET PLANT
EXISTING LAYOUT
FLOW SHEET
21052-00-FL-005
A


drax
DRAX PRINCETON PELLET PLANT
PRINCETON PELLET PLANT
SITE LAYOUT
22069-00-GA-003
A


OFFICE & PARKING SPACE
MCC #1
BURNER #2
BURNER #1
SINGLE PASS DRYER
TRIPLE PASS DRYER
STORAGE SILOS
HAMMERMILL BUILDING
WET MATERIAL I/F CONV
WET BIN AREA
LEGEND
VENDOR
VENDOR
PRIMARY CYCLONES
PELLETIZER BUILDING
PELLET COOLER
LOADING & PACKAGING AREA
PLANT LAYOUT
PRELIMINARY
ISSUED FOR INFORMATION ONLY
drax
DRAX PRINCETON PELLET PLANT
PRINCETON PELLET PLANT
PLANT LAYOUT
22069-00-GA-001
A


TRIPLE PASS DRYER
WET BIN AREA
STORAGE BINS
PRIMARY CYCLONES
WET I/F CONV
WET I/F SCREEN
HAMMERMILL BUILDING
TRIPLE PASS DRYER I/F CONV
SINGLE PASS DRYER I/F CONV
BURNER #1
SINGLE PASS DRYER
BURNER #2
DRY MATERIAL HAMMERMILL
DRY MATERIAL I/F CONV
PELLETIZER BUILDING
WET MATERIAL BIN
PLANT LAYOUT
drax
DRAX PRINCETON PELLET PLANT
PRINCETON PELLET PLANT
PLANT EQUIPMENT
LAYOUT
22069-00-GA-002
A

# Section 08-Credits

**Project Manager**– Jowan Toor

**Project Coordinator and Drone Specialist** – Tai Nguyen

**Mechanical Designer and 3D Scanning Specialist** – Prashanth Karupothula

**Mechanical Designer** – Earl Tabones

**Structural Designer**– Minerva Mutuc

**3D Modelling Artist** – Drake

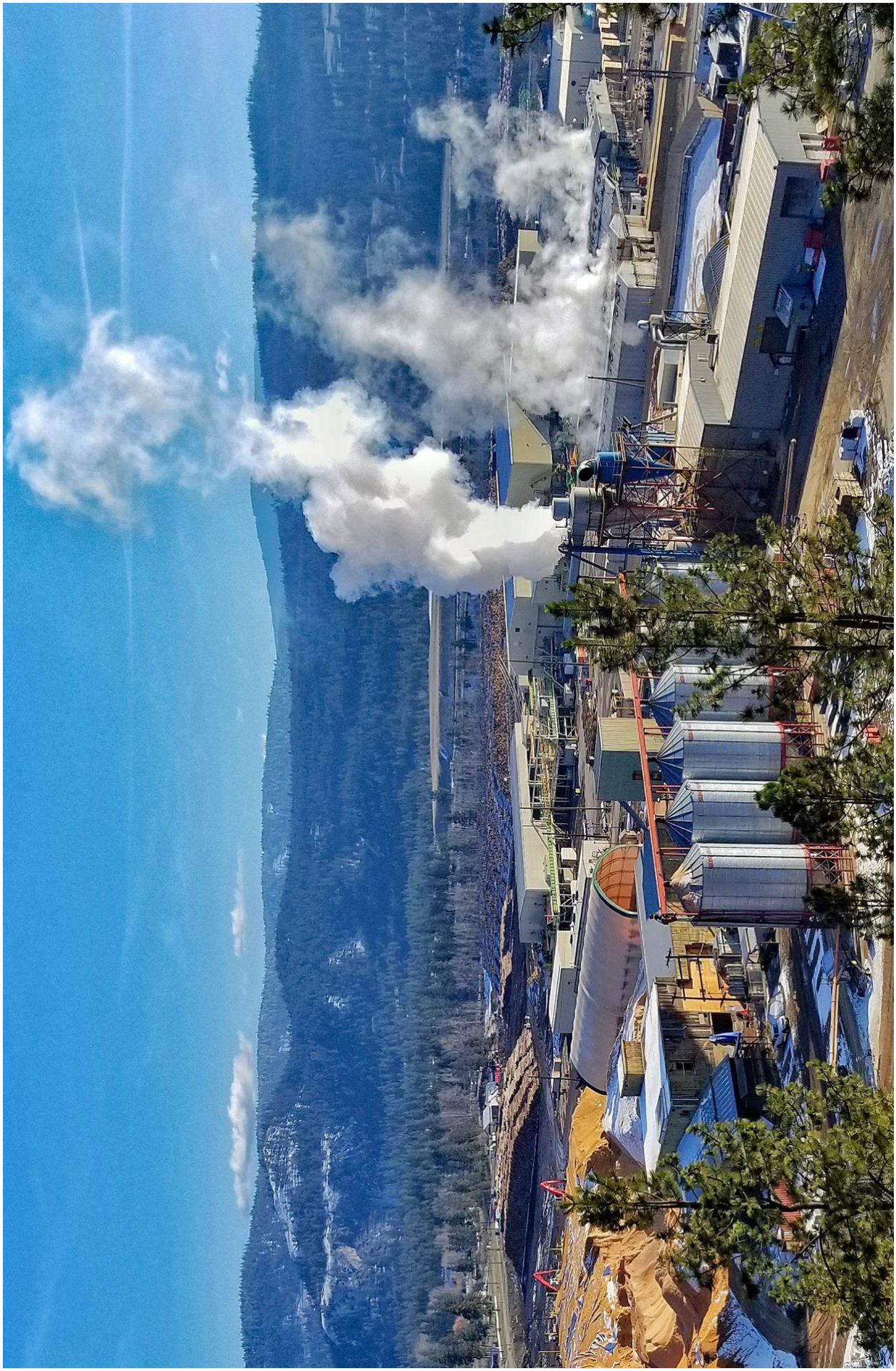
Jowan on site at Princeton BC

Tai using drone to capture site data at Princeton BC

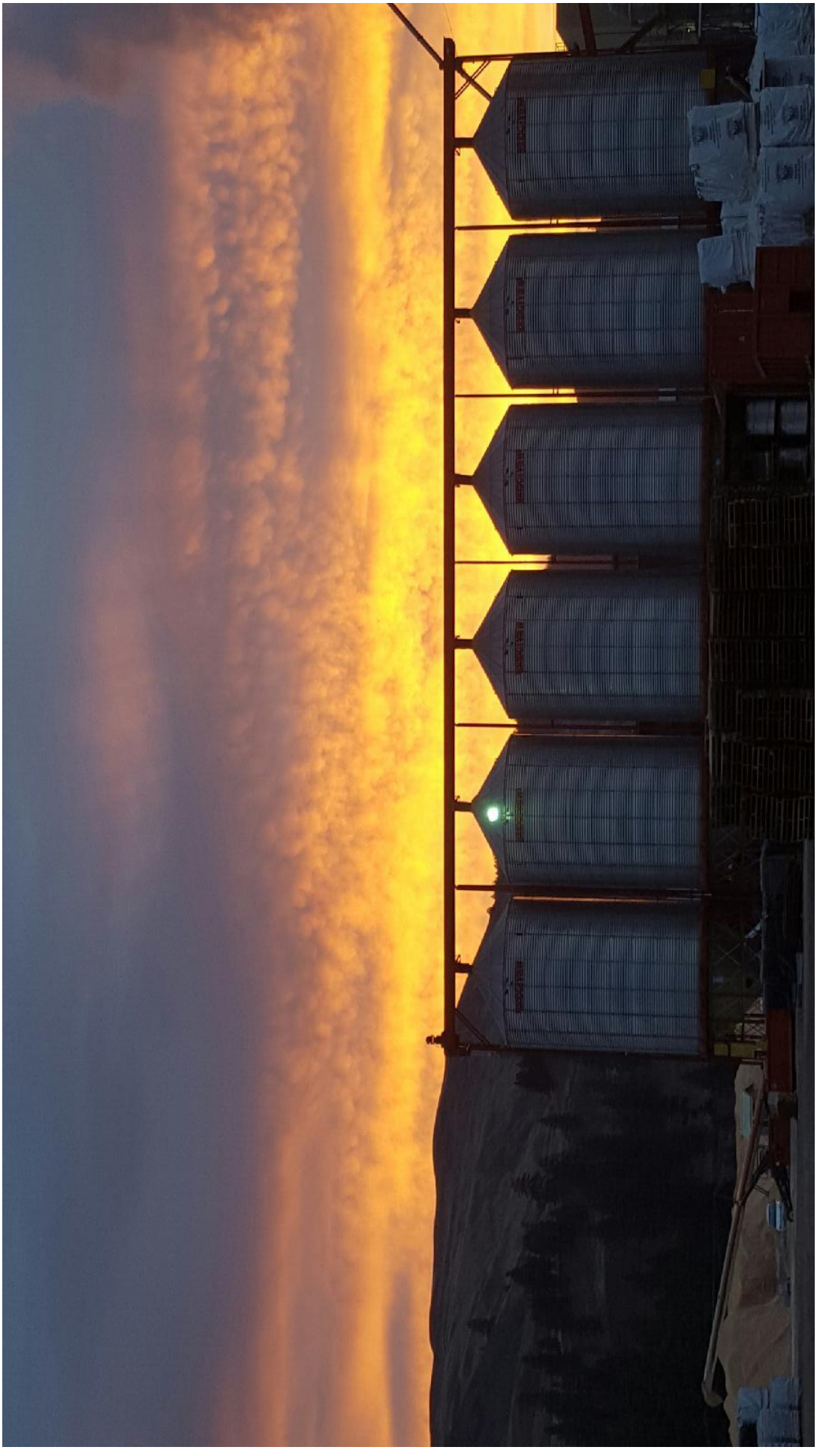
Prashanth using Leica 3D scanner to capture site data at Princeton BC

Earl working on the 3D Model using Advance Steel

Drake adding architecture detail to the 3D Model using Advance Steel



Beautiful view of Princeton BC pellet plant in a gorgeous clear sky afternoon



Beautiful sunset at of Princeton BC pellet plant in a gorgeous clear sky afternoon