

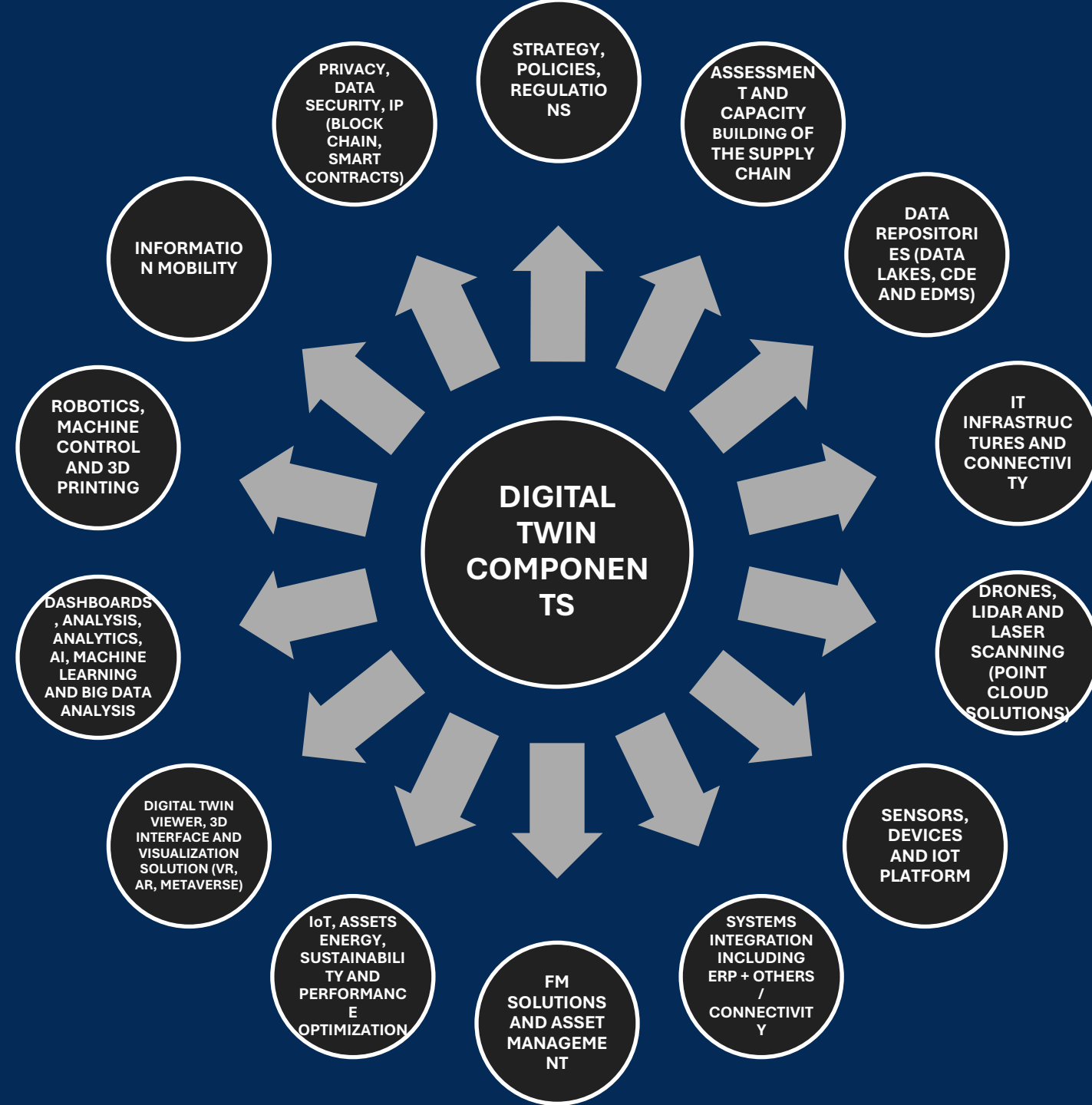


BIM AND DIGITAL WORKFLOWS WITHIN THE CONSTRUCTION INDUSTRY

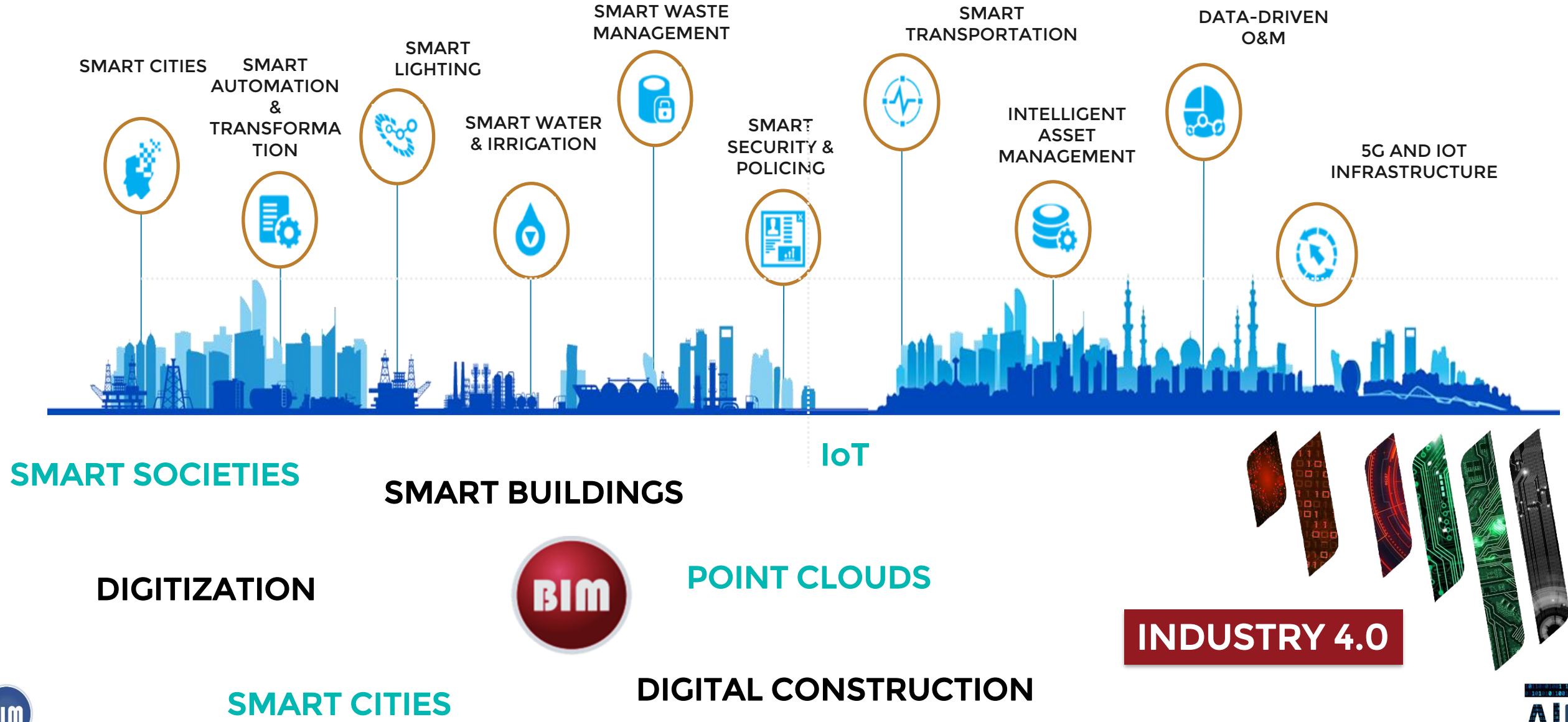
TRANSFORMING FACILITY MANAGEMENT, OPERATIONS, AND MAINTENANCE

THROUGH BIM-DRIVEN DIGITAL TWINS INTEGRATED WITH IOT SOLUTIONS

05/JUNE/2025 ISSAM ELABSI

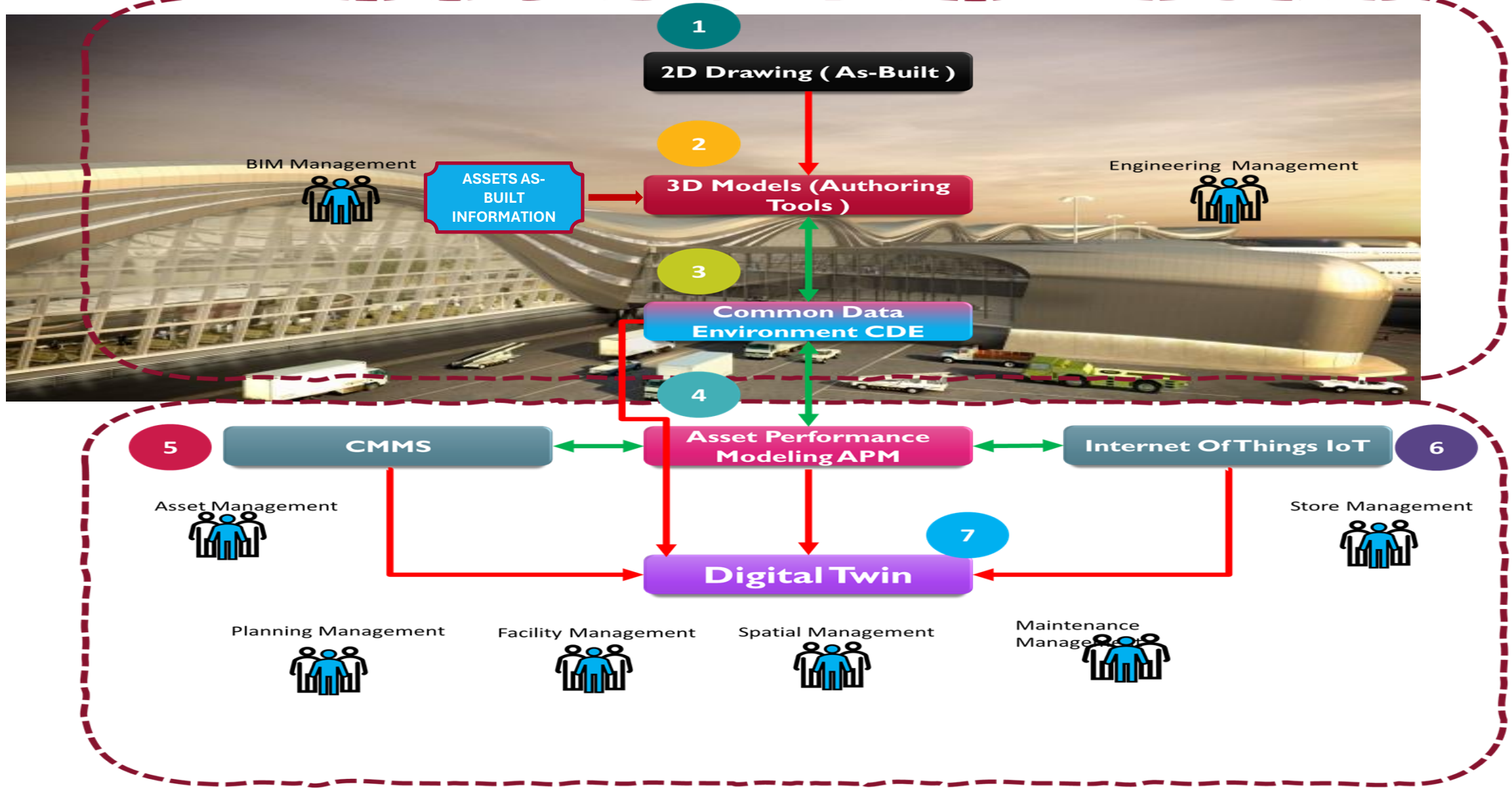


BIM IS THE HEART OF MODERN TECHNOLOGIES





BIM Digital Information Exchange Schema



IOT TECHNOLOGY – SMART BUILDING / DIGITAL TWIN – FIRST USE CASE – 2017



CORPORATE HEADQUARTERS - SMART BUILDING

Project Overview

The new EMPLOYER Head Quarter is a modern “LEED GOLD” certified iconic structure. The EMPLOYER site is one of the most prominent sites in the urbanized area of Abu Dhabi. The 342 meter stone clad portal arch of the EMPLOYER New Corporate Headquarters frames a 65 story monolithic glass box that houses 137,000m2 of office accommodation

BIM SCOPE OF SERVICE

The client, EMPLOYER, is requesting the services of Building Information Model (BIM) Specialist/ CONSULTANT who will undertake sufficient SERVICES pertaining to the development, integration and implementation of BIM methodology and processes for the New EMPLOYER HQ Facility.

EMPLOYER is engaging the BMC to consolidate all the available as-built documentation and produce an as-built BIM platform that fits the client’s expectations and ambition regarding EMPLOYER-HQ Facility Management, Facility Planning, Operation and maintenance.

EMPLOYER is expecting that this process will enable them to effectively manage the New EMPLOYER HQ compound assets to lower the total life-cycle costs over the life of the facility. **BIM, IoT and Digital Twin** services shall facilitate and optimize tasks pertaining specifically to “Facility Management” through integrating BIM, IoT platforms with EMPLOYER’s CAFM/ CMMS systems.

Accordingly the execution of this contract shall lead to having an integrated **building information database feeding the HQ Digital Twin** that will facilitate effective building management environment, enable coordinated commissioning activities and facility management functions such as maintenance management, preventive maintenance and asset management.





DIGITAL TWIN PROJECT

SOLUTION PILLARS

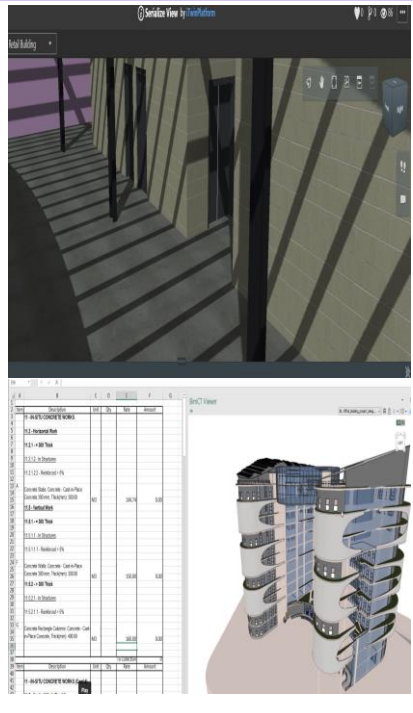


CONTINUOUS AND CONSISTENT COORDINATION WITH COMPANY PROJECT TEAM AND COMPANY IT TEAM

CLIENT PROVIDE Project design, Engineering design parameters, building breakdown, Facility and operation and Maintenance "O&M manuals, O&M schedules, Space parts, Room Space / Room tags, Asset codes, Catalogues, Related Drawings in vector format



CONTRACTOR TO USE EXISTING BENTLEY BIM DESIGNS AND USE BENTLEY AECOSIM TO CONNECT THEM OR ADD THE ATTRIBUTES TO THE BUILDING ASSETS. CONTRACTOR WILL MAINTAIN THE EXISTING GEOMETRY AND JUST WORK WITH DATA AND INFORMATION AS REQUESTED BY THE CLIENT



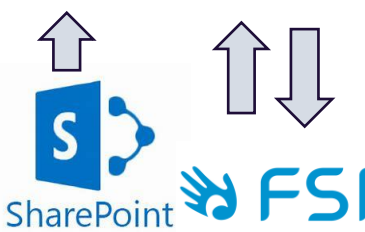
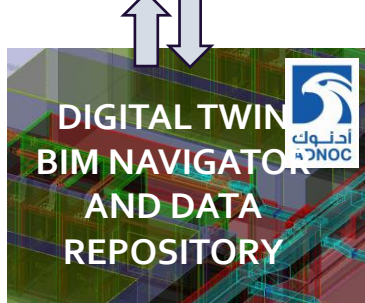
CONTRACTOR TO DEVELOP A CUSTOMIZED BIM VIEWER BASED ON THE CLIENT CHOICE BETWEEN Bentley iTWIN <https://www.bentley.com/en/products/product-line/digital-twins/itwin> and CT Viewer <https://www.cellbim.com/> Contractor Proposed iTWIN if EMPLOYER IT policies are ok with it

CONTRACTOR TO VERIFY MAPPING BETWEEN IoT SENSORS, ROOMS/SPACES NAMES , ASSET TAGS AND BIM OBJECTS/ATTRIBUTES

IOT NEUTRAL PLATFORM

CONTRACTOR TO COOPERATE WITH SENSEONE TO ADD THE BATTERY SYSTEM TO THE SENSEONE PLATFORM AND ENSURE THE PROPER CONNECTION AND MAPPING TO THE BIM OBJECTS (BATTERY SYSTEM IS ASSUMED TO BE READY FOR INTEGRATION AND DOES' NOT REQUIRE ANY HARDWARE OR SOFTWARE UPGRADING

IOT NEUTRAL PLATFORM
MONITOR AND CONTROL



2 SECONDS PULL DATA INTERVAL PROVIDED THAT ALL THE BACKBONE INFRASTRUCTURE AND THE NATIVE SYSTEMS SUPPORTS 2 SECONDS RESPONSE

SERVICE TICKETS CREATION AND STATUS PER ASSET OR BIM OBJECT

SENSEONE AND SOLUTION REPORTS AND DASHBOARDS WILL BE DEVELOPED

AIDIGITS WILL DEPLOY IN-HOUSE SERVICES AND EXPERTS TO DERIVE THE PROCESS OF ANALYSIS AND ANALYTICS BASED ON THE SOLUTION DATA, IOT HISTORICAL DATA, FM HISTORICAL DATA, FINANCIAL DATA AND IDENTIFIED PATTERNS

THE FOLLOWING TOOLS FROM MS WILL BE ADOPTED
Advanced Analytics on Big Data
Real-Time Analytics
Azure Machine Learning Platform

THE TRAINING WILL BE DELIVERED TO 36 PERSONNEL THE TRAINING WILL BE DIVIDED IN TWO CATEGORIES: THE DAILY SOLUTION USERS PRACTICAL NEEDS AND THE NEEDS OF THE SOLUTION ADMINISTRATORS

TECHNICAL SUPPORT AND KNOWLEDGE TRANSFER TO THE HARD FM SERVICE PROVIDER

3 YEARS SOLUTION AND SOFTWARE SUPPORT UNDER SLA

20 CONCURRENT USER LICENSES
OPENBUILDINGDESIGNER
ITWIN PLATFORM
PROJECTWISE
SENSEONE

DEVELOPING AS-BUILT BIM DESIGNS FOR HQ DIGITAL TWIN

DEVELOP CUSTOMIZED BIM PLATFORM (VIEWER + BIM DATA REPOSITORY + 3D INTERFACE + INTEGRATION LAYER)

IoT PLATFORM PREPARATION (26 Systems into a Unified IOT Platform)

INTEGRATE eDMS (SharePoint), FM Tool and SenseOne Platform

Analysis, Analytics, Reports and Dashboards

Training, Knowledge Transfer, Handing Over and Post Execution Support



<https://www.EMPLOYER.ae/en/strategysrallip-cigetarts-ruo/2030>

DIGITAL TWIN DEVELOPMENT MAJOR STEPS



**DATA
COLLECTION
AND ANALYSIS**



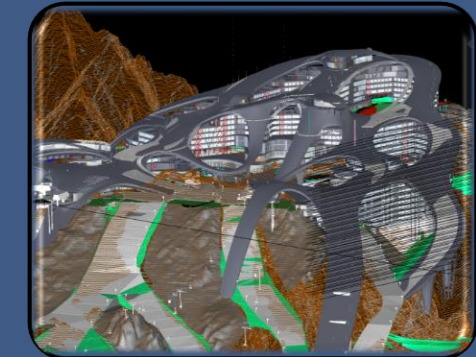
**DATA
PREPARATION,
INJECTION AND
AUTOMATION
TOOLS**



**DIGITAL TWIN
SYSTEM
COMPONENTS**



**BUILDINGS /
ASSETS DIGITAL
TWIN
COMPONENTS
INCLUDING IOT
SOLUTIONS**



**VISUALIZATION
AND
GRAPHICAL
INTERFACES**

DATA PREPARATION

GATHERING

- MODELS
- DESIGN PARAMETERS
- MODELS STRUCTURES / ATTRIBUTES (WBS)
- SPACE / ROOM DATA
- POST CONSTRUCTION DOCUMENTS
- POST CONSTRUCTION INFORMATION
- OPERATION AND MAINTENANCE INFORMATION

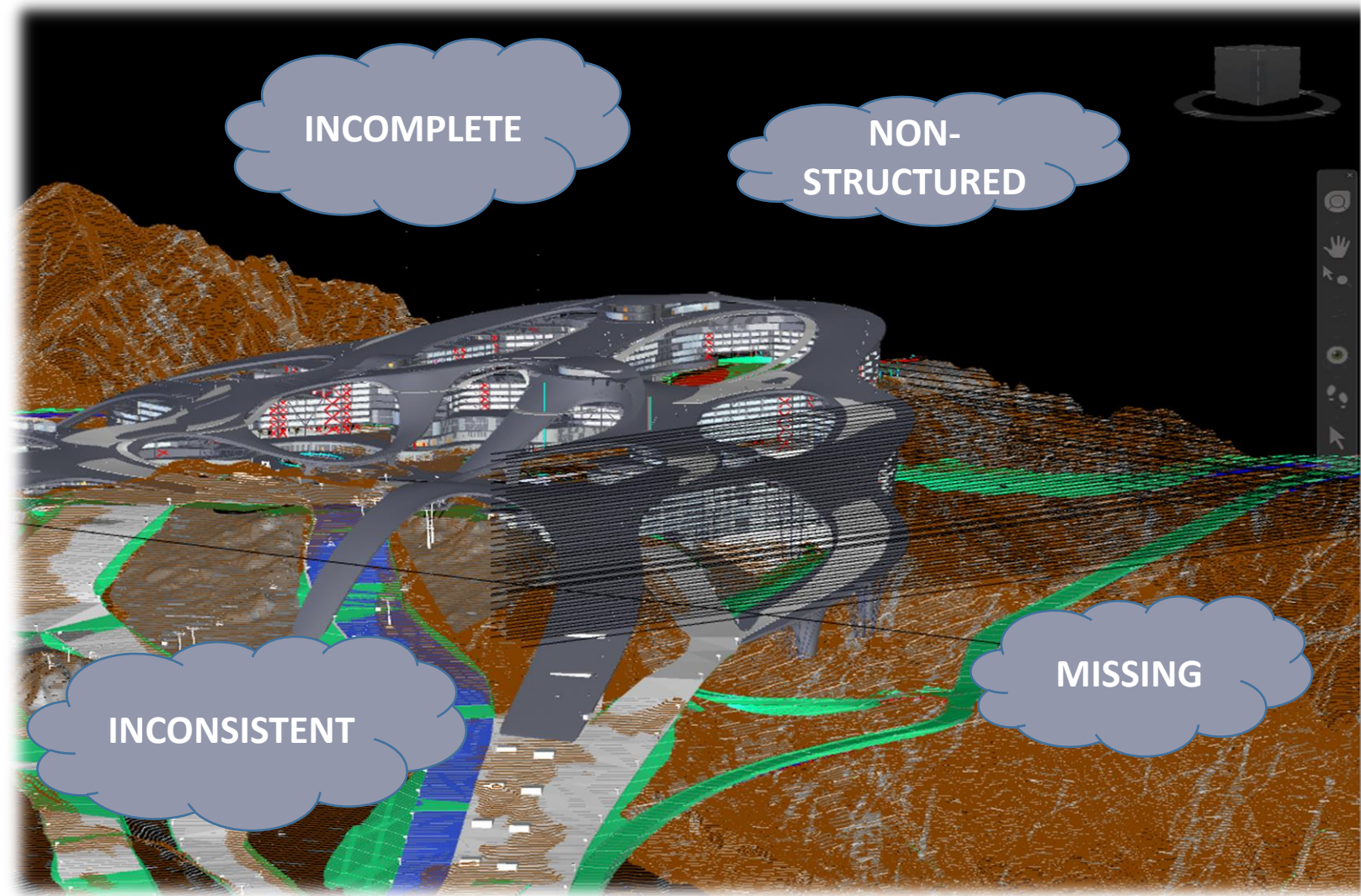
GAP ANALYSIS

- MISSING DATA
- MISSING DOCUMENTS
- INCONSISTENCY
- MISSING ORGANIZATION STRUCTURES
- MISSING ASSET TAGS
- MISSING OPERATIONS AND MAINTENANCE DATA
- MISSING SAFETY INSTRUCTIONS

MISSING DATA DEVELOPMENT/ASSUMPTION FOR MAINTAINABLE ASSETS

- WBS (WORK BREAKDOWN STRUCTURE)
- ASSET TAGS
- AS-BUILT DRAWINGS
- CATALOGUES
- OPERATION AND MAINTENANCE DATA
- SAFETY INSTRUCTION
- TASKS REQUIREMENTS

DATA COLLECTION AND ANALYSIS



Property	Value
Nombre	SKI_FLOORS_SKI_FLOORS_SLOPES_AED_AED
Tipo	SKI_FLOORS_SKI_FLOORS_SLOPES_AED_AED
Familia	Floor
Categoría	Floors
Id	500298
Area	18830.159 m ²
Curved Edge ...	0
Elevation at B...	0.000 m
Elevation at T...	0.000 m
Enable Analyt...	No
Family	FloorType "SKI_FLOORS_SKI_FLOORS_SLOPES_AED_AED", #2...
Family and T...	FloorType "SKI_FLOORS_SKI_FLOORS_SLOPES_AED_AED", #2...
Height Offset ...	0.000 m
Level	Level "00_SKI_SlopesStart", #1679
Mark	1C
Perimeter	1213.390 m
Phase Created	Phase "New Construction", #3
Related to M...	No
Room Boundi...	Yes
Slope	0,00°
Slopes_Diffic...	RED
Slopes_Length	628.714 m
Slopes_Light	Yes
Slopes_Mate...	SNOW
Structural	No
Thickness	0.250 m
Type	FloorType "SKI_FLOORS_SKI_FLOORS_SLOPES_AED_AED", #2...
Type Id	FloorType "SKI_FLOORS_SKI_FLOORS_SLOPES_AED_AED", #2...
Volume	4707.540 m ³
Workset	Workset1

DATA PREPARATION, INJECTION AND AUTOMATION TOOLS

WBS AND OBJECT TAG PROCEDURE

Level 1		Level 2		Level 3		Level 4		Level 5		Level 6	
Code	Project	Code	Building	Code	Floor	Code	Discipline	Code	Trade	Code	Object
NSV	NEOM Ski Village	B01	BUILDING 1	NON	NO FLOOR	ARC	Architectural Works			CRC	CONCRETE COLUMN FOR ARC
		B02	BUILDING 2	GRD	GROUND FLOOR			COR	CORE WORK	BOH	STRUCTURE COLUMN SUPPORT FOR ARC
		B03	BUILDING 3	MZN	MAZZANINE			CRT	CURTAIN PANELS	T01	WALL TYPE 1
		B04	BUILDING 4	U01	Underground Floor 1			DOR	DOORS	GNR	WALL TYPE GENERAL
		B05	BUILDING 5	U02	Underground Floor 2			FHC	ARC COLUMNS	SLB	SLAB
		FLR	Flooring	U03	Underground Floor 3			FLR	FLOORS	SFL	SINGLE FLUSH DOOR
		GNR	General	U04	Underground Floor 4			FUR	FURNITURE	DFL	DOUBLE DOOR
				U05	Underground Floor 5			STA	STAIRS	T02	WALL TYPE 2
				U06	Underground Floor 6			WLL	WALLS	T03	WALL TYPE 3
				U07	Underground Floor 7	STR	Structural			T04	WALL TYPE 4
				U08	Underground Floor 8			FDN	FOUNDATION	LND	LANDING FOR STAIRS
				U09	Underground Floor 9			FRM	FRAMING	RLN	RAILING FOR STAIRS
				U10	Underground Floor 10	MEC	Mechanical			RUN	RUN FOR STAIRS
				U11	Underground Floor 11			DCT	DUCT WORK	SNG	STRINGERS
				A01	Floor 1			EQP	EQUIPMENTS	TRL	TOP RAILING
				A02	Floor 2			PIP	PIPING	ROL	ROLLING DOORS
				A03	Floor 3	FPR	Fire Protection			RTN	RETAINING WALLS
				A04	Floor 4			EQP	EQUIPMENTS	ROD	ROOD FLOOR
				A05	Floor 5			FEX	FIRE EXTINGUISHERS	PRT	PARTITION WALL
				A06	Floor 6			PIP	PIPING	PNL	PANEL
				A07	Floor 7			SPR	SPRINKLERS	MUL	MULLIONS
				A08	Floor 8					ASM	ASSEMBLED STAIRS
				A09	Floor 9	ELE	Electrical			ESC	ESCALATOR
				A10	Floor 10			LDV	Lighting Devices	PRE	PRECAST STAIR
				A11	Floor 11			CND	Conduits	SFR	STORE FRONT GLAZE WALL
				A12	Floor 12			CTR	Cable Trays	DSK	DESK
				A13	Floor 13			DCT	Duct work	CHR	COUCH
				A14	Floor 14			DVC	Devices	SGL	SINGLE DOOR
				A15	Floor 15			EQP	Equipments	CIP	CAST IN PLACE STAIRS

DATA PREPARATION, INJECTION AND AUTOMATION TOOLS

Building Asset Tags for Model, Sensors and IoT Devices, Visual & Data Analysis

GUID	Source File	Element ID	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	MemberMark	Room Number
ecbb6bf0-a718-4c15-b6c5-006cf60b8ddb	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1397924	NSV	B01	A01	ARC	DOR	DFL-0001	NSV_B01_A01_ARC_DOR_DFL-0001	LOBBY R-MS-100-1938
2be1a3f4-db3b-4aa6-a977-bb5d778cca4e	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1435105	NSV	B01	A01	ARC	DOR	DFL-0002	NSV_B01_A01_ARC_DOR_DFL-0002	CIRCULATION R-MS-100-1868
2be1a3f4-db3b-4aa6-a977-bb5d778cca39	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1435106	NSV	B01	A01	ARC	DOR	DFL-0003	NSV_B01_A01_ARC_DOR_DFL-0003	CIRCULATION R-MS-100-1868
2be1a3f4-db3b-4aa6-a977-bb5d778ccb87	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1435128	NSV	B01	A01	ARC	DOR	DFL-0004	NSV_B01_A01_ARC_DOR_DFL-0004	CIRCULATION R-MS-100-1868
2be1a3f4-db3b-4aa6-a977-bb5d778cc874	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1435129	NSV	B01	A01	ARC	DOR	DFL-0005	NSV_B01_A01_ARC_DOR_DFL-0005	CIRCULATION R-MS-100-1868
ffd59950-6f8d-4f2a-a3d9-5a0266100a74	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1435141	NSV	B01	A01	ARC	DOR	DFL-0006	NSV_B01_A01_ARC_DOR_DFL-0006	LOBBY R-MS-100-1938
9fd5bb6f-7306-4b21-a57b-71e0f05bb12	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1456926	NSV	B01	A01	ARC	DOR	DFL-0007	NSV_B01_A01_ARC_DOR_DFL-0007	LOBBY R-MS-100-1938
31657a7b-44e5-49a6-8009-e9b25c202817	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1619652	NSV	B01	A01	ARC	DOR	DFL-0008	NSV_B01_A01_ARC_DOR_DFL-0008	CIRCULATION R-MS-100-2102
2e3b395f-15fc-4a53-b111-87bd3e7e2a79	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1552105	NSV	B01	A01	ARC	DOR	SFL-0001	NSV_B01_A01_ARC_DOR_SFL-0001	CIRCULATION R-MS-100-2273
739b6f93-88fd-4771-8f2e-c538dfb9436f	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1561767	NSV	B01	A01	ARC	DOR	SFL-0002	NSV_B01_A01_ARC_DOR_SFL-0002	2 BHK R-MS-100-2253
ee2c8ddc-3325-46aa-b334-403a2579211e	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1594807	NSV	B01	A01	ARC	DOR	SFL-0003	NSV_B01_A01_ARC_DOR_SFL-0003	1 BHK R-MS-100-2344
ee2c8ddc-3325-46aa-b334-403a25792117	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1594814	NSV	B01	A01	ARC	DOR	SFL-0004	NSV_B01_A01_ARC_DOR_SFL-0004	CIRCULATION R-MS-100-1948
5f966326-f6da-4817-93b2-1167a4d59b0f	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1594929	NSV	B01	A01	ARC	DOR	SFL-0005	NSV_B01_A01_ARC_DOR_SFL-0005	CIRCULATION R-MS-100-2102
d1fc9979-7ff1-47f0-829a-19a11b49babe	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1597032	NSV	B01	A01	ARC	DOR	SFL-0006	NSV_B01_A01_ARC_DOR_SFL-0006	2 BHK R-MS-100-2098
d1fc9979-7ff1-47f0-829a-19a11b49ba2c	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1597178	NSV	B01	A01	ARC	DOR	SFL-0007	NSV_B01_A01_ARC_DOR_SFL-0007	CIRCULATION R-MS-100-2102
d1fc9979-7ff1-47f0-829a-19a11b49bbd5	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1597187	NSV	B01	A01	ARC	DOR	SFL-0008	NSV_B01_A01_ARC_DOR_SFL-0008	1 BHK R-MS-100-2372
d1fc9979-7ff1-47f0-829a-19a11b49bbf5	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1597219	NSV	B01	A01	ARC	DOR	SFL-0009	NSV_B01_A01_ARC_DOR_SFL-0009	2 BHK R-MS-100-2220
d1fc9979-7ff1-47f0-829a-19a11b49bbb4	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1597228	NSV	B01	A01	ARC	DOR	SFL-0010	NSV_B01_A01_ARC_DOR_SFL-0010	1 BHK R-MS-100-2373
d1fc9979-7ff1-47f0-829a-19a11b49bbe5	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1597235	NSV	B01	A01	ARC	DOR	SFL-0011	NSV_B01_A01_ARC_DOR_SFL-0011	1 BHK R-MS-100-2374
d1fc9979-7ff1-47f0-829a-19a11b498592	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1597764	NSV	B01	A01	ARC	DOR	SFL-0012	NSV_B01_A01_ARC_DOR_SFL-0012	CIRCULATION R-MS-100-2102
c12f1a7b-aaa4-4654-9cb9-d624beea69a6	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1601511	NSV	B01	A01	ARC	DOR	SFL-0013	NSV_B01_A01_ARC_DOR_SFL-0013	CIRCULATION R-MS-100-2102
c12f1a7b-aaa4-4654-9cb9-d624beea69b4	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1601525	NSV	B01	A01	ARC	DOR	SFL-0014	NSV_B01_A01_ARC_DOR_SFL-0014	2 BHK R-MS-100-2400
9c1fa067-adda-402d-8916-e3bb81a7166b	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1602147	NSV	B01	A01	ARC	DOR	SFL-0015	NSV_B01_A01_ARC_DOR_SFL-0015	2 BHK R-MS-100-2409
9c1fa067-adda-402d-8916-e3bb81a71662	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1602154	NSV	B01	A01	ARC	DOR	SFL-0016	NSV_B01_A01_ARC_DOR_SFL-0016	2 BHK R-MS-100-2410
939d4f39-db90-4baa-a4e2-f1334eabbc5e	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1609136	NSV	B01	A01	ARC	DOR	SFL-0017	NSV_B01_A01_ARC_DOR_SFL-0017	CIRCULATION R-MS-100-1948
939d4f39-db90-4baa-a4e2-f1334eabbc59	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1609143	NSV	B01	A01	ARC	DOR	SFL-0018	NSV_B01_A01_ARC_DOR_SFL-0018	2 BHK R-MS-100-2428
939d4f39-db90-4baa-a4e2-f1334eabbcfe	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1609248	NSV	B01	A01	ARC	DOR	SFL-0019	NSV_B01_A01_ARC_DOR_SFL-0019	2 BHK R-MS-100-2429
30ad25af-6694-491d-8fa6-bfa87d4b9b75	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1609871	NSV	B01	A01	ARC	DOR	SFL-0020	NSV_B01_A01_ARC_DOR_SFL-0020	1 BHK R-MS-100-2435
30ad25af-6694-491d-8fa6-bfa87d4b9965	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1610399	NSV	B01	A01	ARC	DOR	SFL-0021	NSV_B01_A01_ARC_DOR_SFL-0021	CIRCULATION R-MS-100-2102
30ad25af-6694-491d-8fa6-bfa87d4b9940	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1610426	NSV	B01	A01	ARC	DOR	SFL-0022	NSV_B01_A01_ARC_DOR_SFL-0022	CIRCULATION R-MS-100-2102
87e2ed84-bfff-433b-a90b-708a3f82ead0	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1612177	NSV	B01	A01	ARC	DOR	SFL-0023	NSV_B01_A01_ARC_DOR_SFL-0023	2 BHK R-MS-100-2452
87e2ed84-bfff-433b-a90b-708a3f82eae3	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1612194	NSV	B01	A01	ARC	DOR	SFL-0024	NSV_B01_A01_ARC_DOR_SFL-0024	2 BHK R-MS-100-2453
31657a7b-44e5-49a6-8009-e9b25c202c21	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1618674	NSV	B01	A01	ARC	DOR	SFL-0025	NSV_B01_A01_ARC_DOR_SFL-0025	CIRCULATION R-MS-100-2273
f171f80b-d7bb-4687-bca7-96b7753a05f1	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1625420	NSV	B01	A01	ARC	DOR	SFL-0026	NSV_B01_A01_ARC_DOR_SFL-0026	CIRCULATION R-MS-100-1948
f171f80b-d7bb-4687-bca7-96b7753a0568	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1625557	NSV	B01	A01	ARC	DOR	SFL-0027	NSV_B01_A01_ARC_DOR_SFL-0027	WASTE ROOM CA-PA-100-0068
f171f80b-d7bb-4687-bca7-96b7753a055f	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1625570	NSV	B01	A01	ARC	DOR	SFL-0028	NSV_B01_A01_ARC_DOR_SFL-0028	CIRCULATION R-MS-100-2102
f171f80b-d7bb-4687-bca7-96b7753a0559	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1625572	NSV	B01	A01	ARC	DOR	SFL-0029	NSV_B01_A01_ARC_DOR_SFL-0029	CIRCULATION R-MS-100-2102
5c0edc84-3af5-4371-a501-b74067a32d58	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1693976	NSV	B01	A01	ARC	DOR	SFL-0030	NSV_B01_A01_ARC_DOR_SFL-0030	CIRCULATION R-MS-100-2102
29b7f3d3-64d3-498b-b3a5-ea40c8d4c6ee	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1947372	NSV	B01	A01	ARC	DOR	SFL-0031	NSV_B01_A01_ARC_DOR_SFL-0031	CIRCULATION R-MS-100-1948
29b7f3d3-64d3-498b-b3a5-ea40c8d4c74a	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1947464	NSV	B01	A01	ARC	DOR	SFL-0032	NSV_B01_A01_ARC_DOR_SFL-0032	3 BHK R-MS-100-2341
aa40e94e-b488-406a-bb59-09904d93bd77	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	2025231	NSV	B01	A01	ARC	DOR	SFL-0033	NSV_B01_A01_ARC_DOR_SFL-0033	CIRCULATION R-MS-100-1948
aa40e94e-b488-406a-bb59-09904d93bcf1	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	2025241	NSV	B01	A01	ARC	DOR	SFL-0034	NSV_B01_A01_ARC_DOR_SFL-0034	CIRCULATION R-MS-100-1948
2be1a3f4-db3b-4aa6-a977-bb5d778cccaf	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1435078	NSV	B01	A01	ARC	WLL	GNR-0001	NSV_B01_A01_ARC_WLL_GNR-0001	INDOOR FACILITIES R-MS-100-1865
2be1a3f4-db3b-4aa6-a977-bb5d778cca68	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1435103	NSV	B01	A01	ARC	WLL	GNR-0002	NSV_B01_A01_ARC_WLL_GNR-0002	INDOOR FACILITIES R-MS-100-1865
d66b3cd4-4b95-4e9e-b909-847c11465551	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1446435	NSV	B01	A01	ARC	WLL	GNR-0003	NSV_B01_A01_ARC_WLL_GNR-0003	A01
14ac293b-18f5-4f60-b373-cc09756bdd2a	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1979709	NSV	B01	A01	ARC	WLL	GNR-0004	NSV_B01_A01_ARC_WLL_GNR-0004	TERRACE R-MS-100-1858
c2b955b5-9e9f-4edd-9086-8ae752bb158c	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	2052509	NSV	B01	A01	ARC	WLL	GNR-0005	NSV_B01_A01_ARC_WLL_GNR-0005	FOH LIFT CA-RT-100-016
c2b955b5-9e9f-4edd-9086-8ae752bb15d4	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	2052549	NSV	B01	A01	ARC	WLL	GNR-0006	NSV_B01_A01_ARC_WLL_GNR-0006	FOH LIFT CA-RT-100-016
c2b955b5-9e9f-4edd-9086-8ae752bb15c7	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	2052566	NSV	B01	A01	ARC	WLL	GNR-0007	NSV_B01_A01_ARC_WLL_GNR-0007	FOH LIFT CA-RT-100-016
c2b955b5-9e9f-4edd-9086-8ae752bb15f3	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	2052578	NSV	B01	A01	ARC	WLL	GNR-0008	NSV_B01_A01_ARC_WLL_GNR-0008	FOH LIFT CA-RT-100-016
60ee08f2-47ef-4af1-bdbe-e3d32002875b	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1028403	NSV	B01	A01	ARC	WLL	T01-0001	NSV_B01_A01_ARC_WLL_T01-0001	BOH R-MS-100-1574
60ee08f2-47ef-4af1-bdbe-e3d32002875c	07-004003-4200000004-AED-ARC-MDL-000017_RVT_B.rvt	1028404	NSV	B01	A01	ARC	WLL	T01-0002	NSV_B01_A01_ARC_WLL_T01-0002	BOH R-MS-100-1574

DATA PREPARATION, INJECTION AND AUTOMATION TOOLS

Automation: Building Quantities, Schedules, Processes, Activities, Constraints and Purchase Tags

```

def ceil(float_number):
    return int(float_number) + (float_number > int(float_number))

#def custom_repeat(process,target_sum,column_name):
#target_sum = 600 # The maximum sum of 'Concrete m3' allowed in each group

def activity_fn(process,target_sum,column_name,result):
    def activity_order(group):
        # Sort the group in descending order based on 'Concrete m3'
        group = group.sort_values(by=process, ascending=False)

        groups = []
        group_sums = []
        next_group_id = 1

        for index, row in group.iterrows():
            row_group_ids = [] # To store the group_ids for the current row

            # Calculate the available amount for the current row
            available_amount = row[process]

            # Check if the available amount can be added to an existing group
            added_to_group = False
            for i, group_sum in enumerate(group_sums):
                if group_sum + available_amount <= target_sum:
                    # Add the row to the existing group
                    groups[i].append(available_amount)
                    group_sums[i] += available_amount
                    row_group_ids.append(i + 1) # Store the group_id for this row
                    added_to_group = True
                    break

            # If the available amount couldn't be added to any existing group, create a new group
            if not added_to_group:
                # Calculate the number of 600-unit blocks
                num_blocks = ceil(available_amount) // target_sum
                remaining = available_amount % target_sum

                # Create new groups for each 600-unit block
                for _ in range(num_blocks):
                    groups.append([target_sum])
                    group_sums.append(target_sum)
                    row_group_ids.append(next_group_id) # Store the group_id for this row
                    next_group_id += 1

                if remaining > 0:
                    groups.append([remaining])
                    group_sums.append(remaining)
                    row_group_ids.append(next_group_id)
                    next_group_id += 1

            # Update the column_name column for the current row with the stored group_ids
            group.at[index, column_name] = row_group_ids

        return group

    # Create an empty column_name column as a list to store multiple group_ids for each row
    result[column_name] = [[] for _ in range(len(result))]

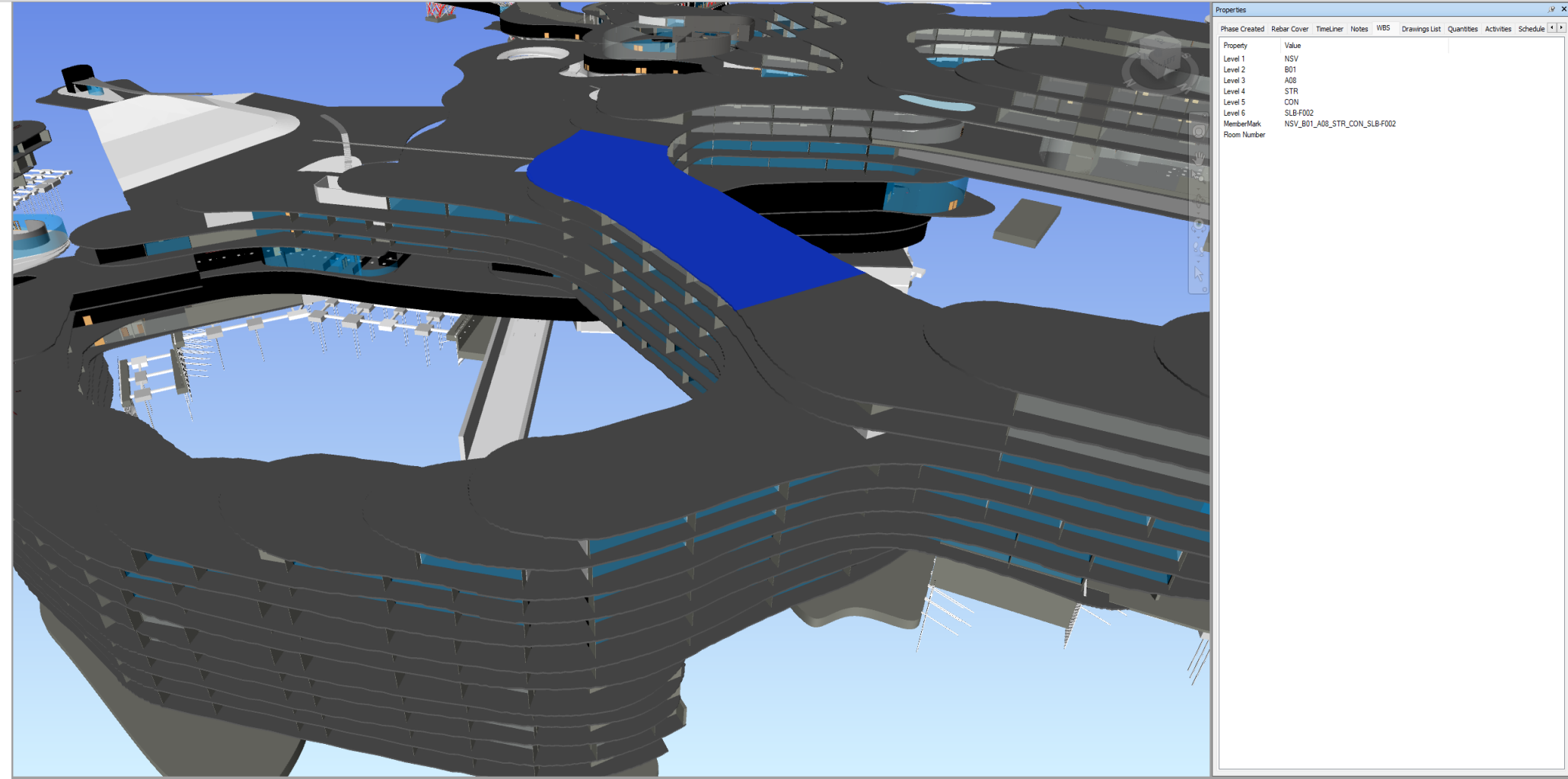
    # Group the DataFrame by 'Activity Group'
    result=result.groupby('Activity Group')

    # Apply the 'activity_order' function to each group and reset the index to get the final result

```

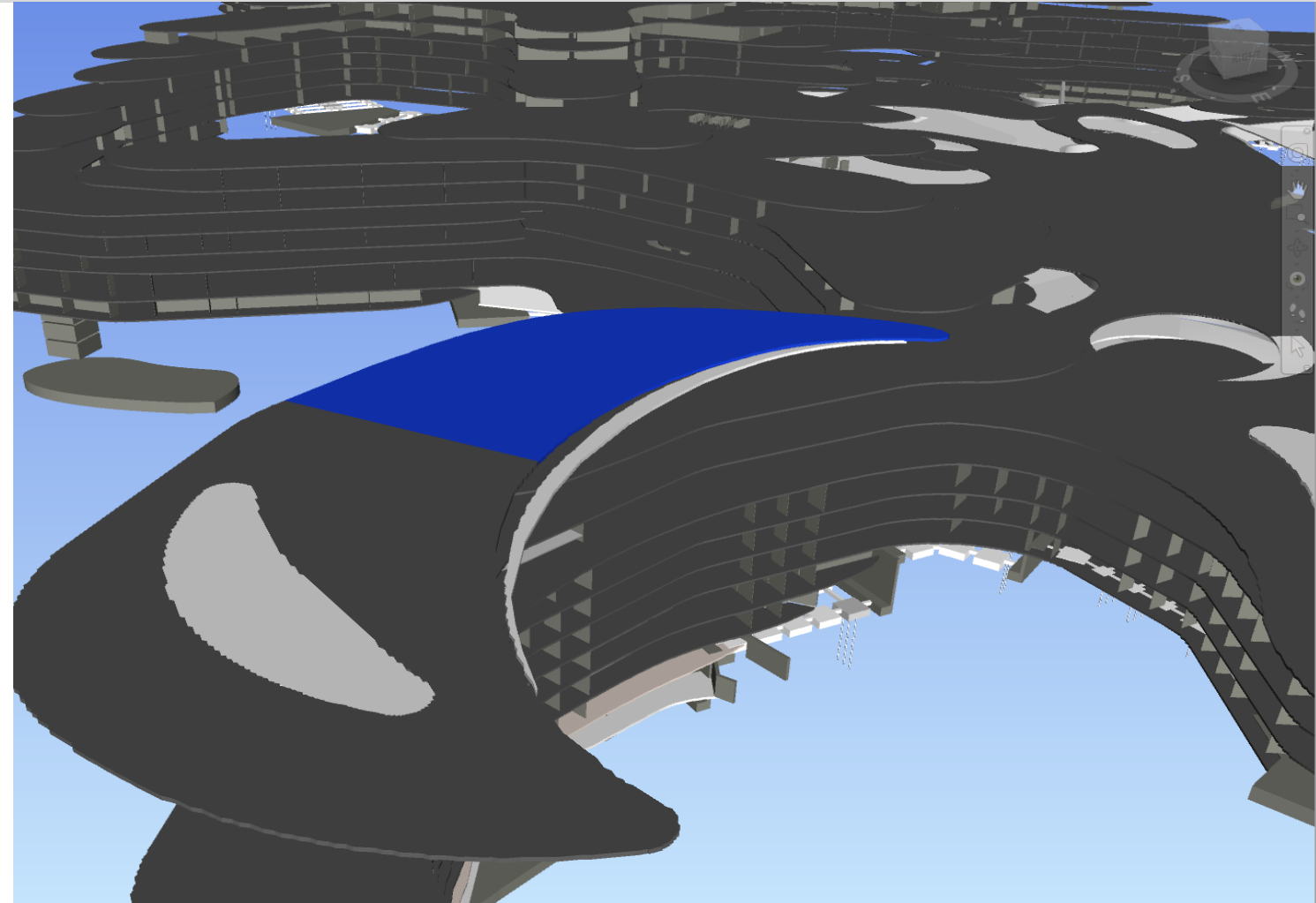
DATA PREPARATION, INJECTION AND AUTOMATION TOOLS

Data Injection: Work Breakdown Structure WBS



DATA PREPARATION, INJECTION AND AUTOMATION TOOLS

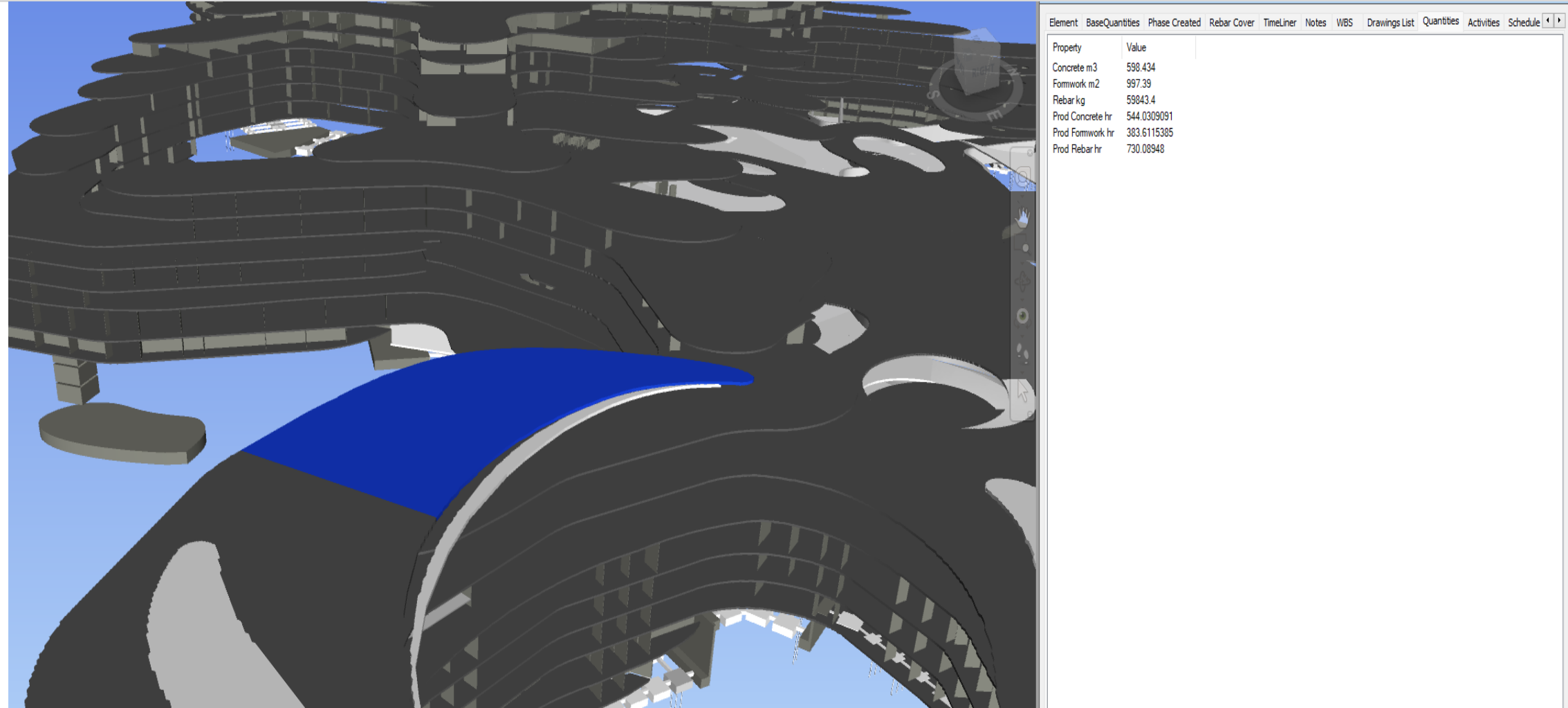
Data Injection: Constraints (Drawings)



Property	Value
General Arrangement	NSV-B05-A05-STR-ZZZ-DRA-GA-001
Schedule	NSV-B05-A05-STR-Z01-DRA-SBS-001
Reinforcement	NSV-B05-A05-STR-Z01-DRA-SBR-001
Standard Details	NSV-GNR-ZZZ-STR-ZZZ-DRA-SD-007

DATA PREPARATION, INJECTION AND AUTOMATION TOOLS

Data Injection: Quantities

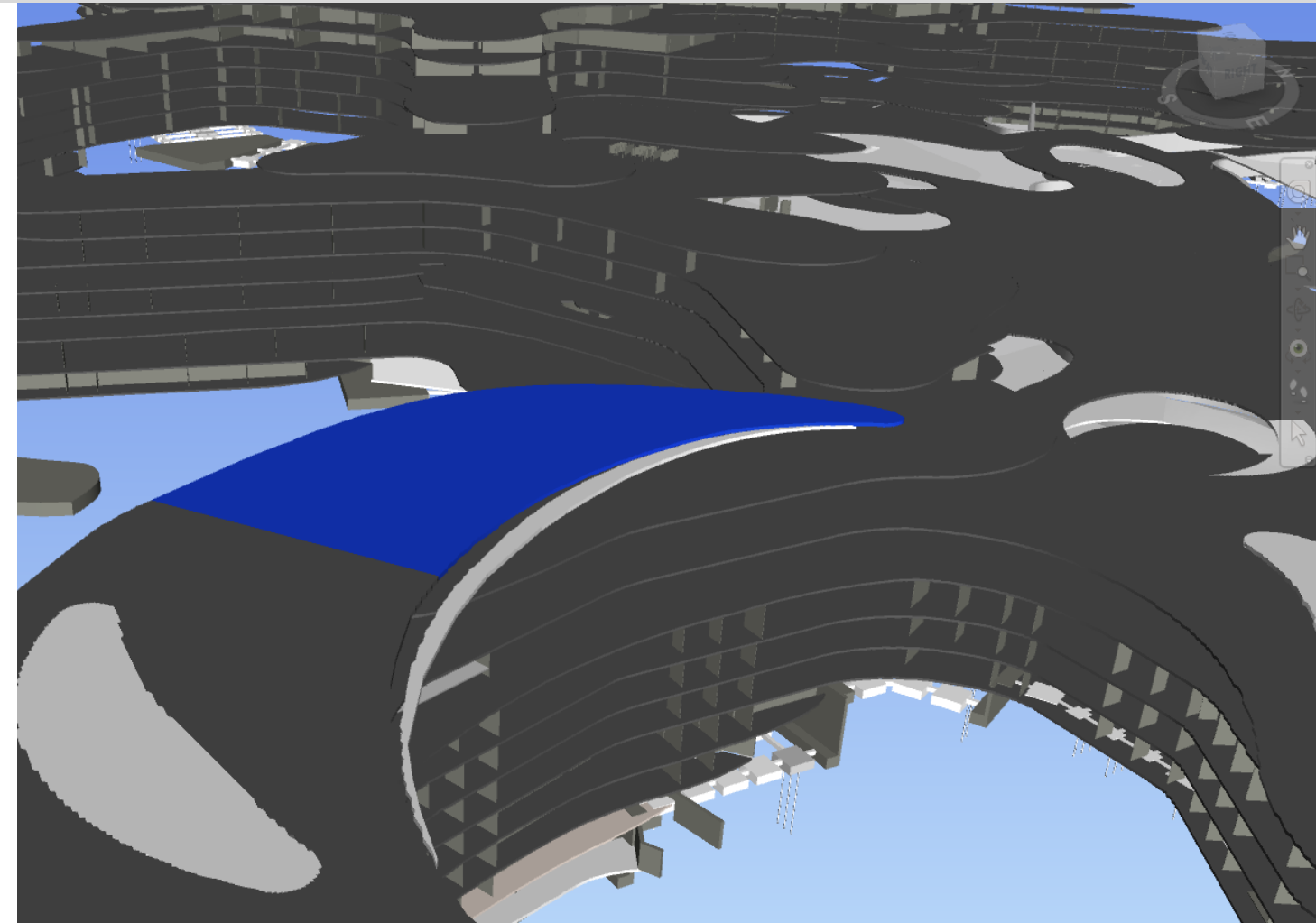


The screenshot displays a 3D architectural model of a building's structural elements, including walls, floors, and columns, rendered in a dark grey color. A specific area of the model is highlighted in a bright blue color. To the right of the model is a software interface window titled 'Quantities'. This window contains a table with two columns: 'Property' and 'Value'. The table lists various construction materials and labor hours with their corresponding numerical values.

Property	Value
Concrete m3	598.434
Formwork m2	997.39
Rebar kg	59843.4
Prod Concrete hr	544.0309091
Prod Formwork hr	383.6115385
Prod Rebar hr	730.08948

DATA PREPARATION, INJECTION AND AUTOMATION TOOLS

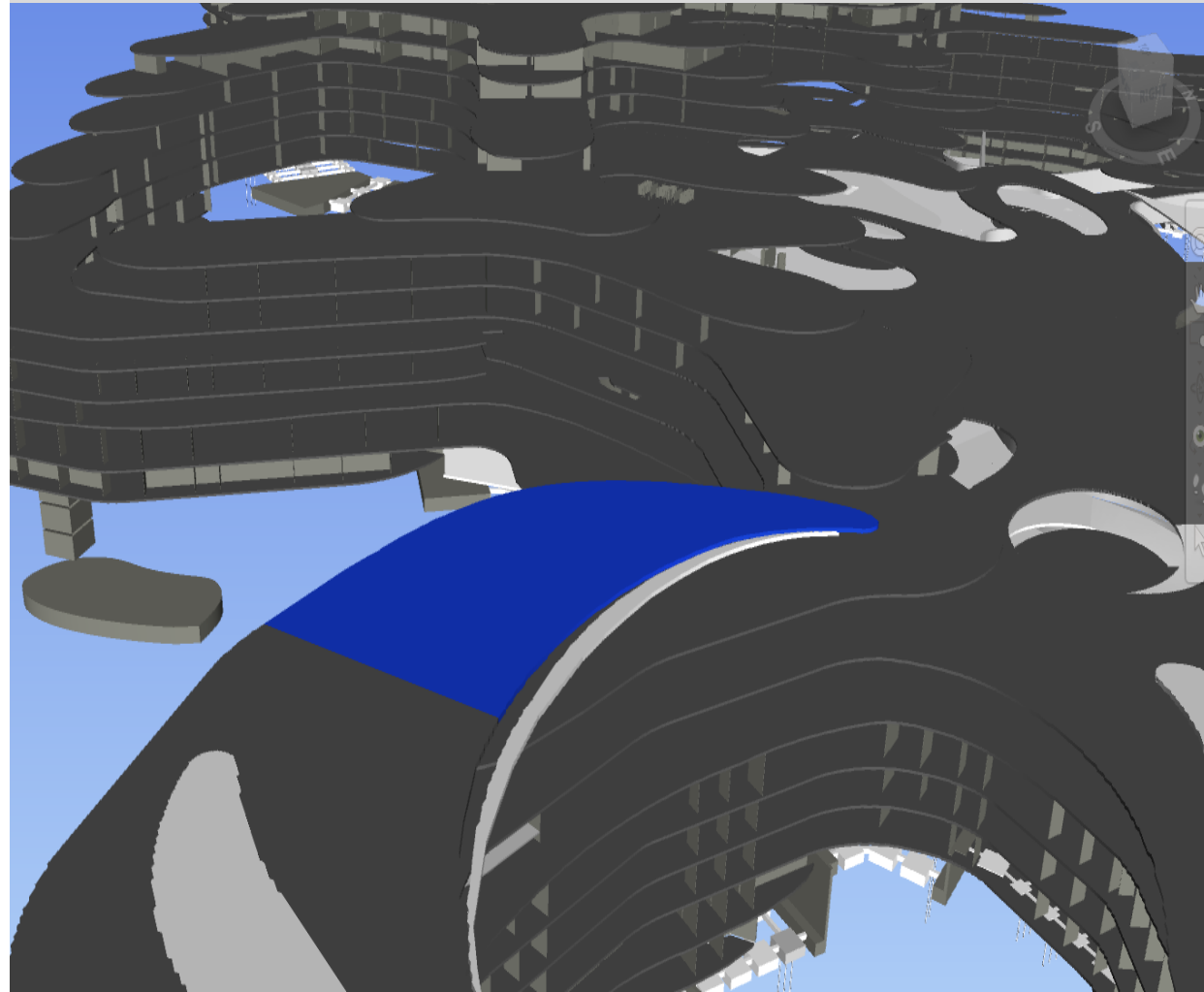
Data Injection: Activities and Processes



Property	Value
Activity Group	NSV_B05_A05_STR_CON_H
Activity Name POR	[NSV_B05_A05_STR_CON_H_POR_0002]
Activity Name FWK	[NSV_B05_A05_STR_CON_H_FWK_0001]
Activity Name REB	[NSV_B05_A05_STR_CON_H_REB_0002]

DATA PREPARATION, INJECTION AND AUTOMATION TOOLS

Data Injection: Schedule Order & Purchase Tags



Phase Created Rebar Cover TimeLiner Notes WBS Drawings List Quantities Activities Schedule Order Purchase Number

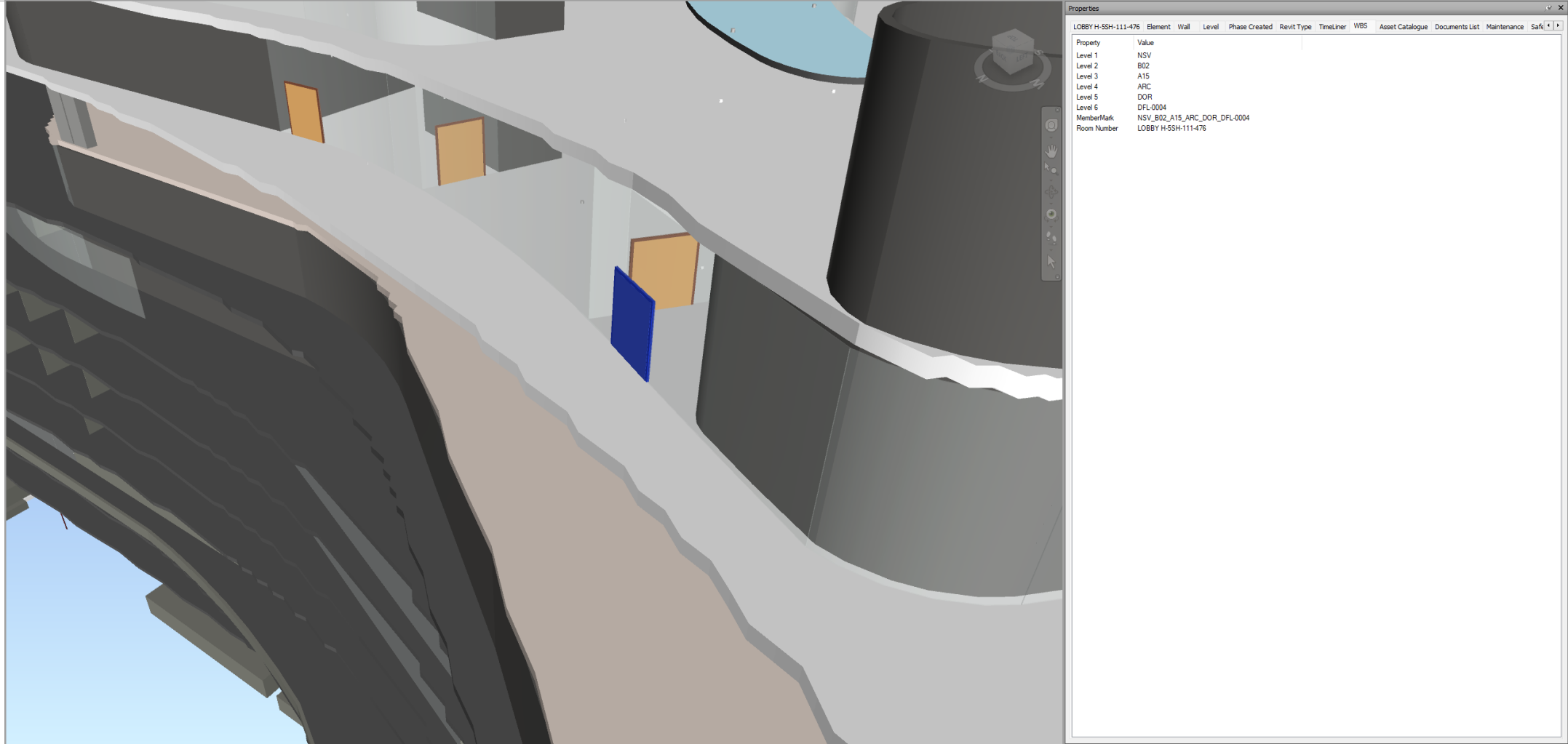
Property	Value
Schedule Order	[699, 701, 703]

Phase Created Rebar Cover TimeLiner Notes WBS Drawings List Quantities Activities Schedule Order Purchase Number

Property	Value
Purchase Number	[140, 141]

DATA PREPARATION, INJECTION AND AUTOMATION TOOLS

Data Injection: WBS Doors



DATA PREPARATION, INJECTION AND AUTOMATION TOOLS

Data Injection: Doors: Asset Catalogue, Docs List, Maintenance and Safety

LOBBY H-SSH-111-476 Element Wall Level Phase Created Revit Type TimeLiner WBS Asset Catalogue Documents List Maintenance Safe

Property	Value
ctgr	DOR
Part description	5-PLY FLUSH DOOR
Tech Standards	WDMA I.S. 1A, AWS Section 9 Edition 1, NFPA 252, UL 10B, UL 10C, NFPA 80
Core	Particleboard, UF-free particleboard, FSC certified particleboard, stave, FSC certified stave, structural composite lumber (SCL), FSC certified structural composite lumber
Thickness	1-3/4" - 2-1/4"
Hinges	Per NFPA 80 - butts, pocket pivots, continuous hinges, pivots (electrical options available)
Finish	UV-cured, primed, painted (MDO only), sealer, full sealer, catalyzed polyurethane, and opaque varnish
MaxSize	4' x 10'

LOBBY H-SSH-111-476 Element Wall Level Phase Created Revit Type TimeLiner WBS Asset Catalogue Documents List Maintenance Safe

Property	Value
Technical docum...	https://www.midwestmldg.com/f/files/Flush(1).pdf
Ordering Details	https://www.midwestmldg.com/f/files/Flush(1).pdf
As-built Drawing	http://fireban.net/documents/FD120/2.%20Drawings/Single%20Flush%20Door.pdf
Detailed Drawing	http://fireban.net/documents/FD120/2.%20Drawings/Single%20Flush%20Door.pdf
Warranty	https://www.northwestern.edu/fm/documents/construction/design_guidelines/08_openings/NU_08%201416%20-%20FLUSH%20WOOD%20DOC

LOBBY H-SSH-111-476 Element Wall Level Phase Created Revit Type TimeLiner WBS Asset Catalogue Documents List Maintenance Safe

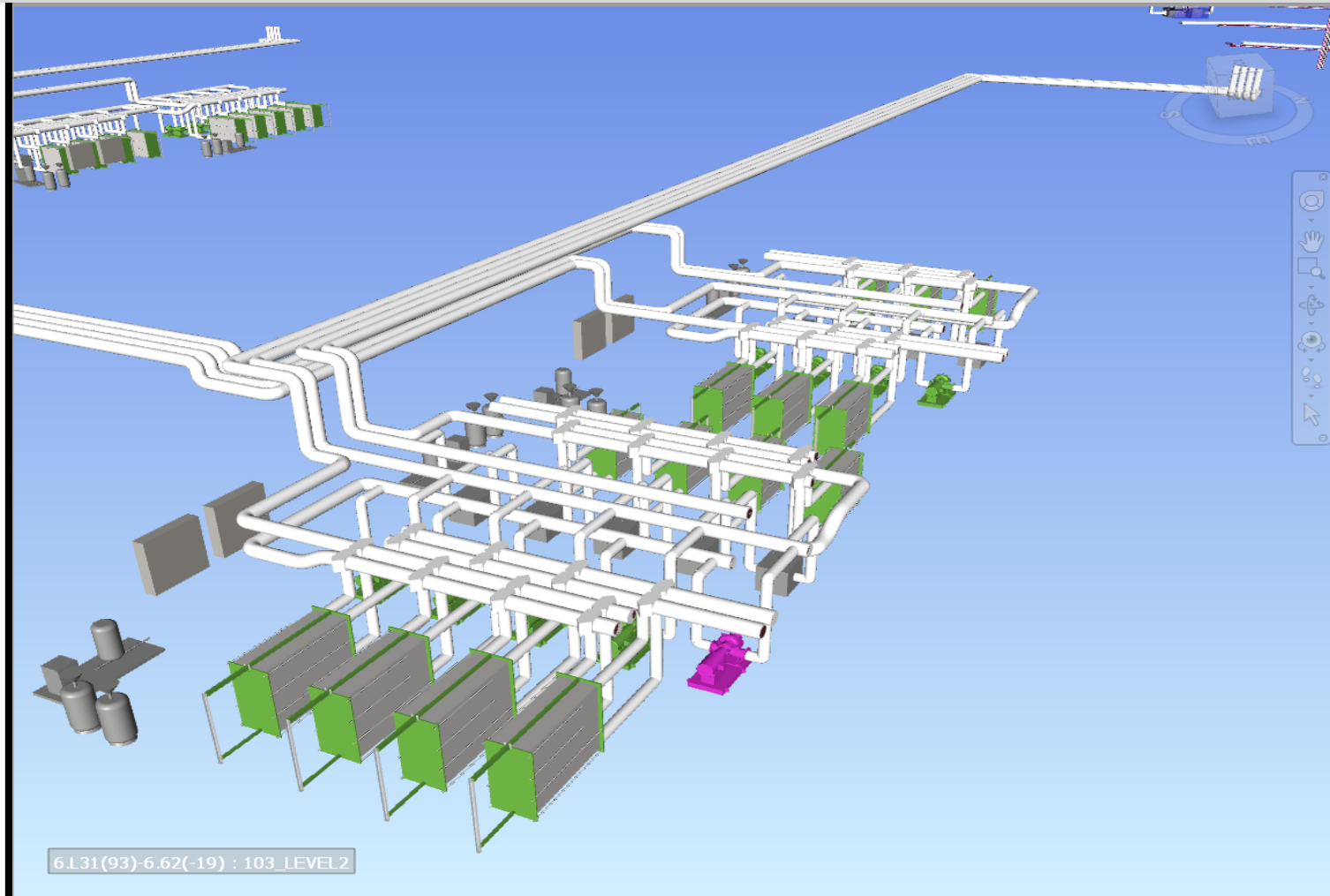
Property	Value
Warranty Duration	36 Months
Warranty Start	02/09/2025
Warranty Finish	01/09/2028
Service-1	Paint
Resource-1	Painter
ManHour-1	4
Check Interval-1	12 Months
Last Check-1	14/01/2026

Element Wall Level Phase Created Revit Type TimeLiner WBS Asset Catalogue Documents List Maintenance Safety

Property	Value
Safety-1	20 minutes Fire barrier

DATA PREPARATION, INJECTION AND AUTOMATION TOOLS

Data Injection: MEC



Properties

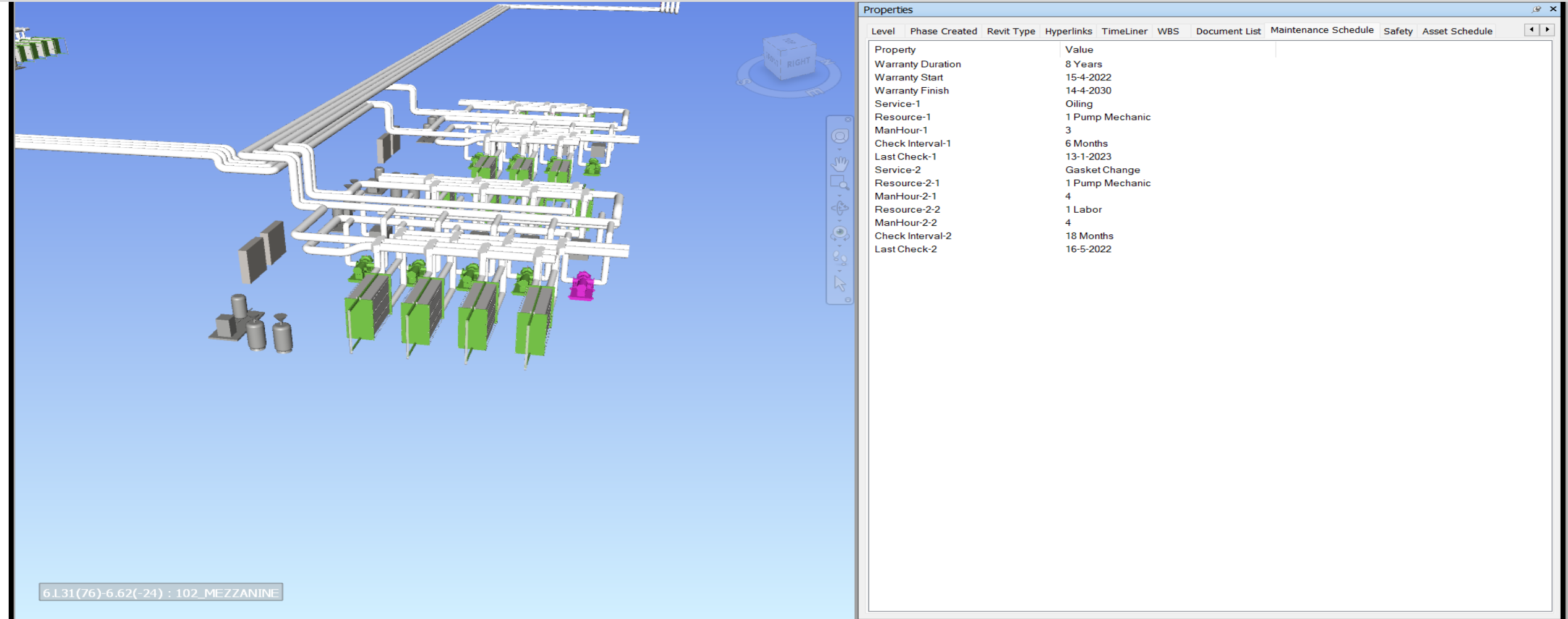
Hyperlinks TimeLiner Document List WBS Maintenance Schedule Safety Asset Schedule

Property	Value
Level1	NSV
Level2	GNR
Level3	U03
Level4	MEC
Level5	EQP
Level6	PMP-0005
MemberMark	NSV_GNR_U03_MEC_EQP_PMP-0005
RoomNumber	U03

6.L31(93)-6.62(-19) : 103_LEVEL2

DATA PREPARATION, INJECTION AND AUTOMATION TOOLS

Data Injection: MEC



The screenshot displays a 3D model of a mechanical system (MEC) on the left, featuring a network of white pipes, green rectangular components, and a purple pump. A 'RIGHT' view cube is visible in the upper right of the model area. On the right side, a 'Properties' window is open, showing a table of maintenance-related data.

Property	Value
Warranty Duration	8 Years
Warranty Start	15-4-2022
Warranty Finish	14-4-2030
Service-1	Oiling
Resource-1	1 Pump Mechanic
ManHour-1	3
Check Interval-1	6 Months
Last Check-1	13-1-2023
Service-2	Gasket Change
Resource-2-1	1 Pump Mechanic
ManHour-2-1	4
Resource-2-2	1 Labor
ManHour-2-2	4
Check Interval-2	18 Months
Last Check-2	16-5-2022

6.L31(76)-6.62(-24) : 102_MEZZANINE

DATA PREPARATION, INJECTION AND AUTOMATION TOOLS

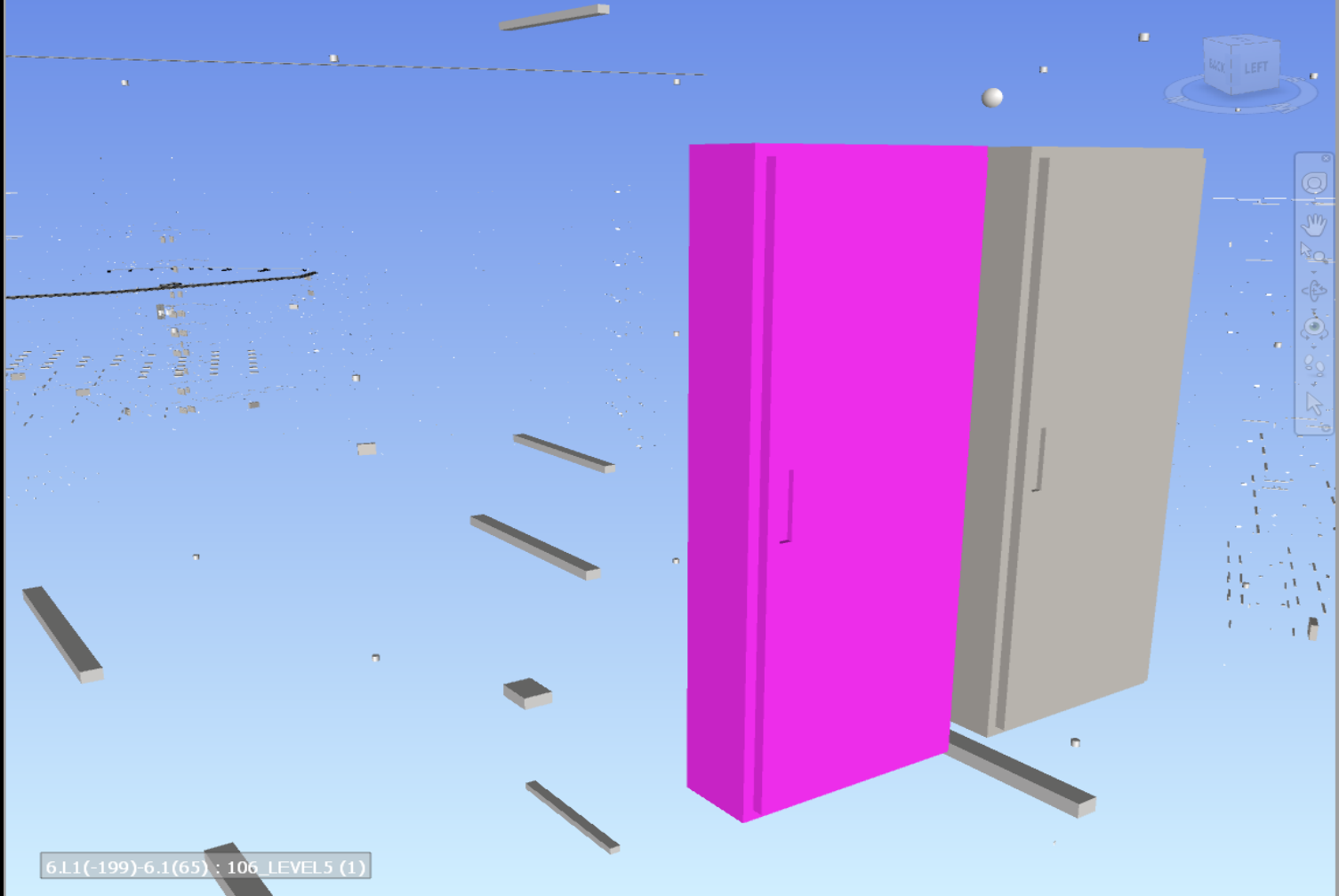
Data Injection: MEC

The screenshot displays a 3D BIM model of a mechanical system, likely a water treatment plant, with a complex network of white pipes and green machinery. A 'Properties' window is open on the right side of the interface, showing a table of safety-related properties. The table has two columns: 'Property' and 'Value'. The 'Property' column lists 'Safety', 'Safety-2', and 'Safety-3'. The 'Value' column lists 'Avoid Bare Touching', 'Check for wear or damage', and 'Switch off when overheat'. The interface also includes a top navigation bar with tabs for 'Hyperlinks', 'TimeLiner', 'Document List', 'WBS', 'Maintenance Schedule', 'Safety', and 'Asset Schedule'. A status bar at the bottom left of the model area shows the text '6.L31(93)-6.62(-19) : 103_LEVEL2'.

Property	Value
Safety	Avoid Bare Touching
Safety-2	Check for wear or damage
Safety-3	Switch off when overheat

DATA PREPARATION, INJECTION AND AUTOMATION TOOLS

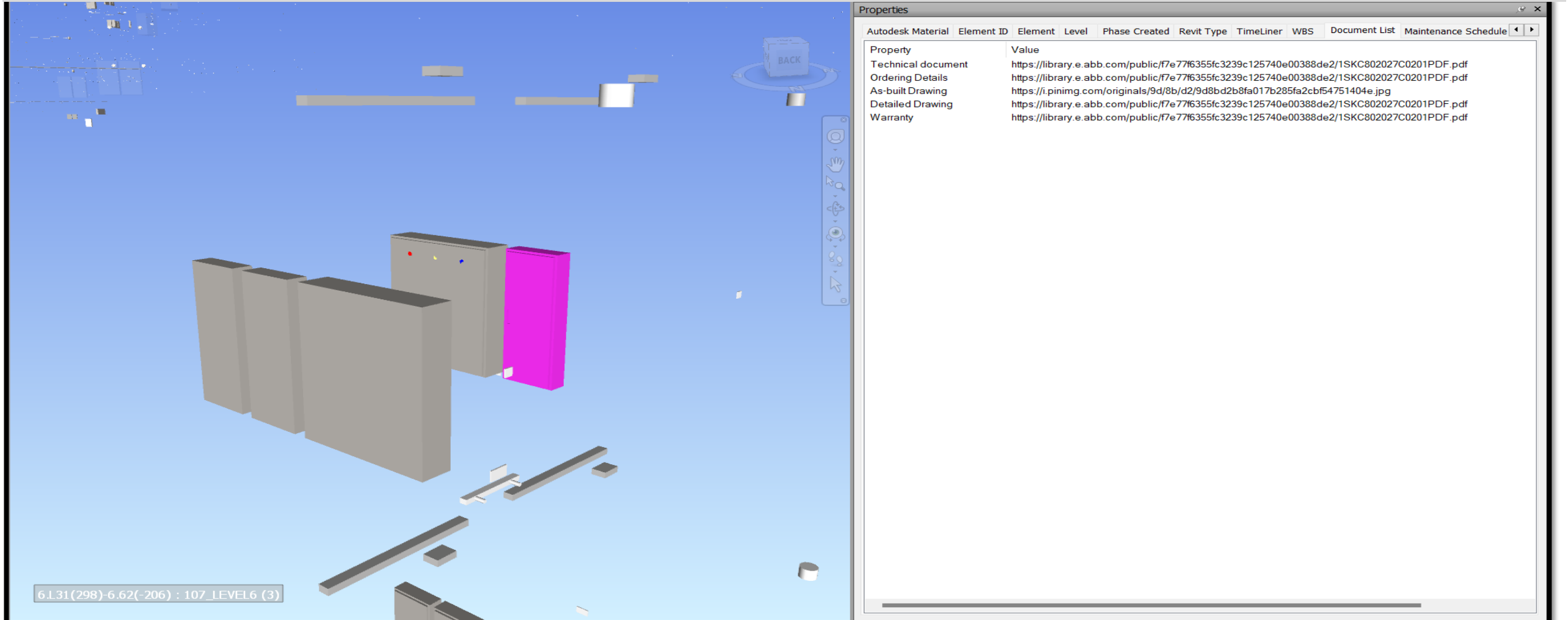
Data Injection: ELE



Property	Value
Level1	NSV
Level2	B02
Level3	A05
Level4	ELE
Level5	EQP
Level6	3DB-0001
MemberMark	NSV_B02_A05_ELE_EQP_3DB-0001
RoomNumber	A05

DATA PREPARATION, INJECTION AND AUTOMATION TOOLS

Data Injection: ELE



The screenshot displays a 3D model of an electrical cabinet assembly in a blue environment. The cabinet consists of several grey units, with one unit highlighted in pink. A 'BACK' button is visible in the upper right of the model area. A vertical toolbar on the right side of the model area contains various navigation and manipulation icons.

The Properties window on the right side of the interface shows the following data:

Property	Value
Technical document	https://library.e.abb.com/public/f7e77f6355fc3239c125740e00388de2/1SKC802027C0201PDF.pdf
Ordering Details	https://library.e.abb.com/public/f7e77f6355fc3239c125740e00388de2/1SKC802027C0201PDF.pdf
As-built Drawing	https://i.pinimg.com/originals/9d/8b/d2/9d8bd2b8fa017b285fa2cbf54751404e.jpg
Detailed Drawing	https://library.e.abb.com/public/f7e77f6355fc3239c125740e00388de2/1SKC802027C0201PDF.pdf
Warranty	https://library.e.abb.com/public/f7e77f6355fc3239c125740e00388de2/1SKC802027C0201PDF.pdf

At the bottom left of the interface, a status bar displays the text: 6.L31(298)-6.62(-206) : 107_LEVEL6 (3)

DATA PREPARATION, INJECTION AND AUTOMATION TOOLS – QUALITY CONTROL

PM Dashboard: Interactive detailed dashboard: Quantities, Activities, Constrains, Schedule, Purchase

NEOM SKI VILLAGE CONSTRUCTION DIGITAL TWIN SIMULATION DASHBOARD

7796	207.95K	364.09K	20.39M
Total Elements	Concrete m3	Formwork m2	Rebar kg

Drawings Constrains			
99	215	215	4
General Arrangement	Schedule Drawings	RF Drawings	SD Drawings

Working Day

1/1/2024

8/2/2026

Purchase Number

1

189

Zone

All

Floor

All

Orientation

H

V

PRC

FWK

POR

REB

Clear all slicers

Total Concrete per Zone

B01	44K
B02	47K
B03	34K
B04	22K
B05	26K
GNR	35K

Total Formwork per Zone

B01	44K
B02	47K
B03	34K
B04	22K
B05	26K
GNR	35K

Total Rebar per Zone

B01	4.4M
B02	4.6M
B03	3.3M
B04	2.2M
B05	2.5M
GNR	3.5M

30

Floors

6

Zones

945

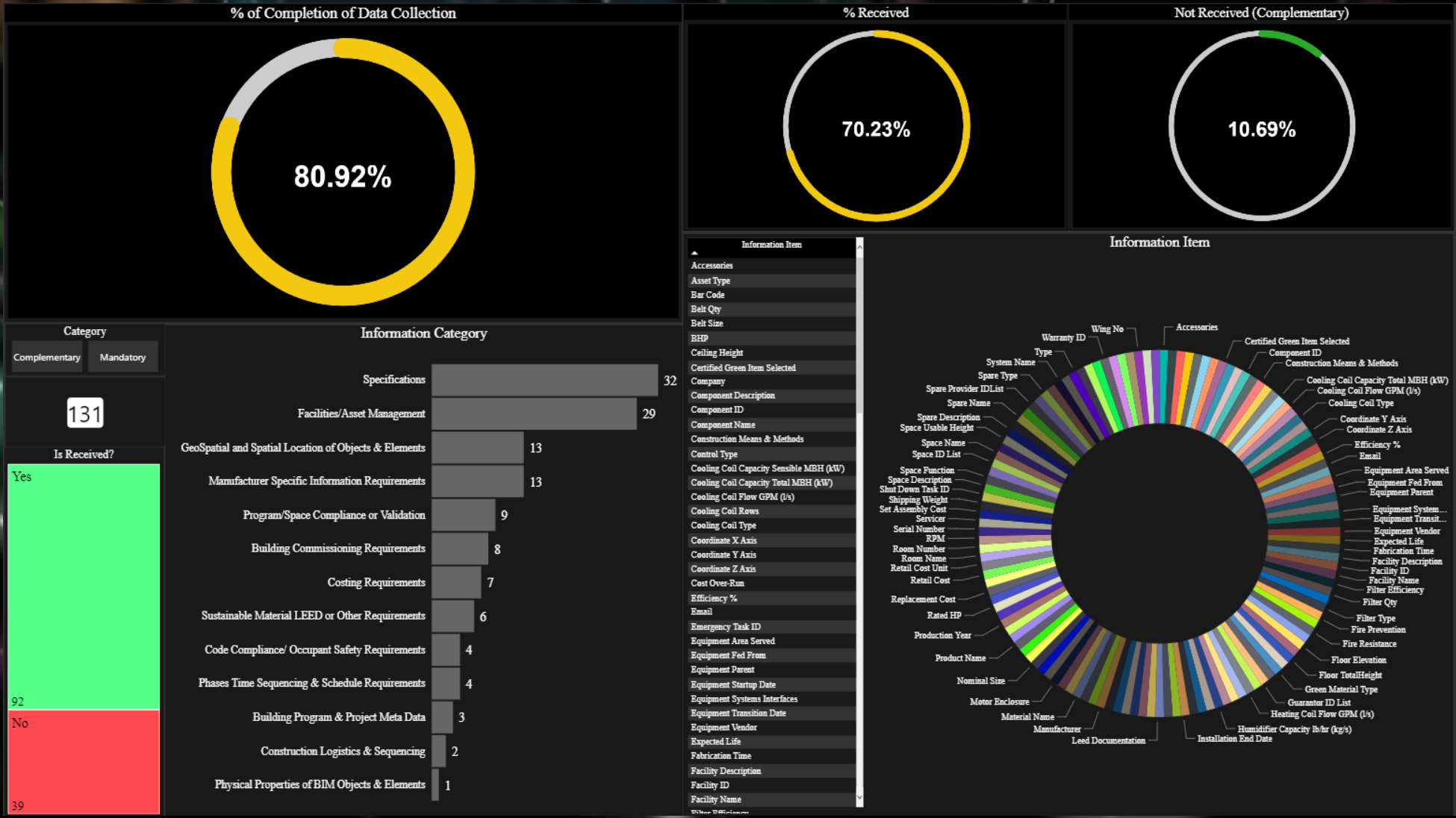
Working Days

Day	Purchase Number	General Arrangement	STANDARD DETAILS	Schedule	Reinforcement
1	1	NSV-B05-U11-STR-ZZZ-DRA-GA-001	NSV-GNR-ZZZ-STR-ZZZ-DRA-SD-007	NSV-B05-U11-STR-Z01-DRA-SBS-001	NSV-B05-U11-STR-Z01-DRA-SBR-001
1	1	NSV-B05-U11-STR-ZZZ-DRA-GA-001	NSV-GNR-ZZZ-STR-ZZZ-DRA-SD-007	NSV-B05-U11-STR-Z01-DRA-SBS-001	NSV-B05-U11-STR-Z01-DRA-SBR-001
1	1	NSV-B05-U11-STR-ZZZ-DRA-GA-001	NSV-GNR-ZZZ-STR-ZZZ-DRA-SD-007	NSV-B05-U11-STR-Z01-DRA-SBS-001	NSV-B05-U11-STR-Z01-DRA-SBR-001
1	1	NSV-B05-U11-STR-ZZZ-DRA-GA-001	NSV-GNR-ZZZ-STR-ZZZ-DRA-SD-007	NSV-B05-U11-STR-Z01-DRA-SBS-001	NSV-B05-U11-STR-Z01-DRA-SBR-001
1	1	NSV-B05-U11-STR-ZZZ-DRA-GA-001	NSV-GNR-ZZZ-STR-ZZZ-DRA-SD-007	NSV-B05-U11-STR-Z01-DRA-SBS-001	NSV-B05-U11-STR-Z01-DRA-SBR-001
2	2	NSV-B05-U11-STR-ZZZ-DRA-GA-001	NSV-GNR-ZZZ-STR-ZZZ-DRA-SD-007	NSV-B05-U11-STR-Z01-DRA-SBS-001	NSV-B05-U11-STR-Z01-DRA-SBR-001

Live Project Reporting Dashboards – QA/QC + PROGRESS MANAGEMENT

Data Collection Dashboard:

This dashboard is showing the tracking of the project data collection and identifying the proper usage of this data.



IoT Services.

- Continuous Integration
- Ease of deployment
- Scalability
- Abstraction layers
- Cluster computing
- Infrastructure as Code for zero-touch provisioning

BIG DATA

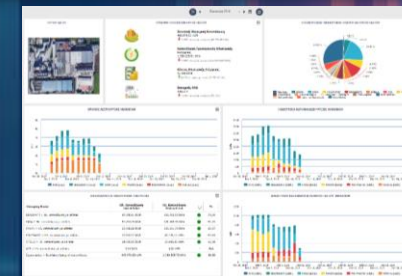
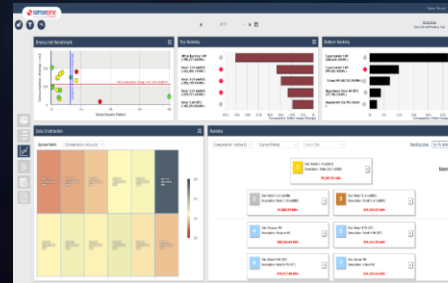
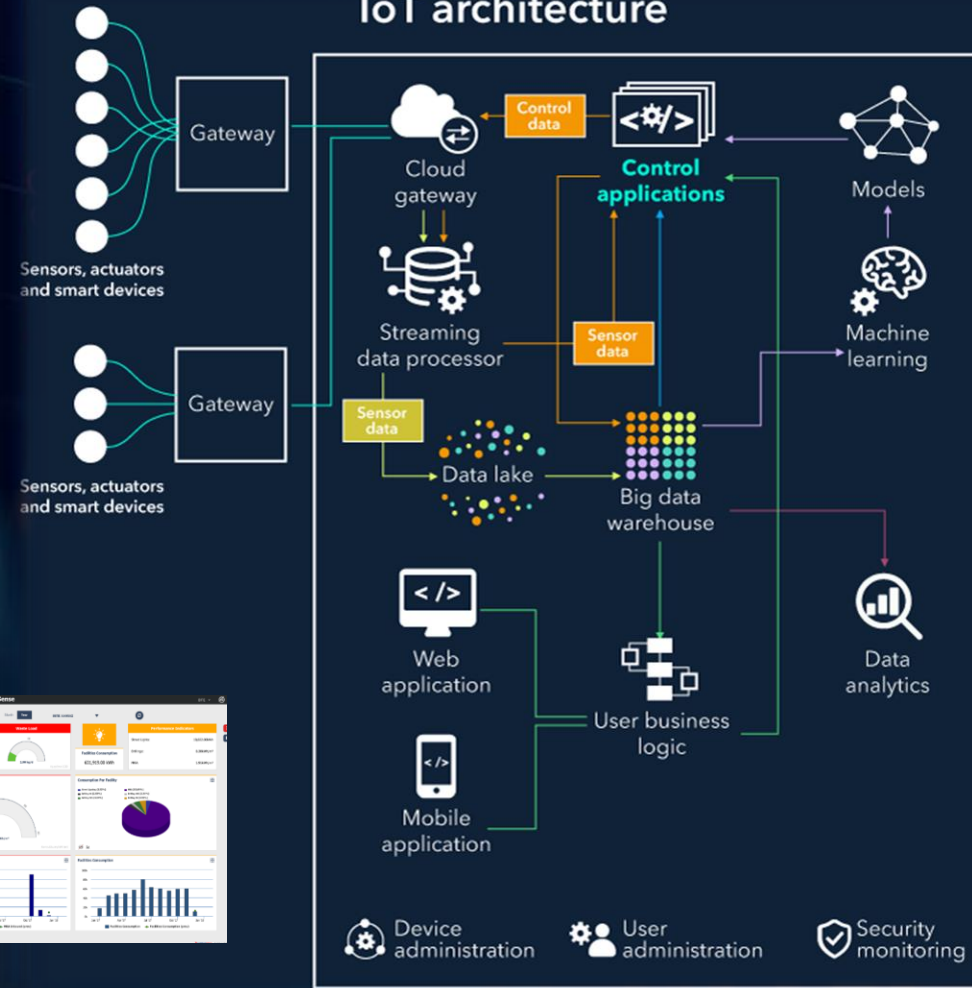


FLEXIBILITY
for fast and secure deployment:
multi-tenant, cloud & on premises

RE-USABILITY
for agile service implementation:
device-agnostic, any OS, software-neutral templates

CONTAINERIZED
for lowering deployment costs & effort:
lightweight virtual environments instead of dedicated servers

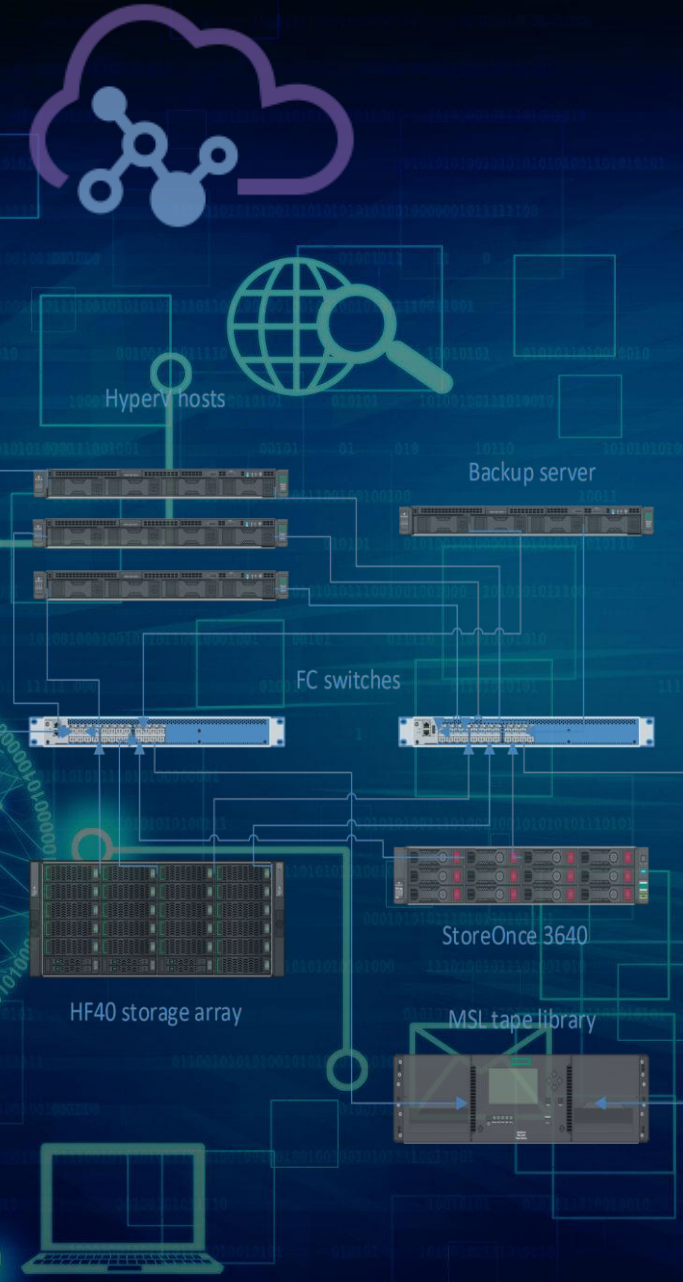
PROTOCOL-NEUTRAL
70+ industry-standard protocols for automatic meter reading, power system automation, building automation, process automation & industrial control



IT Infrastructure Consultation and Design

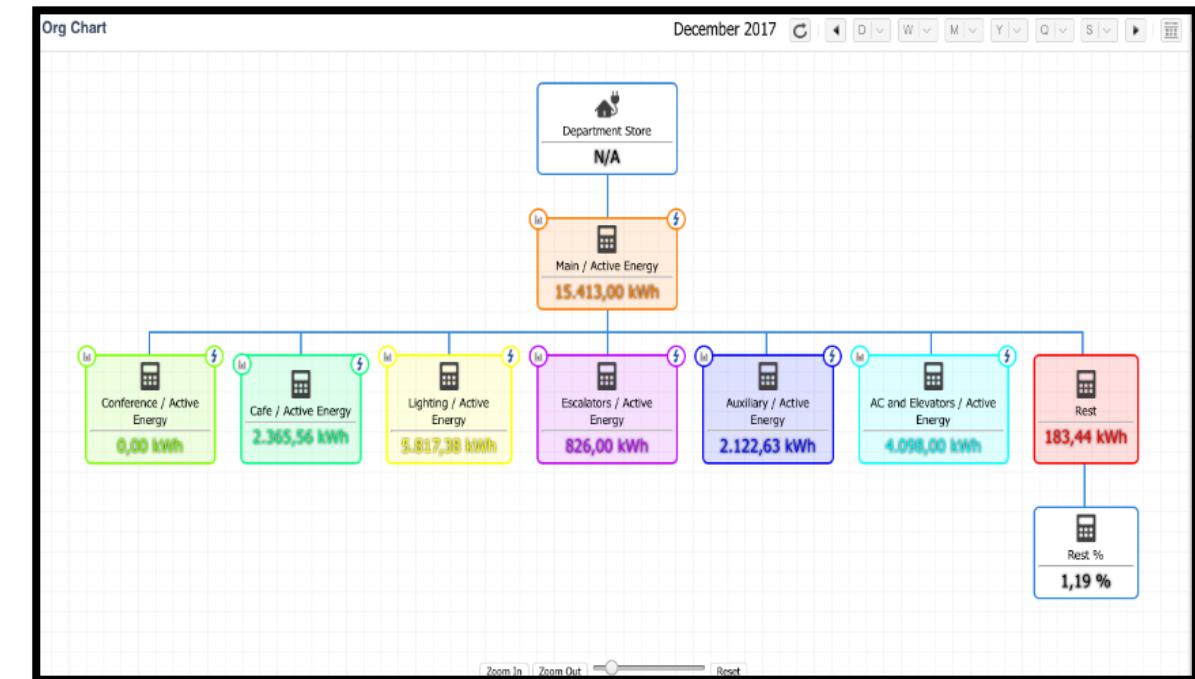
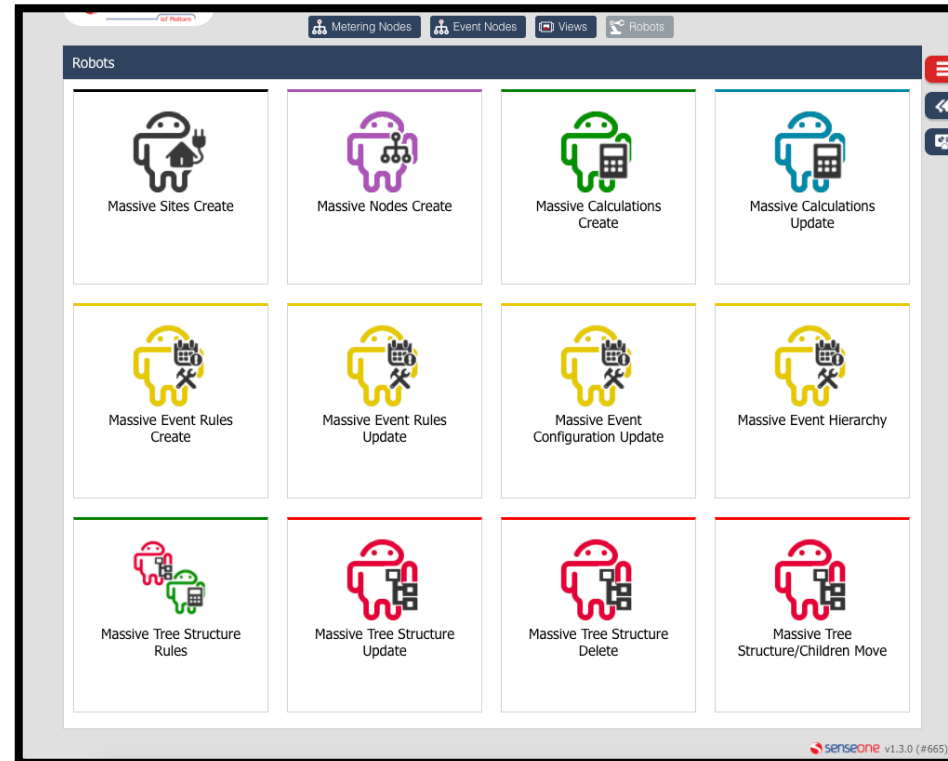


- 1 Design On Premis Solutions
- 2 Future Capcity Requirements
- 3 Estimate Current Infrastructure
- 4 Cloud Solutions Consultations
- 5 IoT Hardware Consultation



DESIGN PRINCIPLES OF THE IOT PLATFORM

- Continuous Integration
- Ease of deployment
- Scalability
- Abstraction layers
- Cluster computing
- Neutral Platform



DEVELOP BIM-FM-IoT INTEGRATION SOLUTION

Control center

Device type Colorization

Scene controls Alarms

Device type, colorization

Layout

Scene

Devices

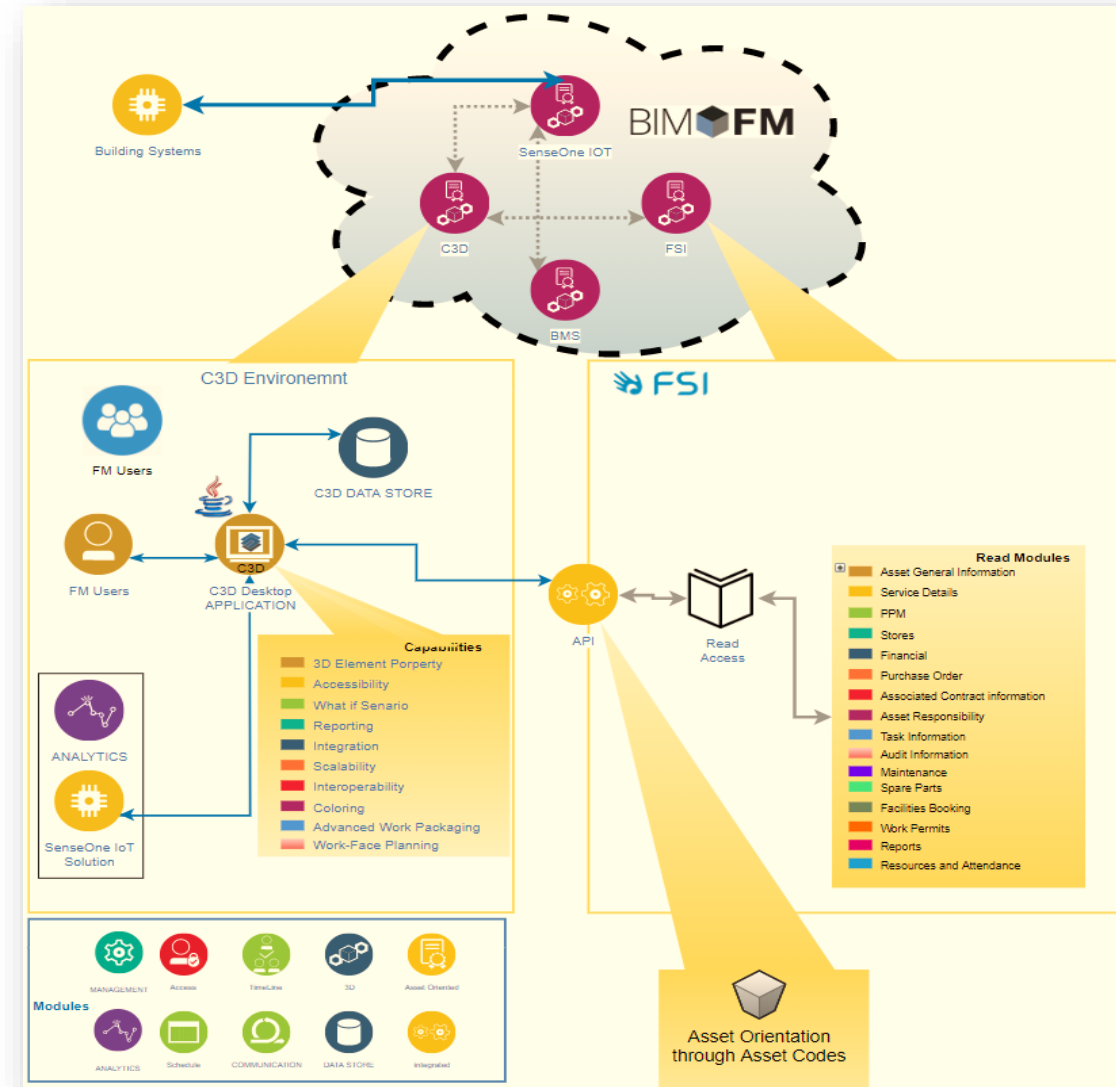
description	device.type
Training Room 532 / Temperature	Temperature Sensor
Training Room 534 / Temperature	Temperature Sensor
CCC-Office	Floor

Device list

There are no controls available for selected device

CCC-Office
Cost 0.80 € [CALC]
Energy/m2 0.01 kWh/m² [CALC]

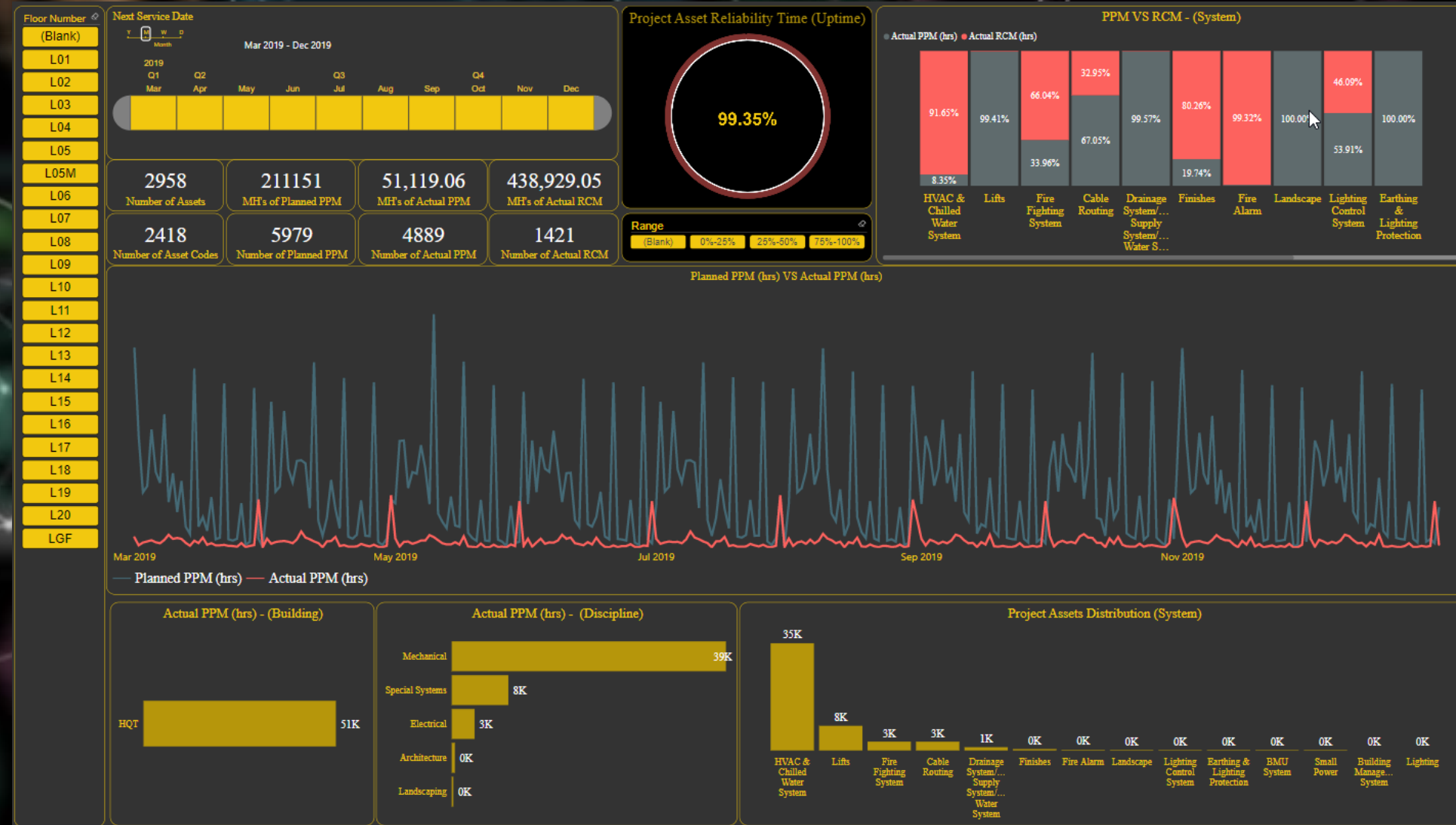
Device info



Live Project Reporting Dashboards

Asset management Dashboard:

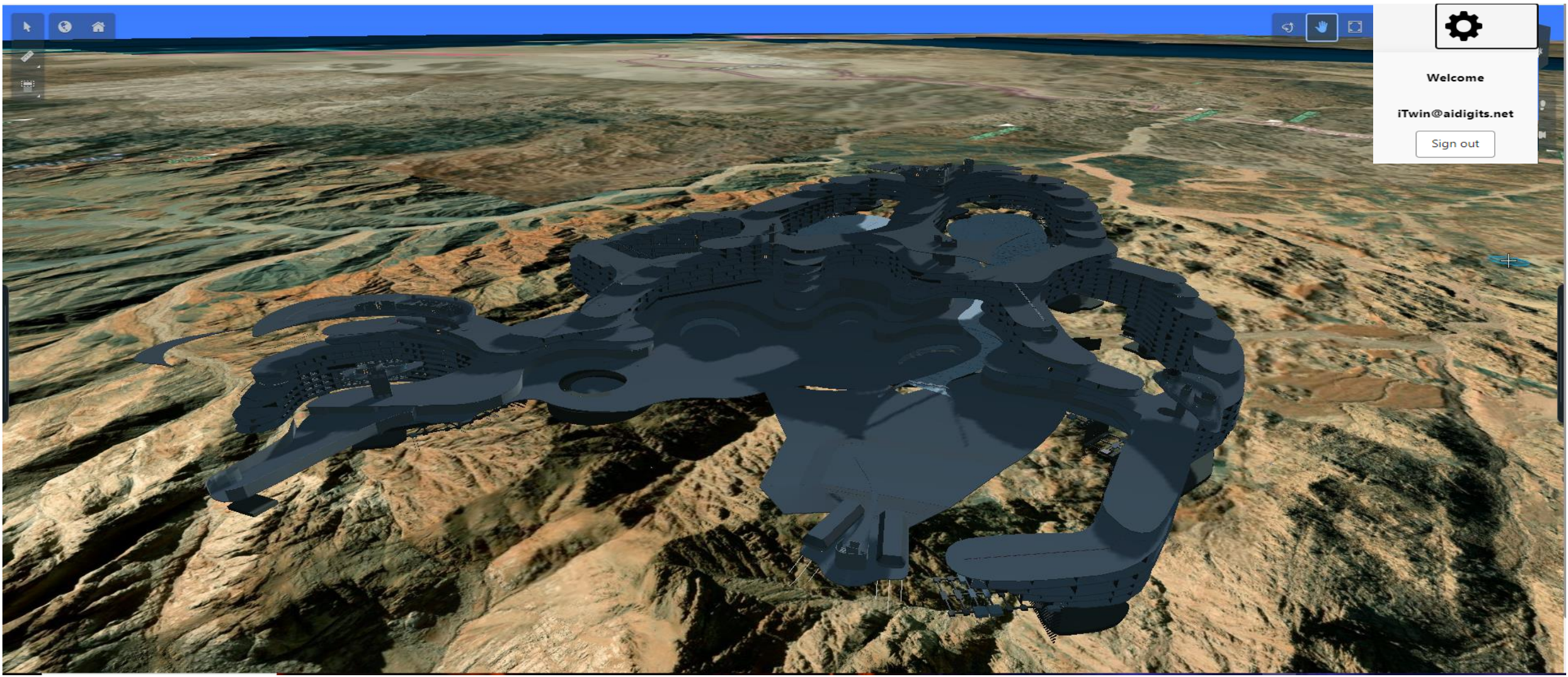
This dashboard is showing the tracking of the project Assets, IoT Sensors mapping and identifying the proper required action of each asset ether in the facility management stage.



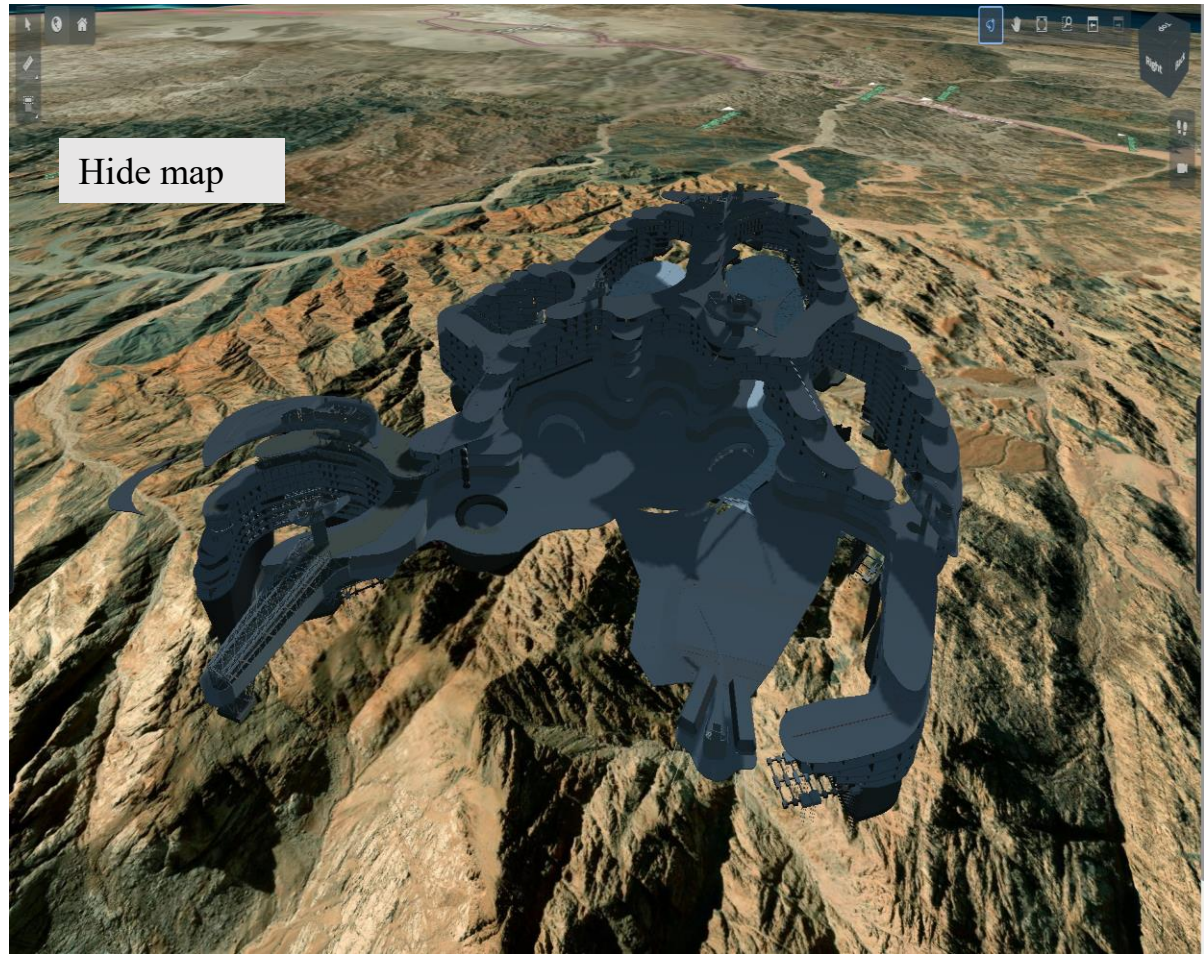
FACILITIES DIGITAL TWIN – iTWIN PLATFORM

The image shows a screenshot of the AIDIGITS website. The top navigation bar is dark blue with the AIDIGITS logo on the left and 'MAIN', 'INFO', and 'CONTACT' links on the right. The main content area has a blue-tinted background image of a modern building's facade. Overlaid on this is the text 'Your Digital Twin Solution' in a large, white, sans-serif font. Below this text is a white, rounded rectangular button with the text 'Join Us'. In the bottom right corner, there is a screenshot of a web browser window. The browser's address bar shows 'https://login.microsoftonline.com' and the page title is 'Sign in to your account'. The page content includes the Microsoft logo, the heading 'Pick an account', and a list of accounts: 'Omar Taha' (omar.taha@aidigits.net, Connected to Windows), 'iTwin@aidigits.net', and a '+ Use another account' option. At the bottom of the browser window, there are links for 'Terms of use' and 'Privacy & cookies'.

FACILITIES DIGITAL TWIN – iTWIN PLATFORM



FACILITIES DIGITAL TWIN – iTWIN PLATFORM



FACILITIES DIGITAL TWIN – iTWIN PLATFORM

AIDIGITS
Sign out

Tree View | **Properties** | Measurements | Tool Settings

Linear Form [2-4736]
Linear Form

Path: AHQ_HQT_L15_ARC-FIN_ABT.dgn.i.dgn

▼ OBJ_LEVELS

Asset Code: -

BIM Description: Architectural Wall Finish;Wall Coverings;Paint ...

BIM Memberma...: AHQ_HQT_L15_ARC-FIN_PTW-15B01.2-0210

Circuit Number: -

Construction Zo...: Zone C

Control Circuit ...:

CSI Code: 099123_007

Electrical Zone: -

Equipment Elect...:

Equipment Mec...:

Equipment Pare...:

Fire Evacuation ...:

Fire Fighting Zones: -

Fire Resistance ...:

Function:

HVAC Zone: -

Level 1: AHQ

Level 2: HQT

Level 3: L15

Level 4: ARC-FIN

Level 5: -

Level 6: PTW-15B01.2-0210

MS-ID: 2778723

Nominal Size: -


Quantity: 11,449

Room Number: 15B01.2

Sub Trade: Painting

Trade: Wall Finish

Unit: M2



Free Form
Category: A-CLNG-FNSH
Model: File Fence from D:\DATA\Zahiya_project\New folder (2)\saved\TRANSMITTAL\new_transmittal\Cut_quantities.dgn

Data Visualization | isolate by Level sele... | sensor integration

OBJ_LEVELS

Room_x0020_Number

Generate visualization | Clear visualization

<input checked="" type="checkbox"/>	Name	Color
<input checked="" type="checkbox"/>	15C03.1	Blue
<input checked="" type="checkbox"/>	15B05.1	Purple
<input checked="" type="checkbox"/>	15B04.2	Green
<input checked="" type="checkbox"/>	15S02	Yellow
<input checked="" type="checkbox"/>	15S01	Gold
<input checked="" type="checkbox"/>	15B01.2	Dark Blue
<input checked="" type="checkbox"/>	15S04	Cyan
<input checked="" type="checkbox"/>	15B04.3	Orange
<input checked="" type="checkbox"/>	15A02.2	Magenta
<input checked="" type="checkbox"/>	15A02.1	Brown
<input checked="" type="checkbox"/>	15A03.2	Pink
<input checked="" type="checkbox"/>	15A04.2	Red
<input checked="" type="checkbox"/>	15A05.2	Light Green

FACILITIES DIGITAL TWIN – iTWIN PLATFORM

The screenshot displays the AIDIGITS iTWIN platform interface. The main area shows a 3D model of a building's cable tray system. A tooltip for a selected element reads: "Linear Form", "Category: E-CABL-TRAY-TEL", and "Model: Master Model".

The right-hand panel, titled "Data Visualization", shows a tree view for "isolate by Level sele...". The tree structure is as follows:

- Tree by Levels
 - AHQ
 - HQT
 - L15
 - ELE-BMS
 - ELE-CBS
 - ELE-ERT
 - ELE-CRT
 - AHQ_HQT_L15_ELE-CRT_TRY-L15-001
 - AHQ_HQT_L15_ELE-CRT_RCD-15B04.2-002
 - AHQ_HQT_L15_ELE-CRT_BSB-L15-001
 - AHQ_HQT_L15_ELE-CRT_RCD-15C05.5-002
 - AHQ_HQT_L15_ELE-CRT_TRK-L15-001
 - ELE-FIA
 - ELE-LIT
 - ELE-NFL
 - ELE-PWR
 - MEC-CHW
 - ELE-SEC
 - MEC-DRN
 - MEC-FFT
 - STR-CON
 - MEC-HVC
 - MEC-WSP
 - ARC-FIN

FACILITIES DIGITAL TWIN – iTWIN PLATFORM

The screenshot displays the AIDIGITS iTWIN platform interface. On the left, a 3D architectural model of a building is shown with numerous white circular markers representing IoT sensors. The building's floor is color-coded, with green and yellow areas. On the right, a control panel titled 'sensor integration' is visible. It includes a 'Data Visualization' tab, an 'isolate by Level sele...' dropdown, and a 'sensor integration' dropdown. Below these are three view options: 'Heatmap' (selected), 'smoke sensor readings', and 'original'. The 'Heatmap' option is described as 'show colormap based on temperature sensor'. Below the view options, there are two sections for active alerts: 'Active temperature Alert(s)' with markers for 15A10.2, 15C01.1, 15C02.1, 15C04.1, 15S04, and 15S08; and 'Active smoke Alert(s)' with markers for 15B04.2, 15S01, and 15S04. A grey box in the bottom right of the 3D view displays data for 'Room Number: 15A02.2':

smokesensor	offline
tempsensor	19°C
time	2023-02-05 22:02:27

A grey box on the right side of the interface contains the text: **IoT (SENSORS MARKER WITH DATA)**

FACILITIES DIGITAL TWIN – iTWIN PLATFORM

The screenshot displays the AIDIGITS iTWIN platform interface. The main area shows a 3D perspective view of a building model with a green heatmap overlay representing sensor data. The interface includes a top navigation bar with the AIDIGITS logo and a 'Sign out' button. On the left, there is a vertical toolbar with icons for home, navigation, and editing. The right-hand side features a control panel with the following elements:

- Data Visualization** and **Isolate by Level sele...** tabs.
- sensor integration** tab with a toggle for **add sensor markers**.
- Choose type of view** section with three options:
 - Heatmap** (selected): show colormap based on temperature sensor.
 - smoke sensor readings**: show colormap based on smoke sensor readings.
 - original**: reset to original view.
- Active temperature Alert(s)** section with buttons for: 15A10.2, 15A21.1, 15C01.1, 15C02.1, 15S01, 15S04.
- Active smoke Alert(s)** section with buttons for: 15B04.2, 15S01, 15S04.

FACILITIES DIGITAL TWIN – iTWIN PLATFORM

The screenshot displays the AIDIGITS iTWIN platform interface. On the left, a 3D architectural model of a building is shown with a red translucent volume highlighting a specific area. On the right, a control panel titled "sensor integration" is visible. It includes a "Data Visualization" tab, a "Sign out" button, and a "Choose type of view" section with three options: "Heatmap" (selected), "smoke sensor readings", and "original". Below this, there are lists of "Active temperature Alert(s)" and "Active smoke Alert(s)". A red arrow points to the "15S01" alert in the smoke sensor list.

AIDIGITS Sign out

Data Visualization isolate by Level sele... sensor integration >

add sensor markers

Choose type of view

Heatmap ✓ show colormap based on temperature sensor	smoke sensor readings show colormap based on smoke sensor readings	original reset to original view
---	--	---

Active temperature Alert(s)

15A10.2 15A15.5 15C02.1 15S01 15S04

Active smoke Alert(s)

15B04.2 15S01 15S04

IOT (ZOOM TO ELEMENT WHEN CLICKING ON ALERT)

FACILITIES DIGITAL TWIN – iTWIN PLATFORM

FM/O&M : SERVICE REQUEST – GENERATE REQUEST

The screenshot displays the AIDIGITS iTWIN platform interface. On the left, a 3D model of a facility is shown with various components highlighted in orange and blue. The main interface features a navigation bar with tabs for 'Data Visualization', 'Maintenance status', 'Service request', and 'Asset performance'. The 'Service request' tab is active, showing a 'Create Request' form. The form includes a 'Select element' tree with the following structure:

- Tree by Levels
- AHQ
 - HQT
 - L15
 - ARC-FIN
 - ELE-BMS
 - ELE-CBS
 - ELE-CRT
 - AHQ_HQT_L15_ELE-CRT_TRY-L15
 - AHQ_HQT_L15_ELE-CRT_RCD-15
 - AHQ_HQT_L15_ELE-CRT_BSB-L15
 - AHQ_HQT_L15_ELE-CRT_RCD-15
 - AHQ_HQT_L15_ELE-CRT_TRK-L15
 - ELE-ERT
 - ELE-FIA
 - ELE-LIT
 - ELE-NFL
 - ELE-PWR
 - ELE-SEC
 - MEC-CHW
 - MEC-FFT
 - MEC-WSP
 - STR-CON
 - MEC-DRN

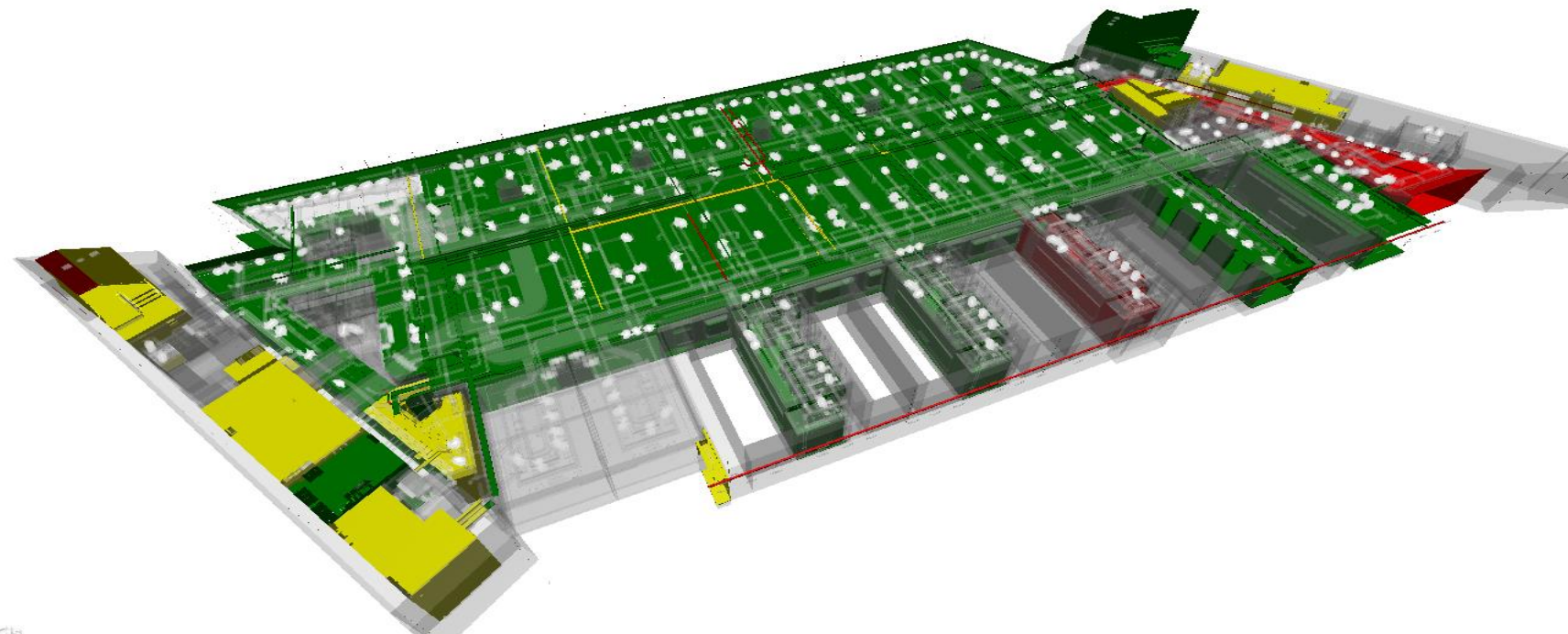
The 'Request 4' form on the right includes the following fields:

- Date: 5/21/2023
- Time occurred: 6:53:33 PM
- Select type: Noise issue
- Notes (optional):
- Create button

FACILITIES DIGITAL TWIN – iTWIN PLATFORM

AIDIGITS

Maintenance status
Service request
Asset performance
Data Visualization



On progress

Pick the starting date

📅 Thu Mar 02 2023 14:55:22 GMT+0200 (Eastern European Standard Time)

Pick the ending date

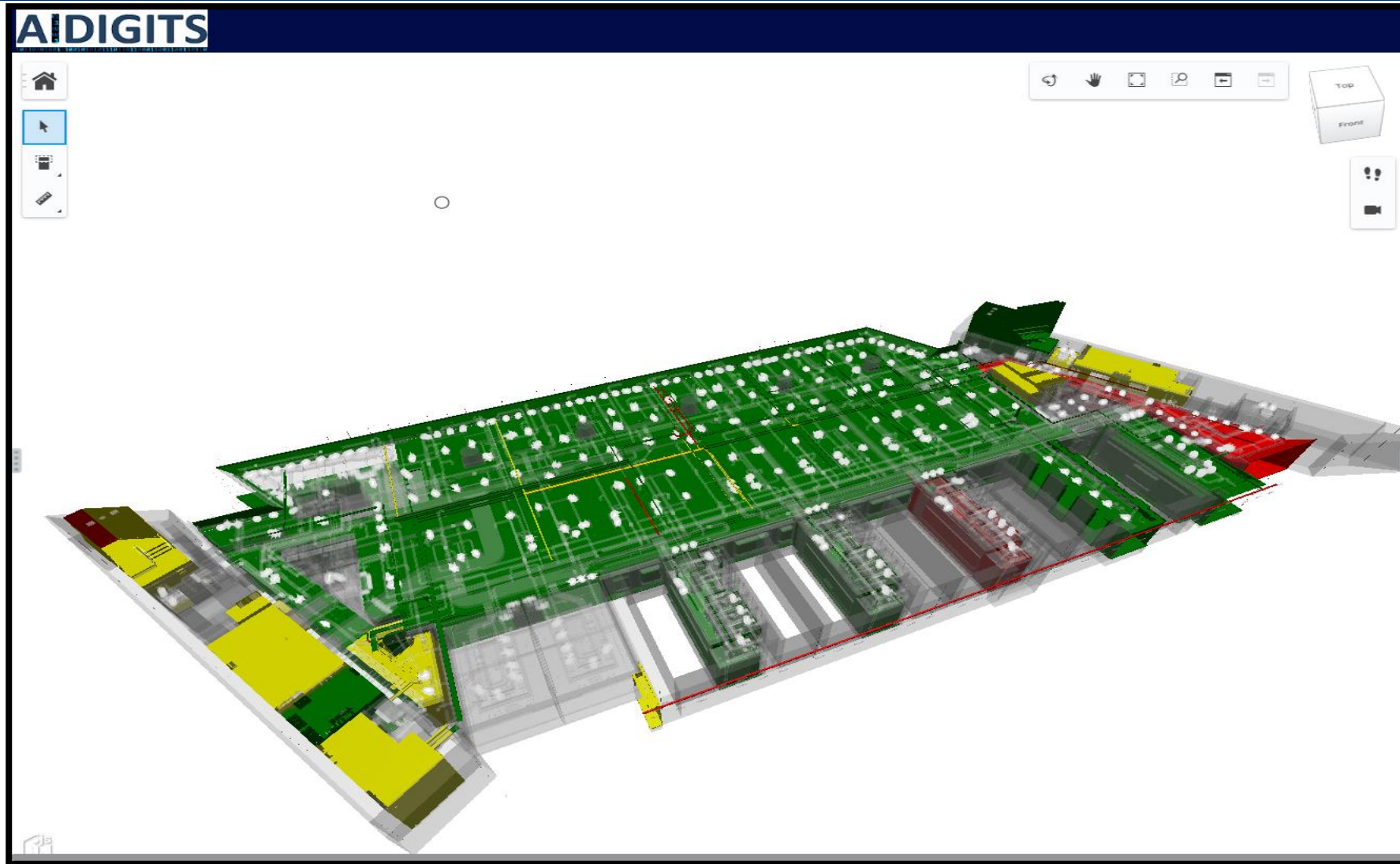
📅 Sun Mar 05 2023 12:45:12 GMT+0200 (Eastern European Standard Time)

Type	Description	Location
<input type="checkbox"/> Mechanical	Air condition on the first floor	See location!
<input checked="" type="checkbox"/> Elecerical	Lightning on the third floor	See location!
<input type="checkbox"/> Mechanical	Third floor at room 05	See location!

1-3 of 3

Send mail

FACILITIES DIGITAL TWIN – iTWIN PLATFORM



Maintenance status | **Service request** | Asset performance

Incoming Requests | **Create Request** | Service status

Select location

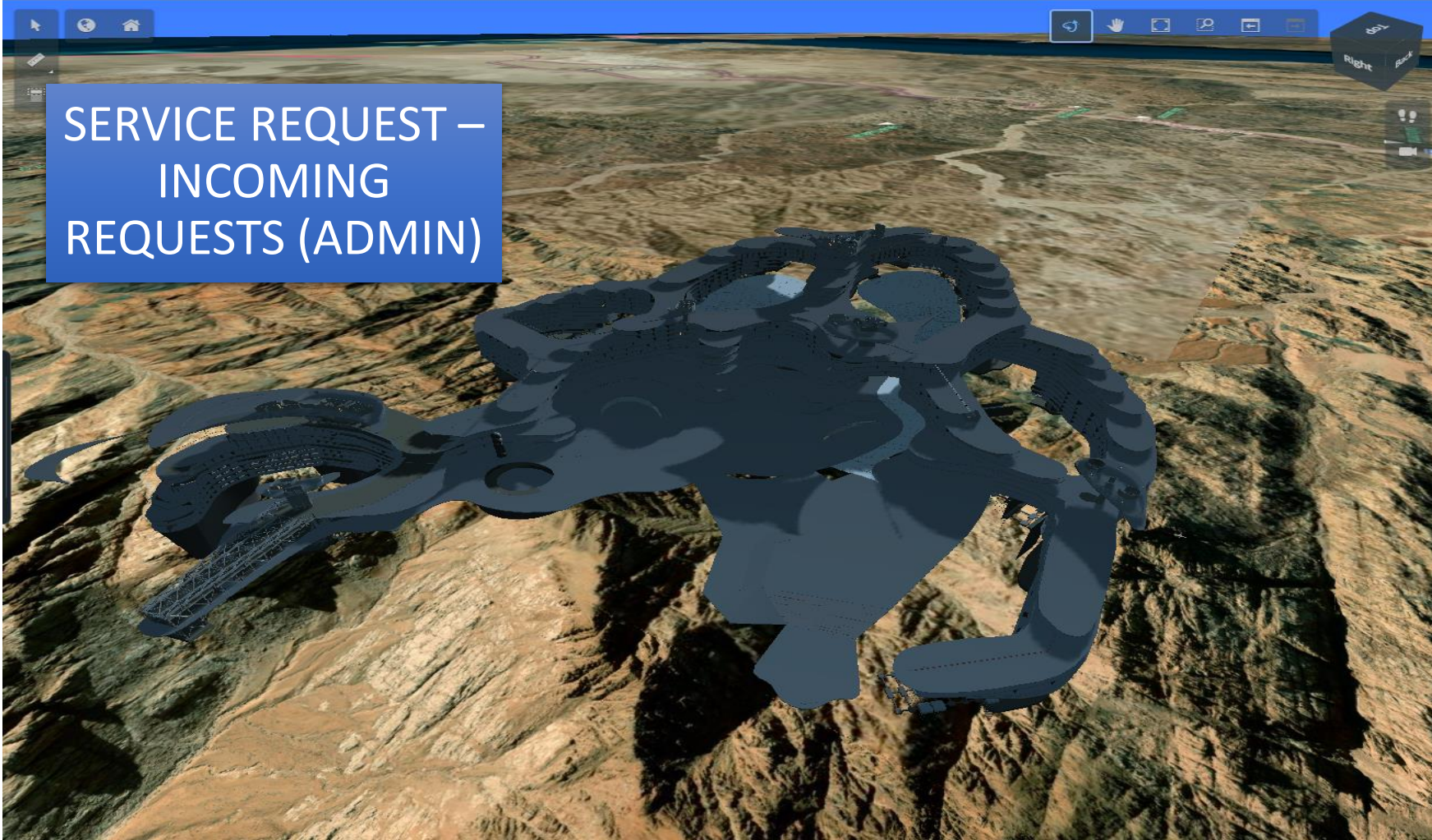
Search...

Generate service

FACILITIES DIGITAL TWIN – iTWIN PLATFORM

MS#3

MS#4



SERVICE REQUEST – INCOMING REQUESTS (ADMIN)

Service_request

Incoming Requests | Create Request | Incoming Requests (worker)

Select element

Select level-1 (project)
LVL 1

Select level-2 (building)
LVL 2

Select level-3 (floor)
LVL 3

Select level-4 (Discipline)
LVL 4

Select level-5 (discipline trade)
LVL 5

Select room/space number
MEETING RM 4 H-4SH-098-654

Select level-6 (object)
LVL 6

Reset

Name
<input type="checkbox"/> DFL-0054
<input checked="" type="checkbox"/> T01-0045

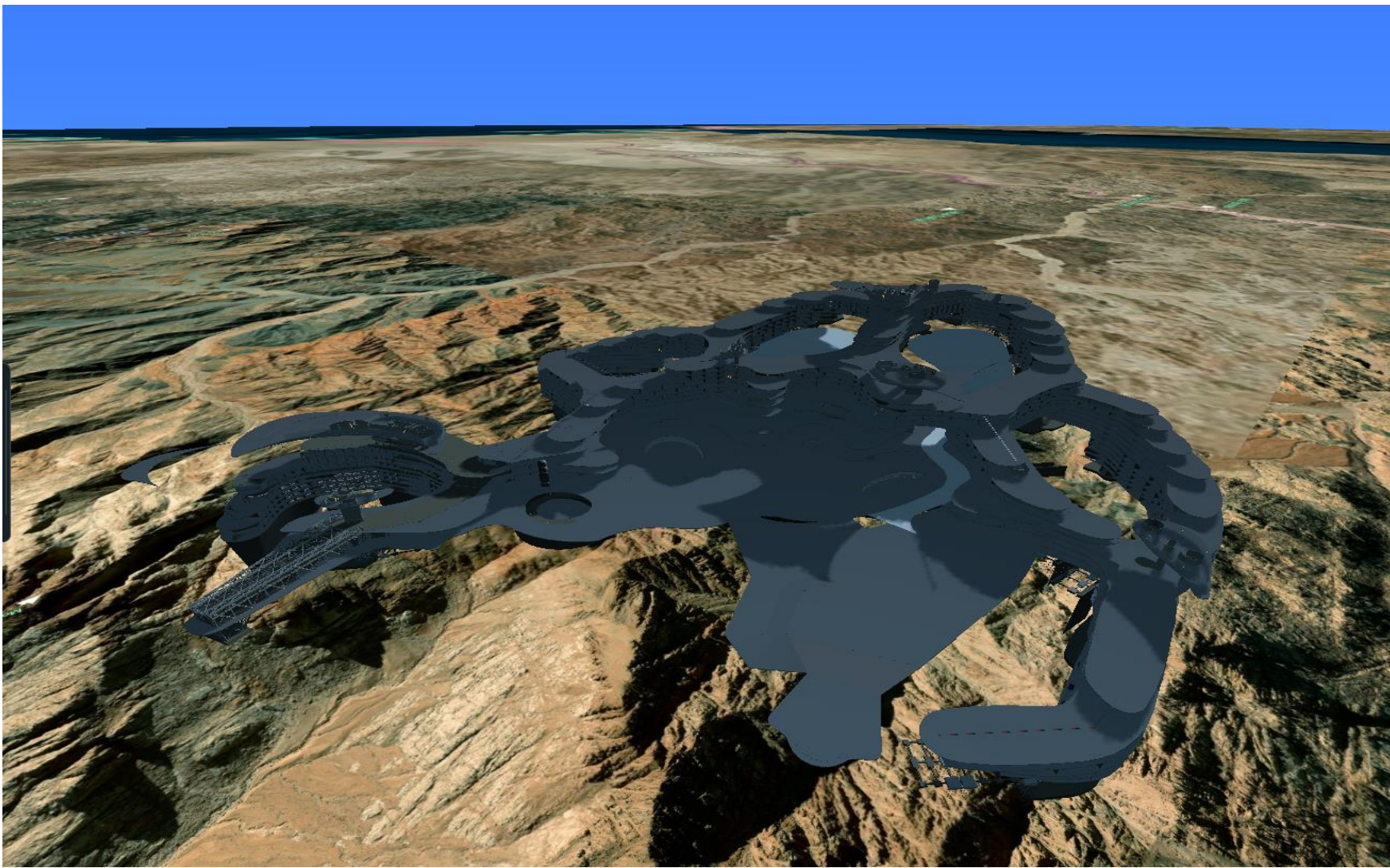
1 row selected | 1-2 of 2

Generate_Service

FACILITIES DIGITAL TWIN – iTWIN PLATFORM

MS#3

MS#4



Service_request

Incoming Requests

Select element

Select level-1 (project)
LVL 1

Select level-2 (building)
LVL 2

Select level-3 (floor)
LVL 3

Select level-4 (Discipline)
LVL 4

Select level-5 (discipline trade)
LVL 5

Select room/space number
MEETING RM 4 H-4SH-098-654

Select level-6 (object)
LVL 6

Reset

Name
<input type="checkbox"/> DFL-0054
<input checked="" type="checkbox"/> T01-0045

1 row selected

Generate_Service

Request 1

Date: 8/25/2023

Time occurred: 2:44:36 AM

Select type: Smell issue

Notes (optional)

Create

FACILITIES DIGITAL TWIN – iTWIN PLATFORM

The screenshot displays the iTWIN platform interface. The main view is a 3D model of a facility, rendered in a dark blue color, overlaid on a topographic terrain map. The interface includes a navigation toolbar at the top left and a control panel at the top right with buttons for 'Right' and 'Back'. Two data panels are overlaid on the 3D view:

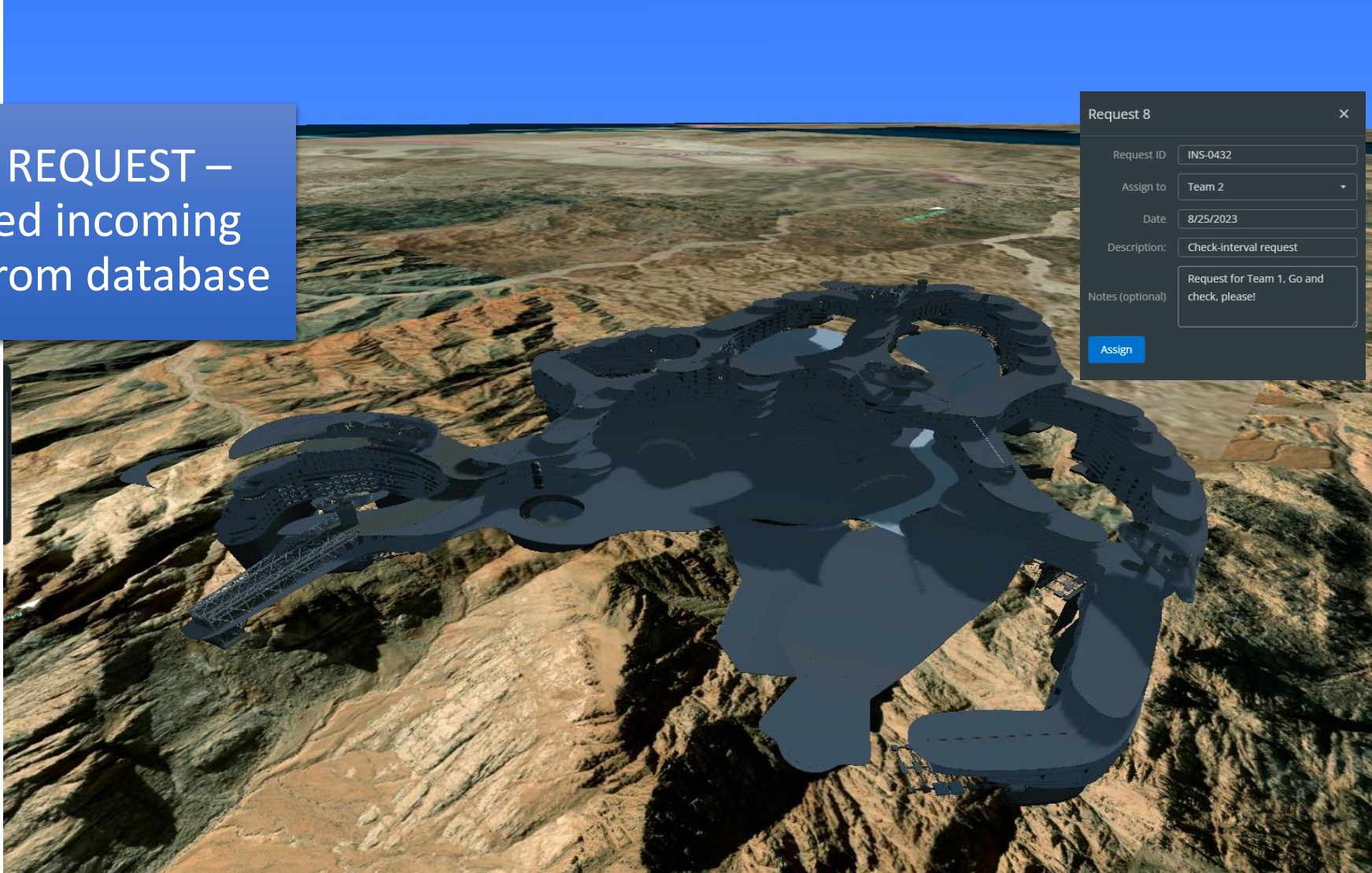
- Incoming Requests Panel:** A table showing a list of requests.

Type	Time	Location	Status	Assign/Details	Dismiss
Smell issue	2:44:36 AM	See location!	Pending		
- Request 1 Panel:** A detailed view of a specific request.

Request ID	T01-0045
Assign to	Team 1
Date	8/25/2023
Description:	new service generated
Notes (optional)	There is a strange smell in the meeting room please check it fast!

FACILITIES DIGITAL TWIN – iTWIN PLATFORM

SERVICE REQUEST – automated incoming requests from database



Service_request

Incoming Requests Create Request Incoming Requests (worker)

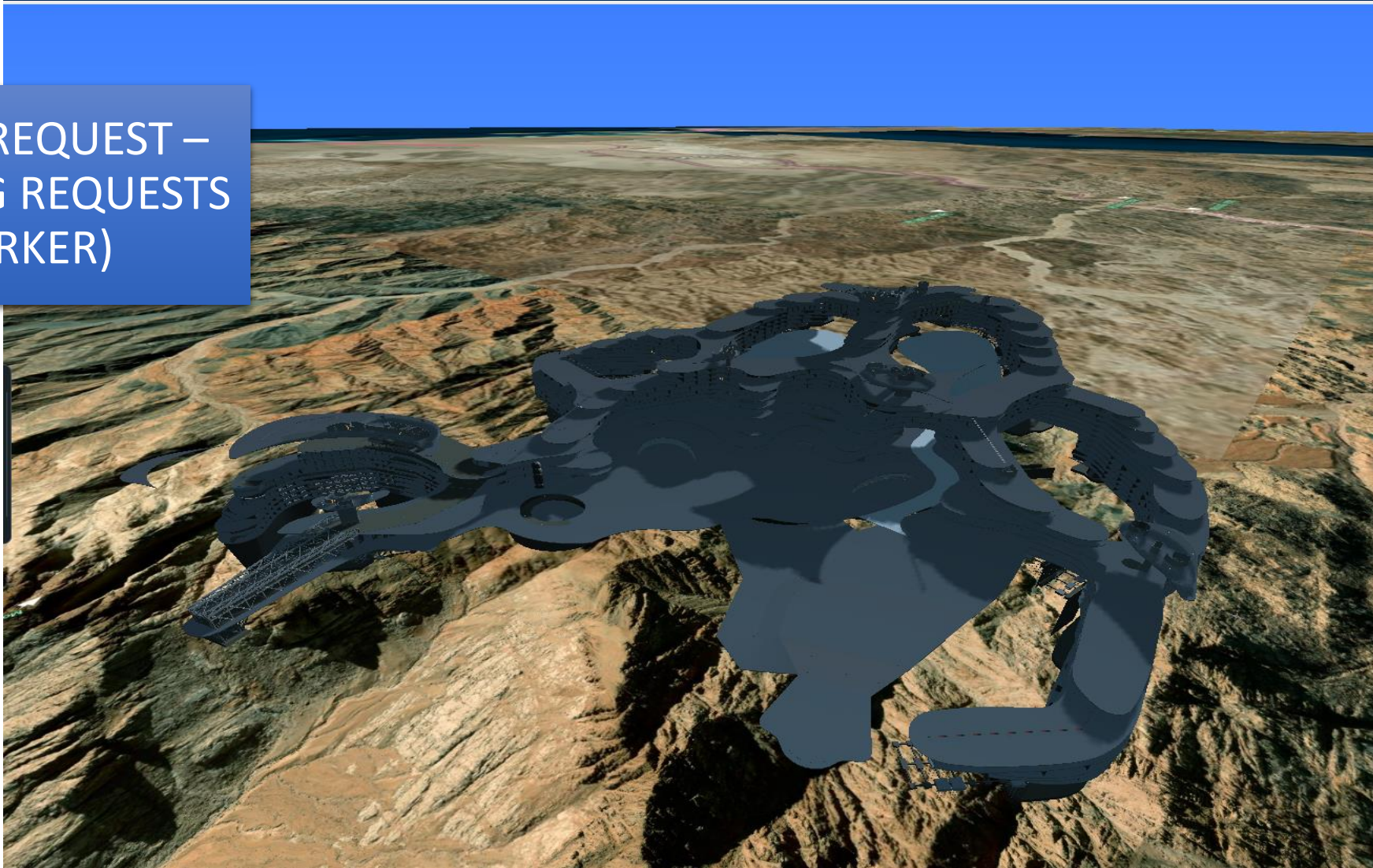
Incoming type: Check intervals

Type	Time	Location	status	Assign/Details	Dismiss
ELE	2:44:36 AM	See location!	Pending		
ELE	2:44:36 AM	See location!	Pending		
ELE	2:44:36 AM	See location!	Pending		
ELE	2:44:36 AM	See location!	Pending		
ELE	2:44:36 AM	See location!	Pending		
ELE	2:44:36 AM	See location!	Pending		
ELE	2:44:36 AM	See location!	Pending		
MEC	2:44:36 AM	See location!	Pending		
MEC	2:44:36 AM	See location!	Pending		
MEC	2:44:36 AM	See location!	Pending		

1-10 of 10

FACILITIES DIGITAL TWIN – iTWIN PLATFORM

SERVICE REQUEST –
INCOMING REQUESTS
(WORKER)



Service_request ➔

Incoming Requests Create Request Incoming Requests (worker)

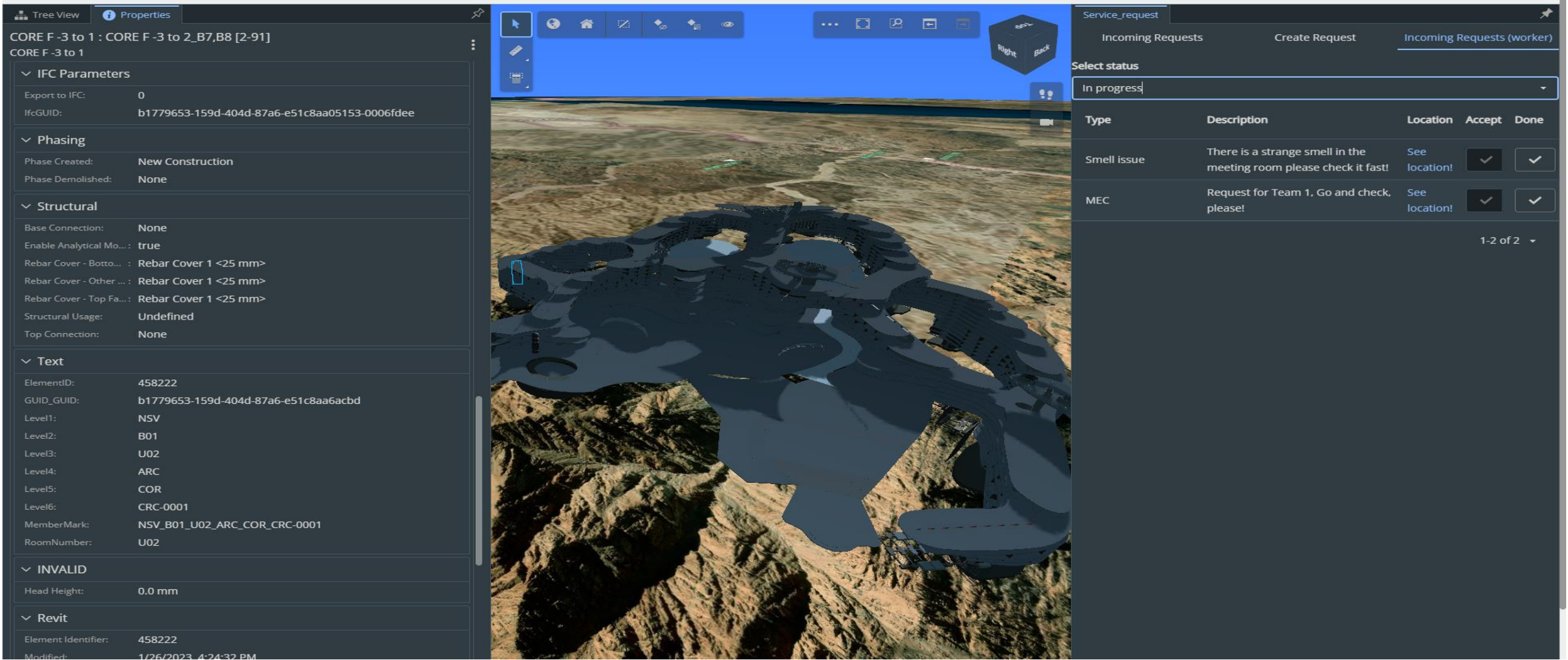
Select status

Incoming ▼

Type	Description	Location	Accept	Done
Smell issue	There is a strange smell in the meeting room please check it fast!	See location!	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MEC	Request for Team 1, Go and check, please!	See location!	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

1-2 of 2 ▼

FACILITIES DIGITAL TWIN – iTWIN PLATFORM



Tree View | Properties

CORE F -3 to 1 : CORE F -3 to 2_B7,B8 [2-91]
CORE F -3 to 1

IFC Parameters

Export to IFC: 0
IfcGUID: b1779653-159d-404d-87a6-e51c8aa05153-0006fdee

Phasing

Phase Created: New Construction
Phase Demolished: None

Structural

Base Connection: None
Enable Analytical Mo...: true
Rebar Cover - Botto... : Rebar Cover 1 <25 mm>
Rebar Cover - Other ... : Rebar Cover 1 <25 mm>
Rebar Cover - Top Fa... : Rebar Cover 1 <25 mm>
Structural Usage: Undefined
Top Connection: None

Text

ElementID: 458222
GUID_GUID: b1779653-159d-404d-87a6-e51c8aa6acb
Level1: NSV
Level2: B01
Level3: U02
Level4: ARC
Level5: COR
Level6: CRC-0001
MemberMark: NSV_B01_U02_ARC_COR_CRC-0001
RoomNumber: U02

INVALID

Head Height: 0.0 mm

Revit

Element Identifier: 458222
Modified: 1/26/2023 4:24:32 PM

Navigation icons: Home, View, Rotate, etc.

3D Model of a building on a terrain map.

Service_request

Incoming Requests | Create Request | Incoming Requests (worker)

Select status: In progress

Type	Description	Location	Accept	Done
Smell issue	There is a strange smell in the meeting room please check it fast!	See location!	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MEC	Request for Team 1. Go and check, please!	See location!	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

1-2 of 2

FACILITIES DIGITAL TWIN – iTWIN PLATFORM

Tree View Properties

CORE F -3 to 1 : CORE F -3 to 2_B7,B8 [2-91]
CORE F -3 to 1

- IFC Parameters

Export to IFC: 0

IfcGUID: b1779653-159d-404d-87a6-e51c8aa05153-0006fdee
- Phasing

Phase Created: New Construction

Phase Demolished: None
- Structural

Base Connection: None

Enable Analytical Mo...: true

Rebar Cover - Botto... : Rebar Cover 1 <25 mm>

Rebar Cover - Other ... : Rebar Cover 1 <25 mm>

Rebar Cover - Top Fa... : Rebar Cover 1 <25 mm>

Structural Usage: Undefined

Top Connection: None
- Text

ElementID: 458222

GUID_GUID: b1779653-159d-404d-87a6-e51c8aa6acbd

Level1: NSV

Level2: B01

Level3: U02

Level4: ARC

Level5: COR

Level6: CRC-0001

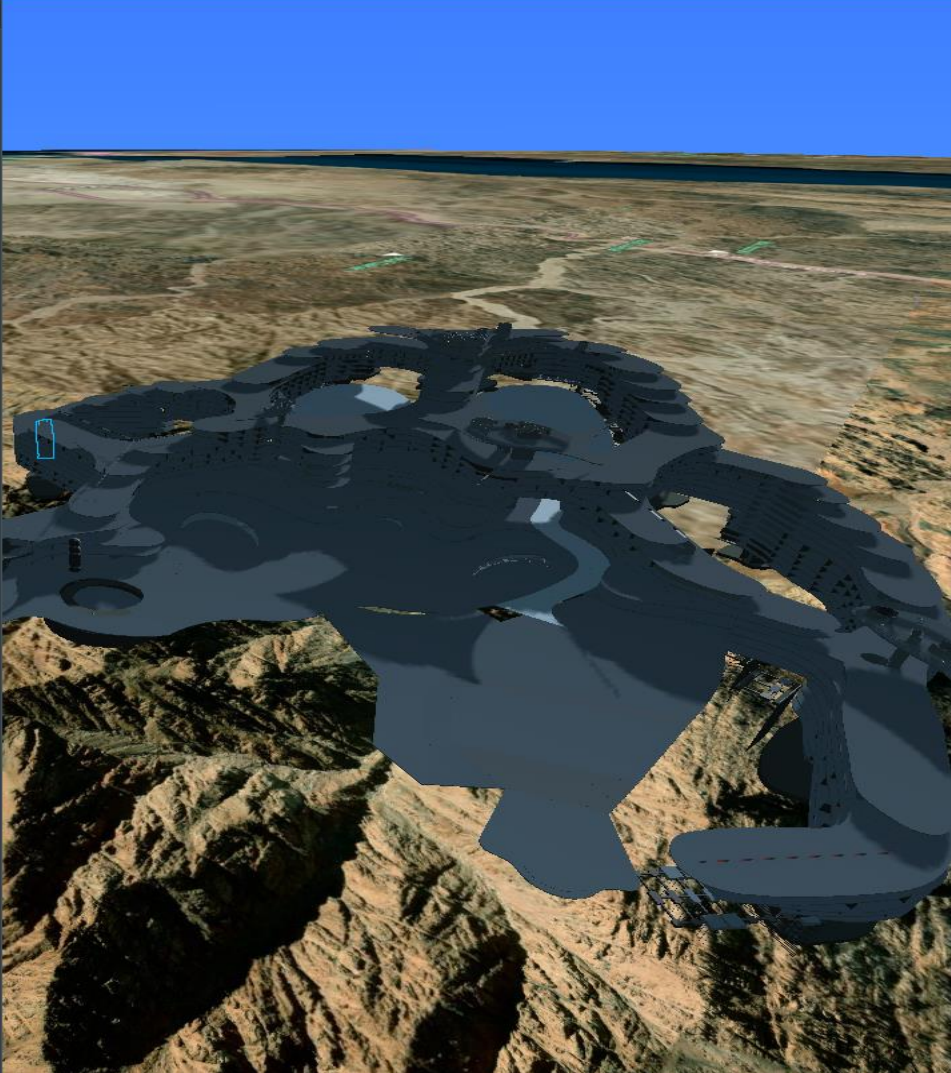
MemberMark: NSV_B01_U02_ARC_COR_CRC-0001

RoomNumber: U02
- INVALID

Head Height: 0.0 mm
- Revit

Element Identifier: 458222

Modified: 1/26/2023 4:24:22 PM



Service_request

Incoming Requests Create Request Incoming Requests (worker)

Incoming type

All request

Type	Time	Location	status	Assign/Details	Dismiss
Smell issue	2:44:36 AM	See location!	Assigned		
Smell issue	2:44:36 AM	See location!	Pending		
ELE	2:44:36 AM	See location!	Accepted		
ELE	2:44:36 AM	See location!	Pending		
ELE	2:44:36 AM	See location!	Pending		
ELE	2:44:36 AM	See location!	Pending		
ELE	2:44:36 AM	See location!	Pending		
ELE	2:44:36 AM	See location!	Pending		
ELE	2:44:36 AM	See location!	Pending		
ELE	2:44:36 AM	See location!	Pending		
MEC	2:44:36 AM	See location!	Done		
MEC	2:44:36 AM	See location!	Pending		
MEC	2:44:36 AM	See location!	Pending		

1-12 of 12

FACILITIES DIGITAL TWIN – iTWIN PLATFORM

Tree View | Properties

CORE F -3 to 1 : CORE F -3 to 2_B7,B8 [2-91]
CORE F -3 to 1

IFC Parameters

Export to IFC: 0
IfcGUID: b1779653-159d-404d-87a6-e51c8aa05153-0006fdee

Phasing

Phase Created: New Construction
Phase Demolished: None

Structural

Base Connection: None
Enable Analytical Mo...: true
Rebar Cover - Botto... : Rebar Cover 1 <25 mm>
Rebar Cover - Other ... : Rebar Cover 1 <25 mm>
Rebar Cover - Top Fa... : Rebar Cover 1 <25 mm>
Structural Usage: Undefined
Top Connection: None

Text

ElementID: 458222
GUID_GUID: b1779653-159d-404d-87a6-e51c8aa6acbdc
Level1: NSV
Level2: B01
Level3: U02
Level4: ARC
Level5: COR
Level6: CRC-0001
MemberMark: NSV_B01_U02_ARC_COR_CRC-0001
RoomNumber: U02

INVALID

Head Height: 0.0 mm

Revit

Element Identifier: 458222
Modified: 1/26/2023 4:24:32 PM

Service_request

Incoming Requests | Create Request | Incoming Requests (worker)

Select status

Finished

Type	Description	Location	Accept	Done
Smell issue	There is a strange smell in the meeting room please check it fast!	See location!	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

1-1 of 1

FACILITIES DIGITAL TWIN – iTWIN PLATFORM

Maintenance Request



itwin.service.requests@gmail.com <itwin.service.requests@gmail.com>

2:50 AM



To: iTwin

Dear Team 1,

I hope this email finds you well. I am writing to inform you about a maintenance request that requires your attention. We have identified a need for maintenance on T01-0045 and kindly request your expertise in performing the necessary checks.

The details of the request are as follows:

Object: T01-0045

Maintenance Type: Created Requests

Description: There is a strange smell in the meeting room please check it fast!

Requested Date: 8/25/2023

Requester: Maintenance Manager

Priority: if applicable

We kindly ask for your prompt attention to this matter to ensure the smooth operation and reliability of T01-0045. Your expertise in handling maintenance requests is greatly appreciated.

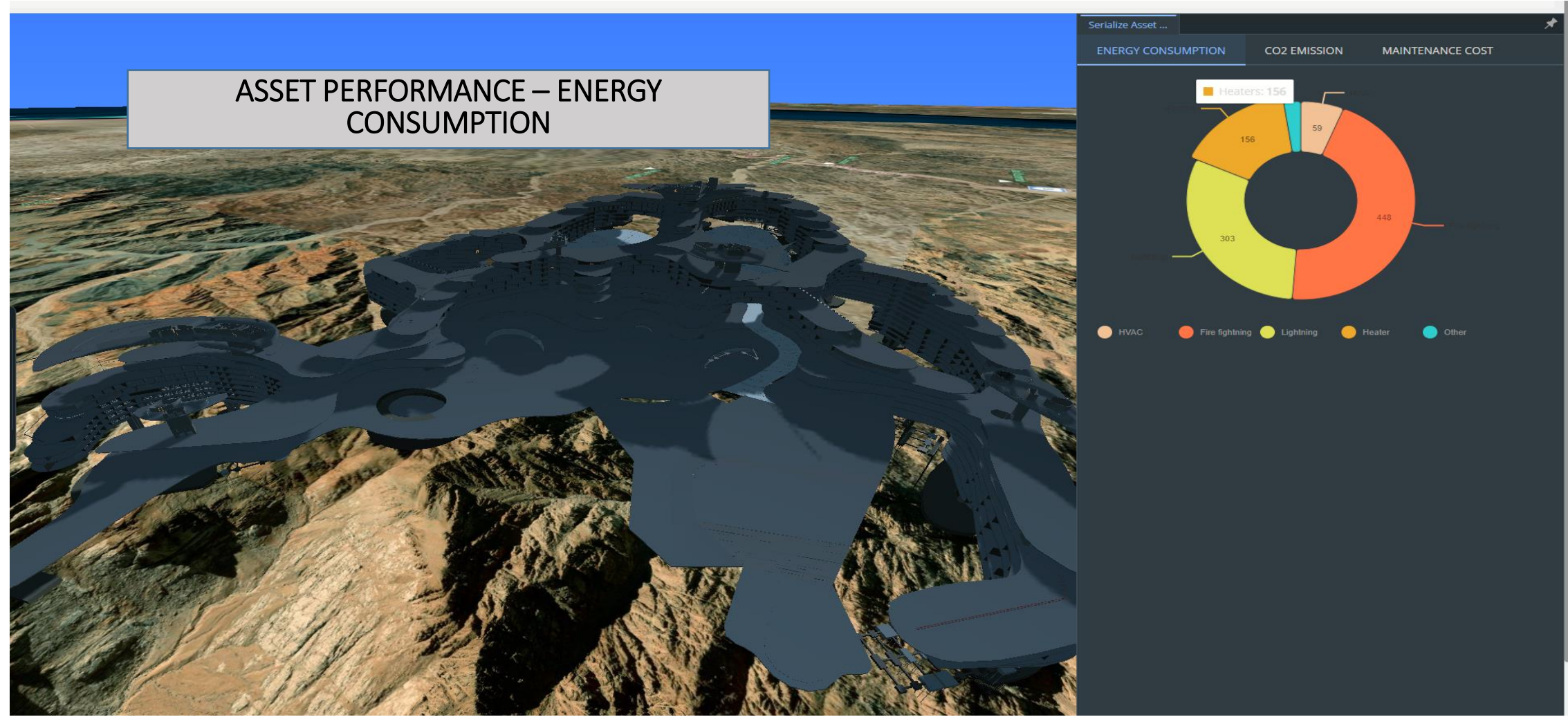
If you have any questions or require further information, please do not hesitate to reach out to us. Thank you in advance for your assistance and dedication to maintaining the quality of our equipment.

Best regards,

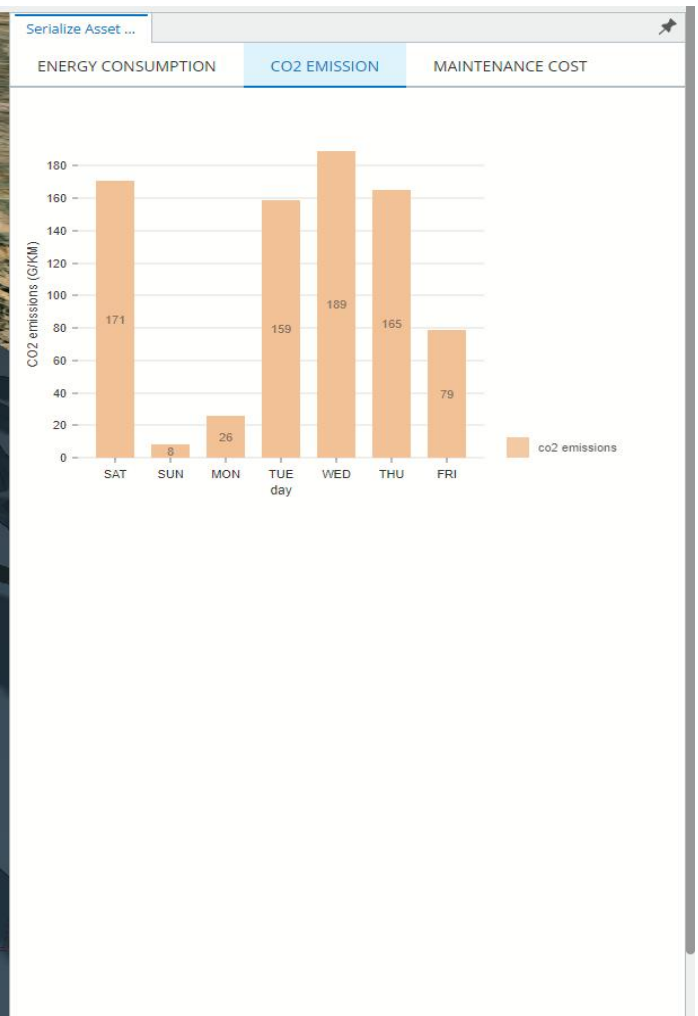
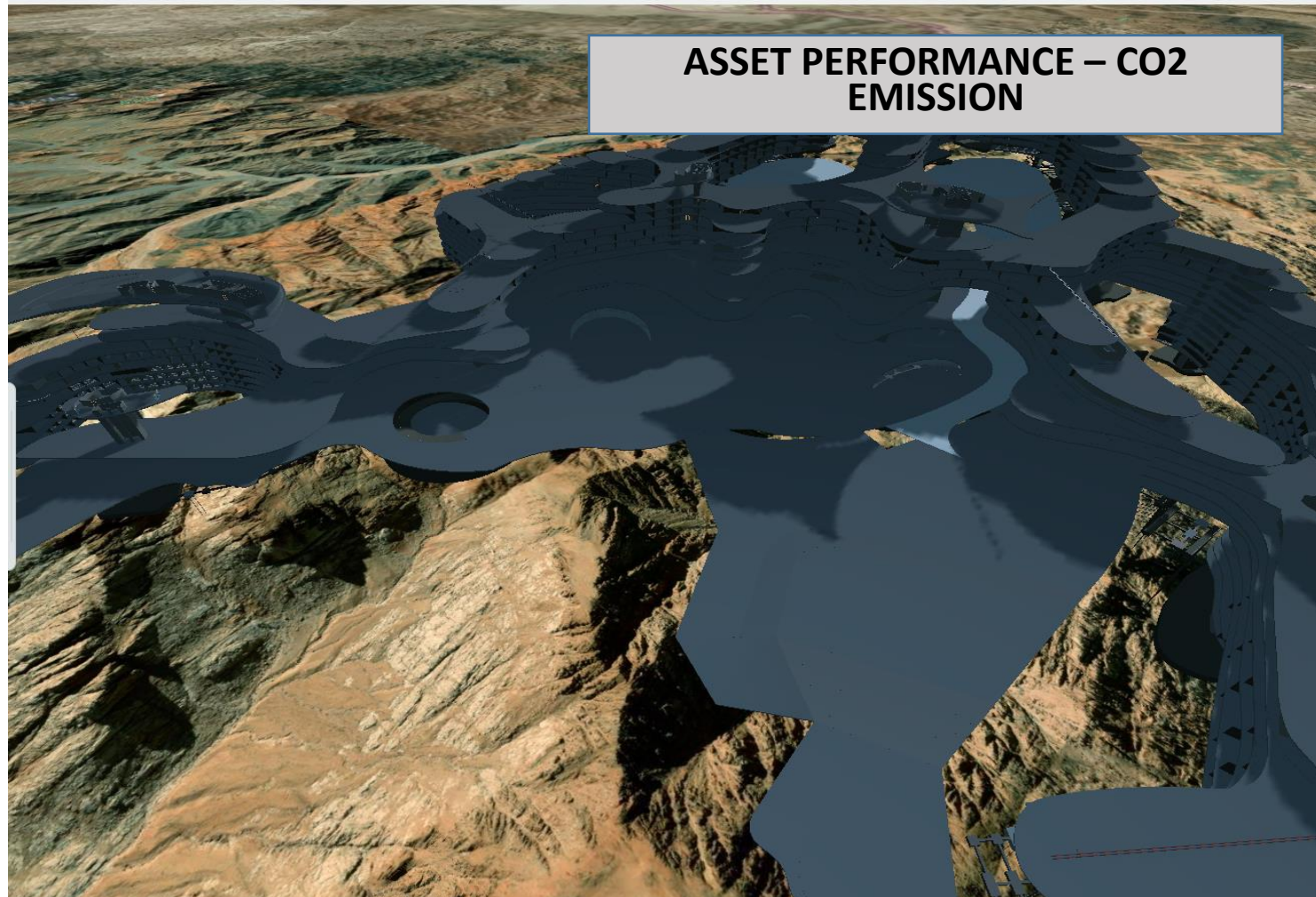
Admin

iTwin@aidigits.net

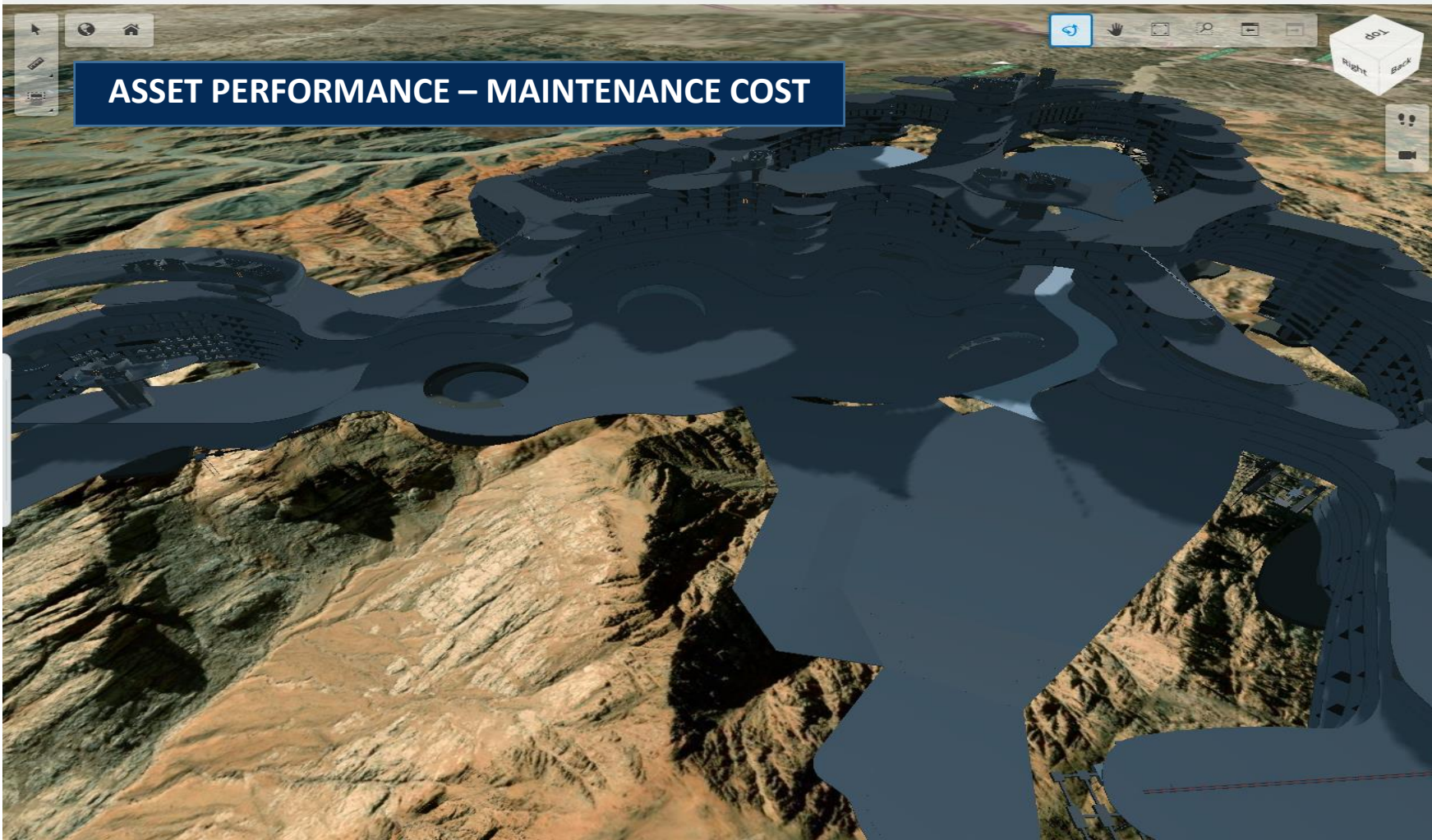
FACILITIES DIGITAL TWIN – iTWIN PLATFORM



FACILITIES DIGITAL TWIN – iTWIN PLATFORM



FACILITIES DIGITAL TWIN – iTWIN PLATFORM



ASSET PERFORMANCE – MAINTENANCE COST



FACILITIES DIGITAL TWIN – iTWIN PLATFORM

MAINTENANCE STATUS

The screenshot displays the iTWIN platform interface. On the left, a 3D model of a facility is shown over a topographic map. The right side of the interface contains a maintenance request management panel.

Maintenance Request Form:

- Status: Finished
- Pick the starting date: Fri Aug 25 2023 14:55:22 GMT+0300 (Eastern European Summer Time)
- Pick the ending date: Sat Aug 26 2023 12:45:12 GMT+0300 (Eastern European Summer Time)

Type	Description	Location	status
Mechanical	MEETING RM , T01-0045 , small issue	See location!	Finished

Request Frequency Chart:

Bar chart showing 'Request per day' for each day of the week. The legend indicates 'request - TUE: 5'.

Day	Request per day
SAT	2
SUN	4
MON	1
TUE	5
WED	3
THU	1
FRI	6

Date Picker:

Pick the starting date: Thu Aug 24 2023 14:55:22 GMT+0300 (Eastern European Summer Time)

Calendar for August 2023:

Su	Mo	Tu	We	Th	Fr	Sa
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9

Pick the ending date: Sat Aug 26 2023 12:45:12 GMT+0300 (Eastern European Summer Time)

IOT TECHNOLOGY - INFRASTRUCTURE DIGITAL TWIN - SECOND USE CASE - 2017

SMART INFRASTRUCTURES - INFRA DIGITAL TWINS

