WP4 –BIM INTERMODAL TERMINALS

IDP

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2nd global meeting

Espoo, September 2017

TABLE OF CONTENTS

1- STATUS OVERVIEW

Main works in WP4:

- *Task 4.1 -BIM execution plan guideline. Submitted in 31/03/2017*
  - *Included BIM execution plan workshop 23-24 /03/2017 with the participation of Viasys, BASF, IDP and VTT*
  - *Modifications due by 25/09/2017*

- *Task 4.2 Modelling of existing terminals started as of 03/04/2017*
  - *Phase I, Previous Works started with CONT and APSP for existing terminal infrastructure data collection. In parallel works with VTT and Viasys to define modelling basis for future testings*
  - *Phase II, Engaged with model layouts with information for coupling with other Work packages*

- *Task 4.3 Modelling of virtual terminals to be engaged 01/10/2017*

- ✓ *BIM execution plan definition. Deliverable 4.1*
  - *Modelling strategies to comply with specific project innovations and demonstrations*
  - *Modelling recording and mapping strategies for future implementation purposes*
- *Modelling of existing Railway Terminals. Deliverable 4.2*
  - *Data Collection and surveys of existing infrastructure*
  - *Build BIM model of existing terminals according to established guidelines*
- *Modelling of virtual Railway Terminals. Deliverable 4.3*
  - *Build BIM model of virtual terminal using as a guideline the desired optimizations for WP2*
- *Implementations in virtual terminals of innovations from WP2. Deliverable 4.4*

✓ *Modelling of existing Railway Terminals. Deliverable 4.2*

✓ *Information for coupling with WP needs.*

Rail requirements

Rail requirements have been a part of the first test for coupling. They are included for the completeness of the document.

Tracks:

- **Start point coordinates**
- **End point coordinates**
- **Shape/geometry (preferably: list of coordinates)**
- **length**
- *Connected objects*
- *Track mileage (start/end) (if necessary, e.g. for speed profile or signal positions)*
- **Speed profile**
- **Track classification: main track, secondary, connecting, siding, rail yard, shunting yard, parking for locomotives**
- **If applicable: specify if track ends in either buffer stops or sources/sinks**
- Safety levels
- If applicable: ride directions (preferred/allowed)

Junctions (including crossings):

- Type
- Shape/geometry
- Connection points
- *Tracks connected* (list)
- Type specific parameters
- *Junction constraints*
- **Speeds (through speed and bend speed)**

Rail signals:

- **Signal type**
- **Coordinates or *track mileage***
- **Parent track**
- **Direction**

Rail yard requirements

Rail yard general:

- Area designation/dimensions
- **Crane rails location (start/end + shape)**
- Designation of driving/parking lanes for connecting roads

Buffer (if applicable):

- *Location*
- *Shape/geometry*
- *Size in TEU or metres (width, length, height)*
- *Ground spots plan*

Road requirements

Road network encompasses entire port and terminals from port entry, through terminal gates to terminal internal paths. In general, road network must connect all areas accessible to road vehicles (and unconstrained container handling equipment like reach stackers or rubber tyred gantry cranes) every vehicle can ride exclusively on roads. Thus, all paths which could be taken by vehicles must be part of the road network.

Nodes:

- **Coordinates**
- **Connected links**
- **Whether is a source/sink** (connection to road network outside of port)

Road links:

- Start Node
- End Node
- Shape/Geometry
- Length
- *Width*
- *Speed Limit*
- Uni/Bidirectional (preferred/allowed)

✓ *Modelling of existing Railway Terminals. Deliverable 4.2*

✓ *Information for coupling with WP needs.*

- Classification/Hierarchy
- Allowed areas to switch lanes (for roads containing multiple lanes, e.g. in a rail yard with driving and parking lanes)

Road Intersections:

- Type
- Shape/geometry
- Connection points
- *Links connected* (list)
- Type specific parameters
- *Crossing constraints*

Road/Rail Intersections:

- Type (bridge/level crossing/etc.)
- Location
- Shape/geometry
- Involved links (list)
- **Collisions possible or not**
- Known limitations or rules

Gates:

- **Gates location**
- **Number of lanes (in/out/hybrid)**
- **Connected roads**

Other gate connected elements:

- *Buffer areas (on entry and exit)*
- *Scanners location*

Parking areas:

- **Location**
- **Shape/geometry**
- *Spots location (centre point) or at least number of places*
- Connection points to road network

Buffer spots (understood as temporary waiting places for internal transporters)

- *Location*
- *Shape/geometry*
- *Connected roads*
- *Number of places*

Yard requirements

Stacking area:

- **Location**
- **Dimensions**
- **Division into functional areas with dimensions (general purpose/empty storage/hazardous cargo/reefer/OOG/etc.)**

Stack Blocks:

- *Location*
- *Width / Height / Length (TEU or metres)*
- *Rotation*
- *Ground spots map*
- *Type (general purpose/empty/reefer/hazardous)*
- *Crane rails*
- Handling crane type (RTG, ASC, Reach Stacker, etc.)
- Transfer lanes (parking/driving lane designation, if applicable)

Stack block transfer spots (if applicable):

- *Location*
- *Shape/geometry*
- *Number of transfer spots*

Other yard requirements:

- Division of stack blocks into import/export parts

Other areas

Any other applicable functional divisions for specific areas not mentioned above, including customs, special handling, container maintenance, freight station, etc., specific to the terminal need to be added in high level of details.

Areas not relevant for the simulation model, yet defined and constraining available space should also be added with general specifications: dimensions and area designation.

- ✓ *Modelling of existing Railway Terminals. Deliverable 4.2*
  - ✓ *Information for coupling with WP needs.*

Element Categorization / Planning Interface						
Category	**Element**	**Bim object type**	**Attributes**	**Attributes**	**Atributes**	**Attributes**
1. Waterside Area	a.Berth	Area	Physical	Operational	Simulation Specific	Design Criteria
	b.Apron	Network				
	c.Navigation Area	Area				
2. Quayside Transport	a.Vehicle Access Area	Area				
	b.Handling System	Area				
3. Stacking area	a.Piles of Containers	Area				
	b.Bulk Stacking	Area				
	c.Warehousing	Area				
	d.Access Gates	Area				
4. Unloading Areas	a.Vehicle Unloading Areas	Access point				
	b.Train Unloading Areas	Access point				
5. Internal Transport Area	a.Railway	Network				
	b.Road	Network				
6. Gates and Connections	a.Truck Gates	Access point				
	b.Rail Gates	Access point				
	c.Weighing	Access point				
	d.Scanners and detection	Access point				
7. Auxiliary Buildings	a.Buildings/Spaces	Area				
8. Utilities	a.Utilities	Area/Network				
9, External Transport	a.Railway	Network				
	b.Road	Network				

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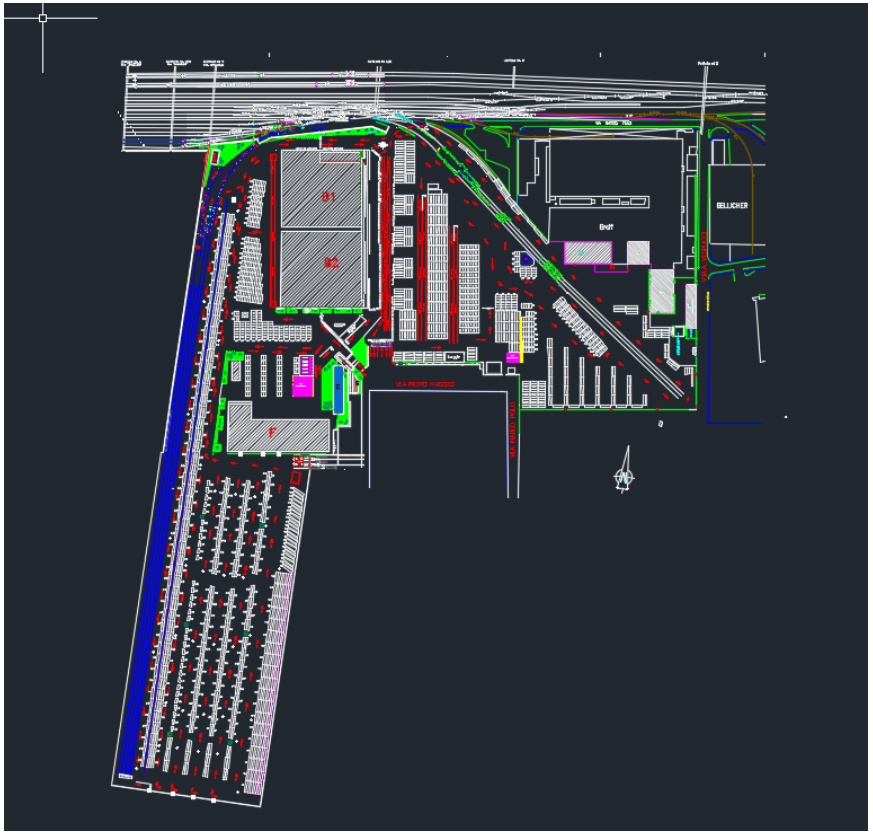
- ✓ *BIM Intermodal Terminals. Deliverable 4.2 – 4.3*
  - *Phase I. Infrastructure data collection*
    - *Infrastructure asset survey from Contship Italia*



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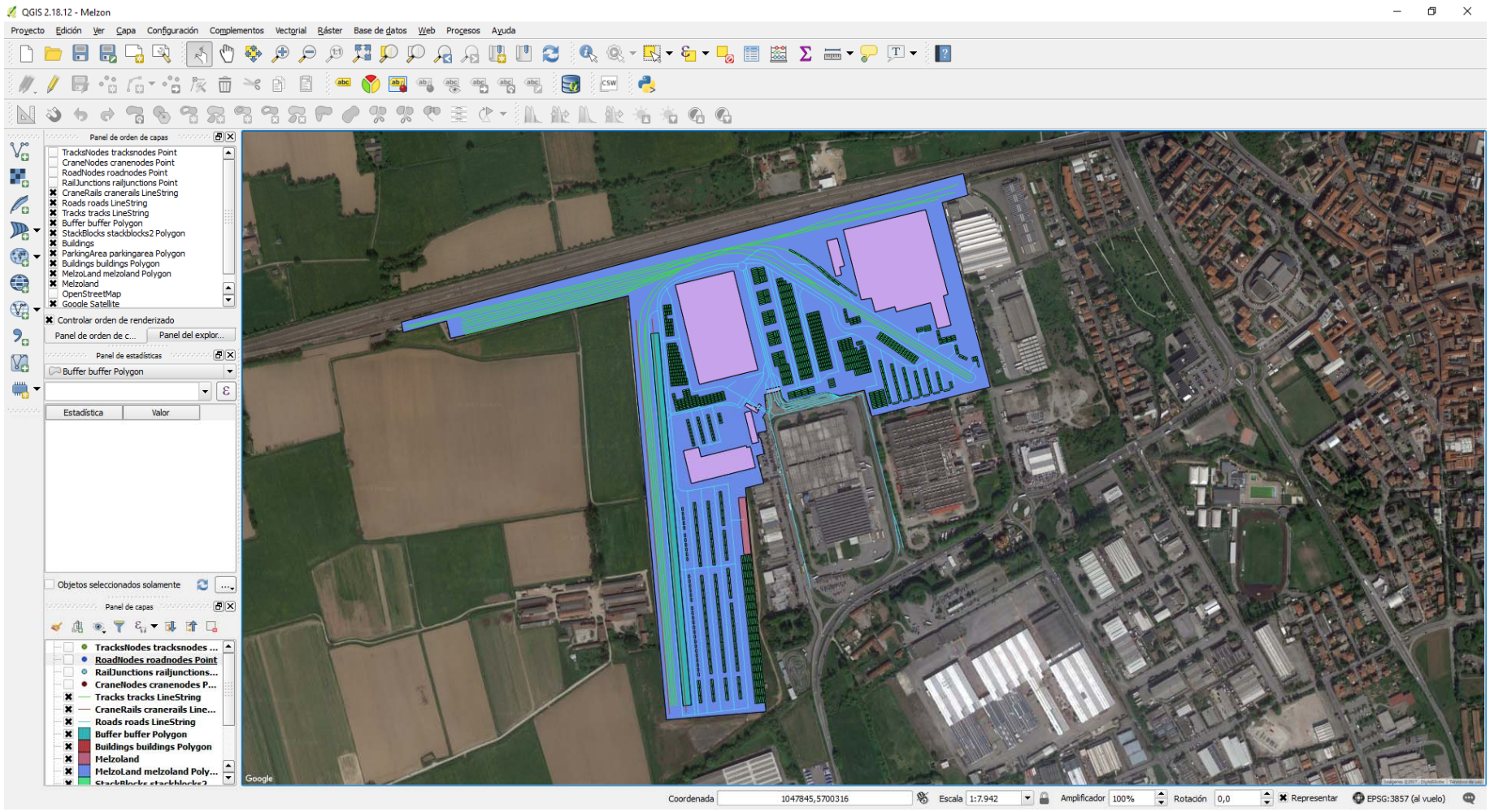

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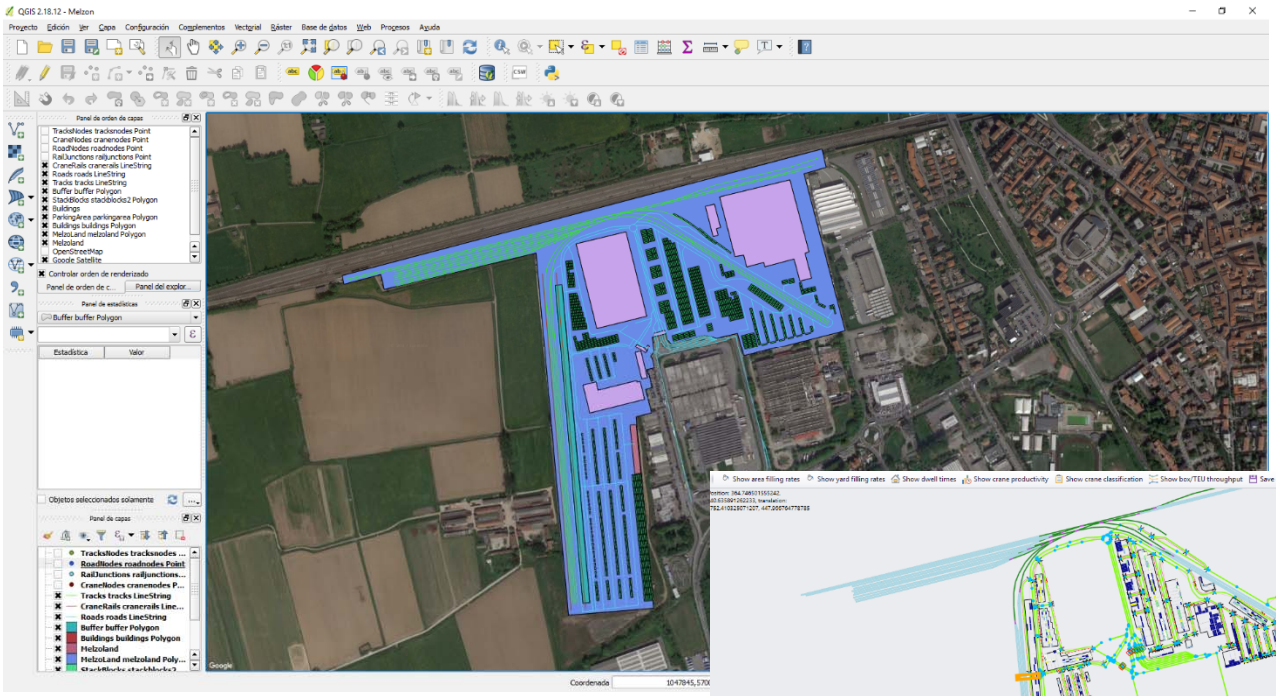

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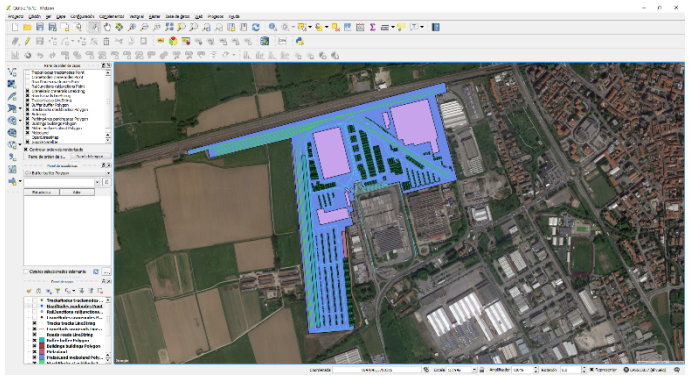
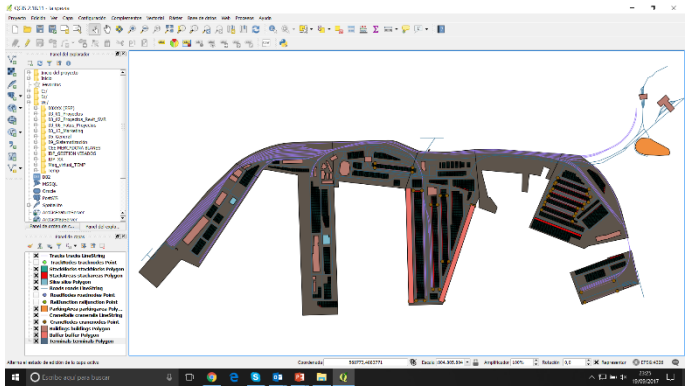


AUTOCAD MAP 3D



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AJTODESK DYNAMO STUDIO

SHP

Terminal Operations Simulations

BIM Project

Traffic Simulations

- ✓ *BIM Intermodal Terminals. Deliverable 4.2 – 4.3*
  - *Phase I. Infrastructure data collection*
    - *Infrastructure asset survey from La Spezia*

- ✓ *Modelling of existing Railway Terminals. Deliverable 4.2*
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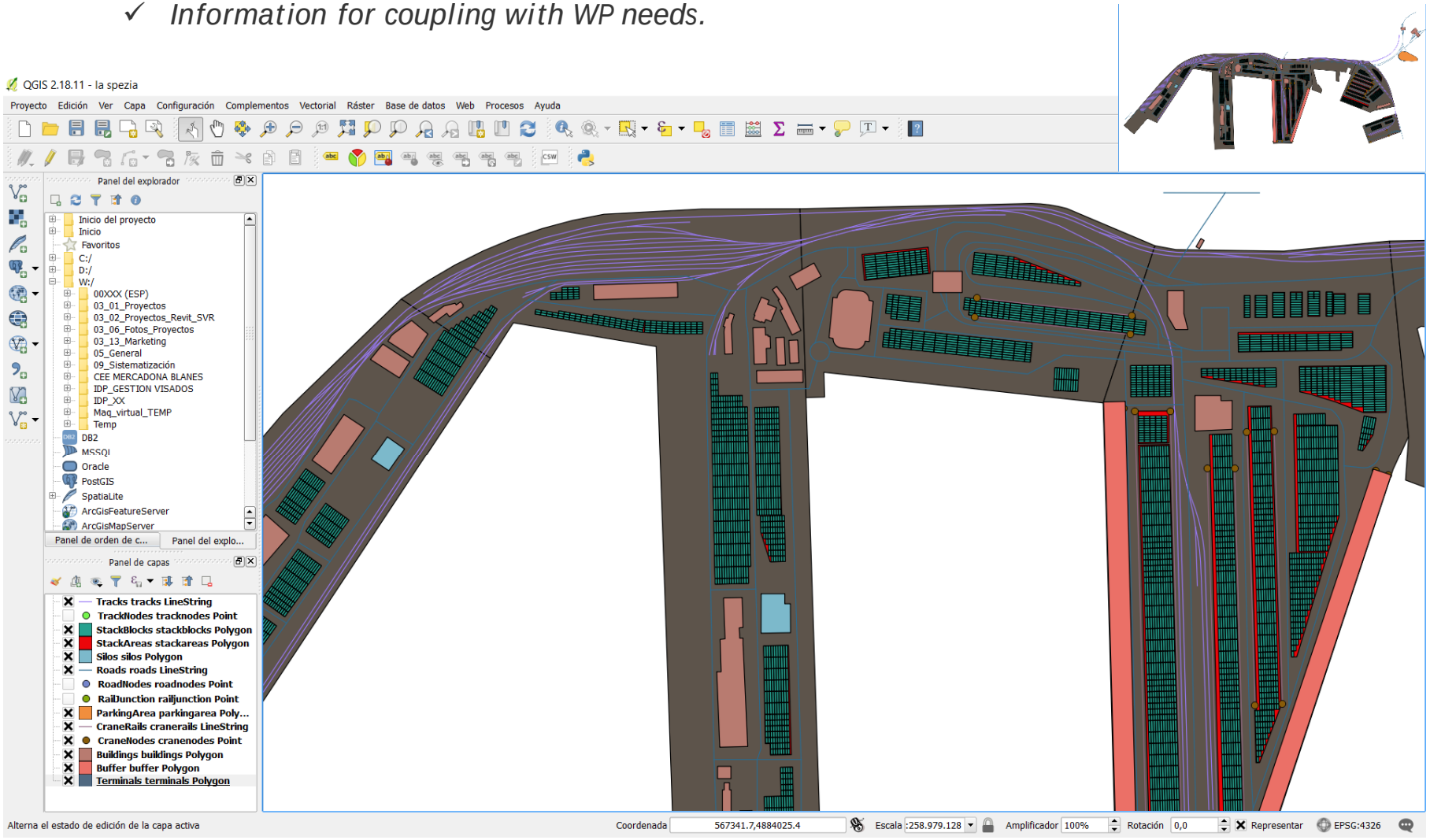

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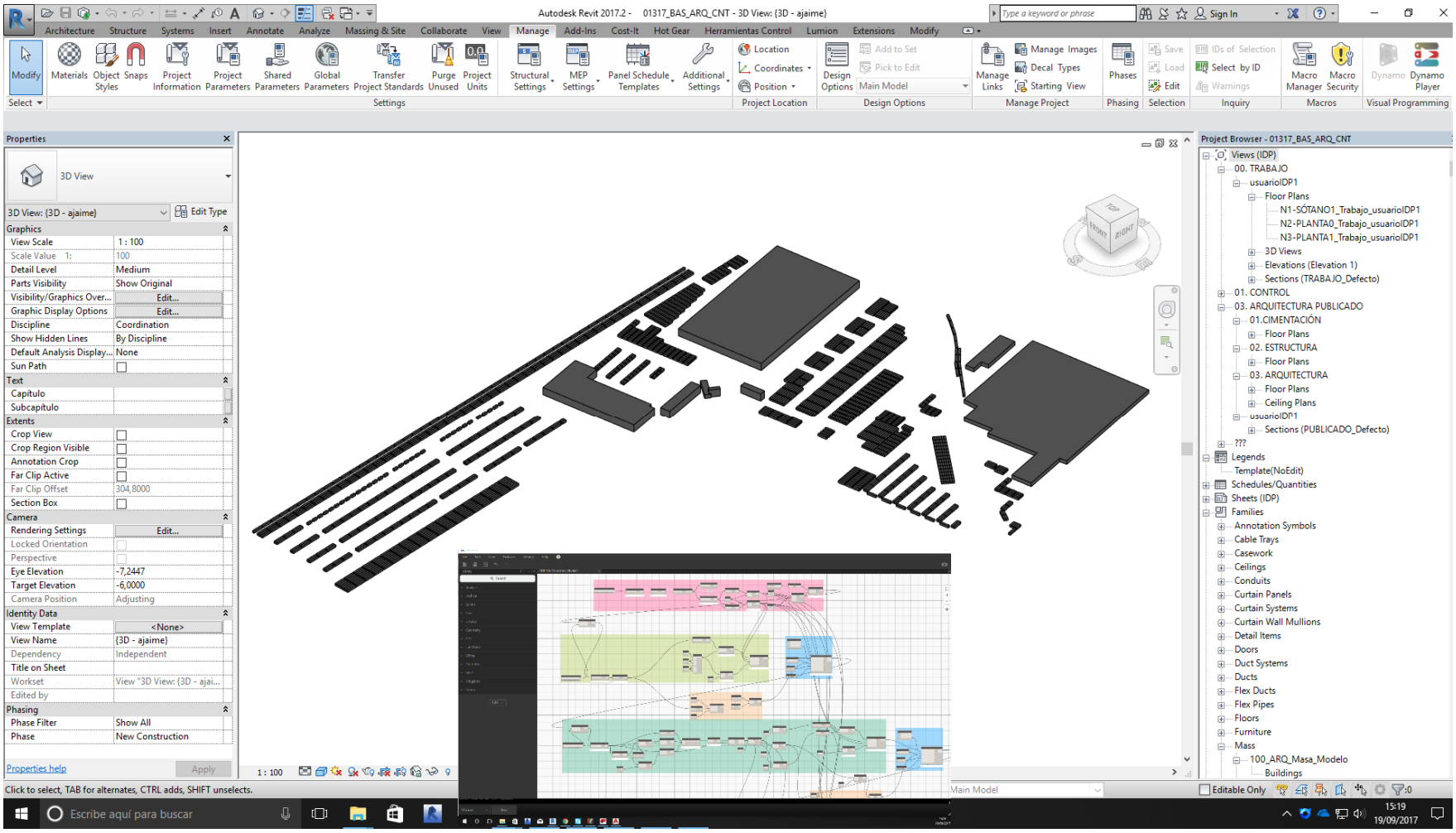

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✓ *Modelling of existing Railway Terminals. Deliverable 4.2*

✓ *Information for coupling with WP needs.*

Type of terminal: container / bulk				
Type	*Category*	*Level 1*	*Level 2*	*Level 3*
FIXED COSTS				
	Waterside area			
		Quayside operations	Operating cost of equipment	
		Water treatments		
		Other(s)		
	Landside - terminal			
		Stacking/parking Operating Costs		
		Terminal Operating Costs	Land	
			Buildings (warehouses, sheds...)	
			Realisation costs (infra and pavement)	
			Operating cost of equipment	Cranes
				Reach stackers
				etc.
		Transportation costs	Road operations	
			Rail operations	Shunting yard
				Handling area
				Rail connection
			Operating cost of equipment	Shunter
				etc.
		Other(s)		
	Overall terminal			
		Utilities Costs		
		Firefighting Costs		
		Marketing, Sales and Advertising		
		IT systems		
		Lighting poles		
		Other(s)		
		ROI		

- ✓ *Modelling of existing Railway Terminals. Deliverable 4.2*
  - ✓ *Information for coupling with WP needs.*

VARIABLE COSTS				
	Waterside area			
		Quayside maintenance		
		Water treatments		
		Other(s)		
	Landside - terminal			
		Terminal Maintenance costs		
		Transportation costs	Road maintenance	
			Rail maintenance	
		Network fee for rail access		
		Other(s)		
	Overall terminal			
		Labor Costs	Office employees	
			Terminal employees	
		Police and security guard expenses		
		Environmental expenses		
		Vehicle Maintenance Costs		
		Administrative (finance, HR, legal, executive, procurement, etc.)		
		Terminal management soft- and hardware		
		Energy		
		Fuel		
		Interests		
		Terminal licenses		
		Insurance		
		Taxes		
		Other(s)		

- ✓ *Modelling of existing Railway Terminals. Deliverable 4.2*
  - ✓ *Information for coupling with WP needs.*

OmniClass™ A Strategy for Classifying the Built Environment

The 15 inter-related *OmniClass* tables are:

- Table 11 - Construction Entities by Function
- Table 12 - Construction Entities by Form
- Table 13 - Spaces by Function
- Table 14 - Spaces by Form
- Table 21 - Elements (*includes Designed Elements*)
- Table 22 - Work Results
- Table 23 - Products
- Table 31 - Phases
- Table 32 - Services
- Table 33 - Disciplines
- Table 34 - Organizational Roles
- Table 35 - Tools
- Table 36 - Information
- Table 41 - Materials
- Table 49 - Properties

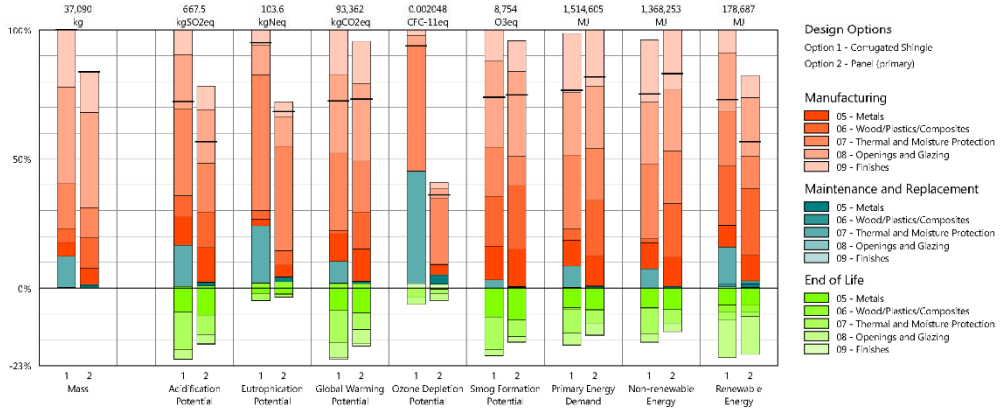
4- IMMEDIATE OBJECTIVES (NEXT 6 MONTHS)

- *Asset management innovations*

Tally™ can be used to compare design options.

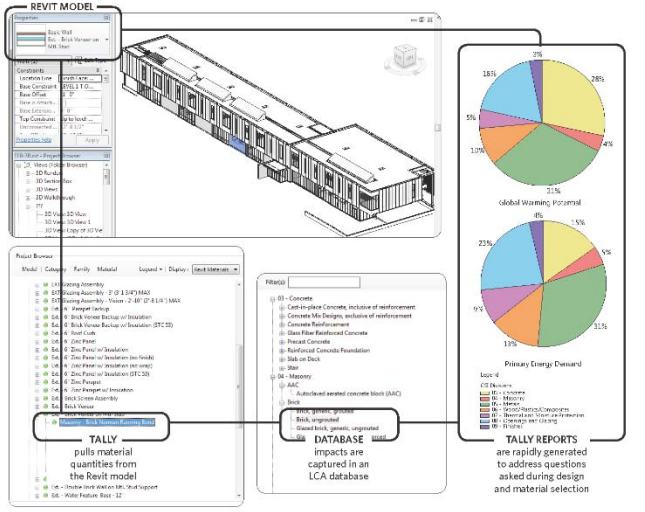
Option 1 - Corrugated Shingle Cladding

Option 2 - Translucent Panel Cladding (Selected)



Results Per Life Cycle Stage, Itemized by CSI Division

Tally™ pulls material quantities from the Revit model to create an accurate bill of goods.

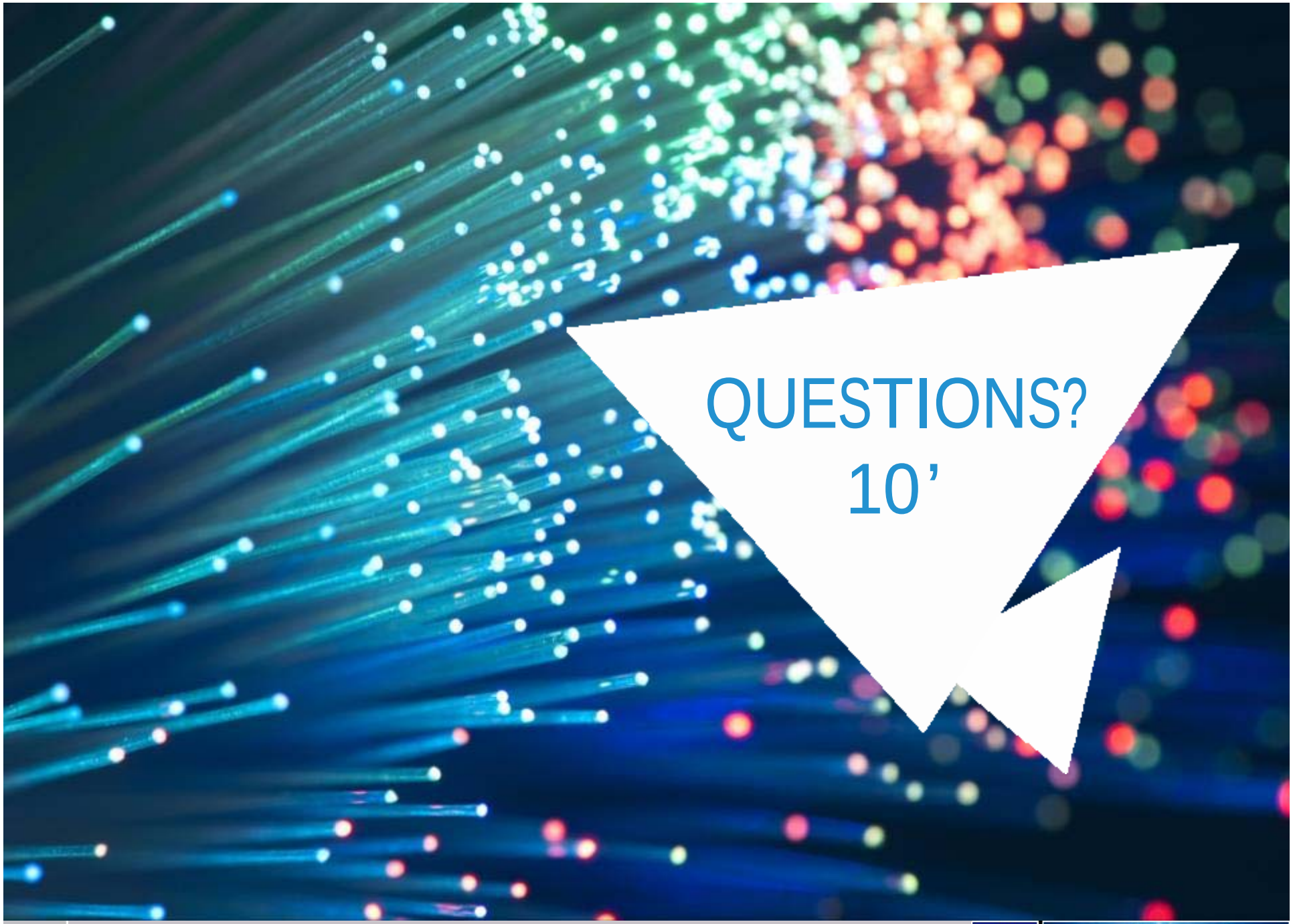


4- IMMEDIATE OBJECTIVES (NEXT 6 MONTHS)

- *Modelling of existing Railway Terminals. Deliverable 4.2 (February 2018)*

- *Modelling of virtual Railway Terminals. Deliverable 4.3 (February 2018)*

- *Implementations in virtual terminals of innovations from WP2. Deliverable 4.4 (March 2018)*



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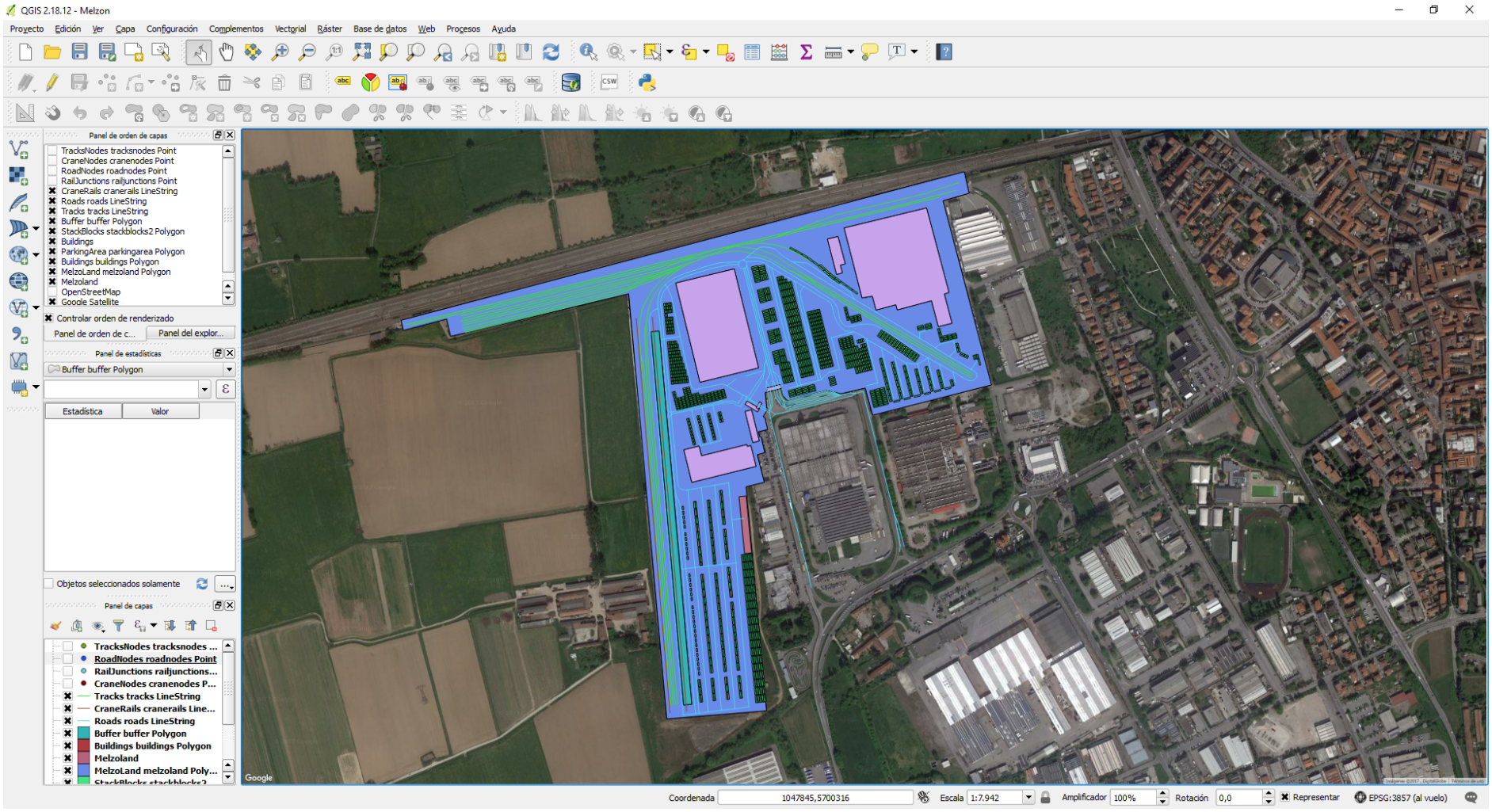

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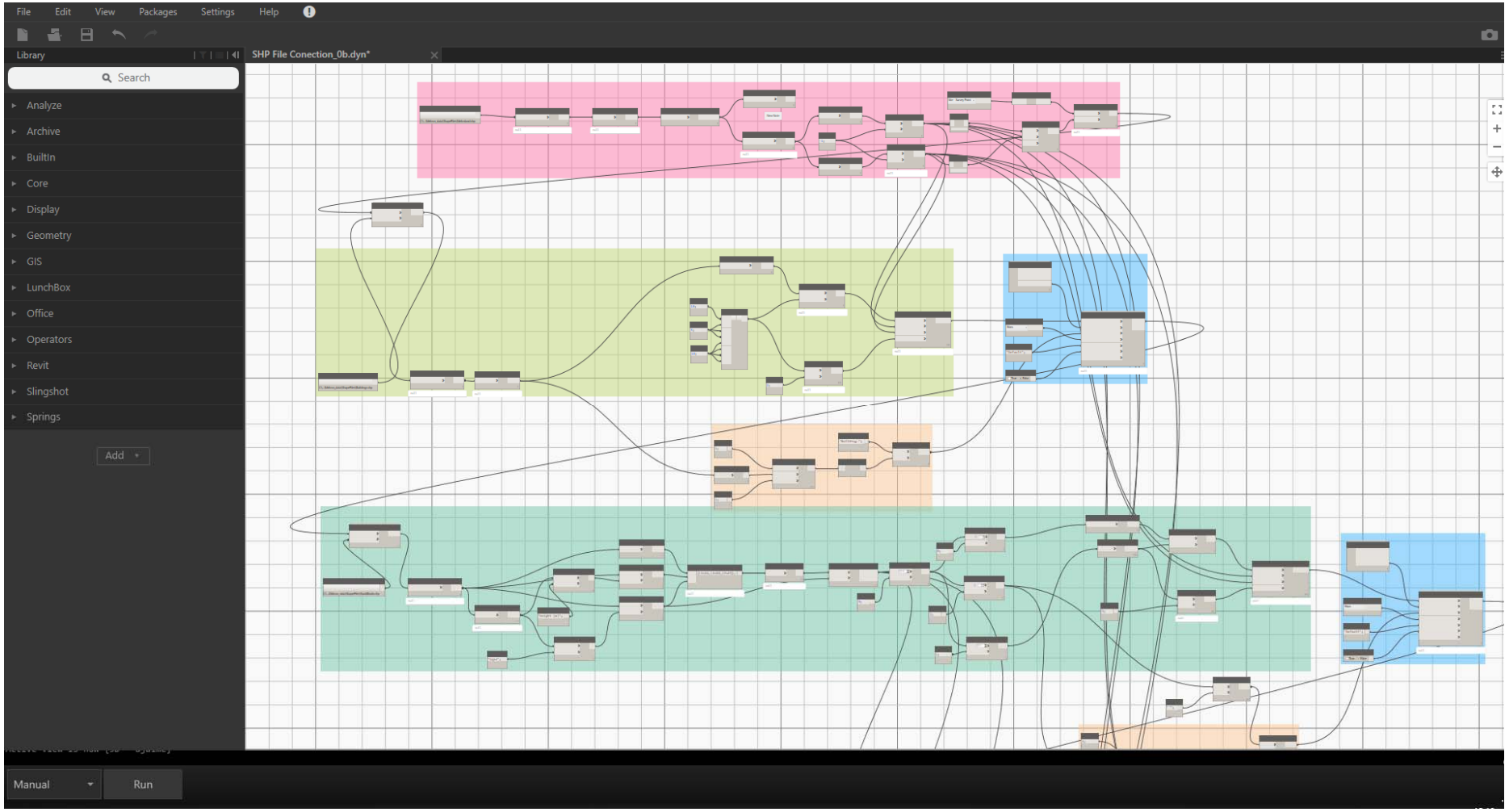
4- IMMEDIATE OBJECTIVES (NEXT 6 MONTHS)



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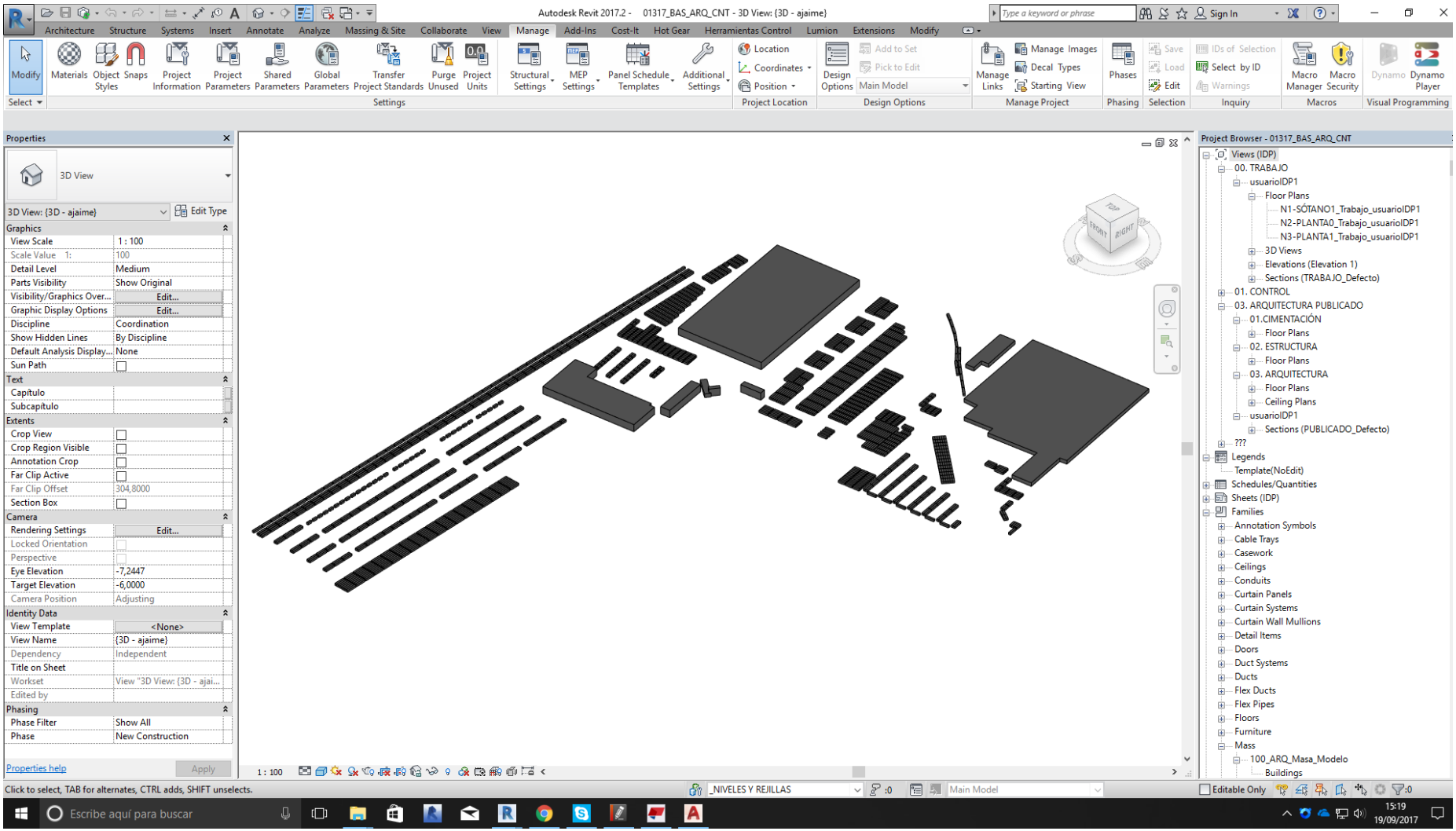
4- IMMEDIATE OBJECTIVES (NEXT 6 MONTHS)



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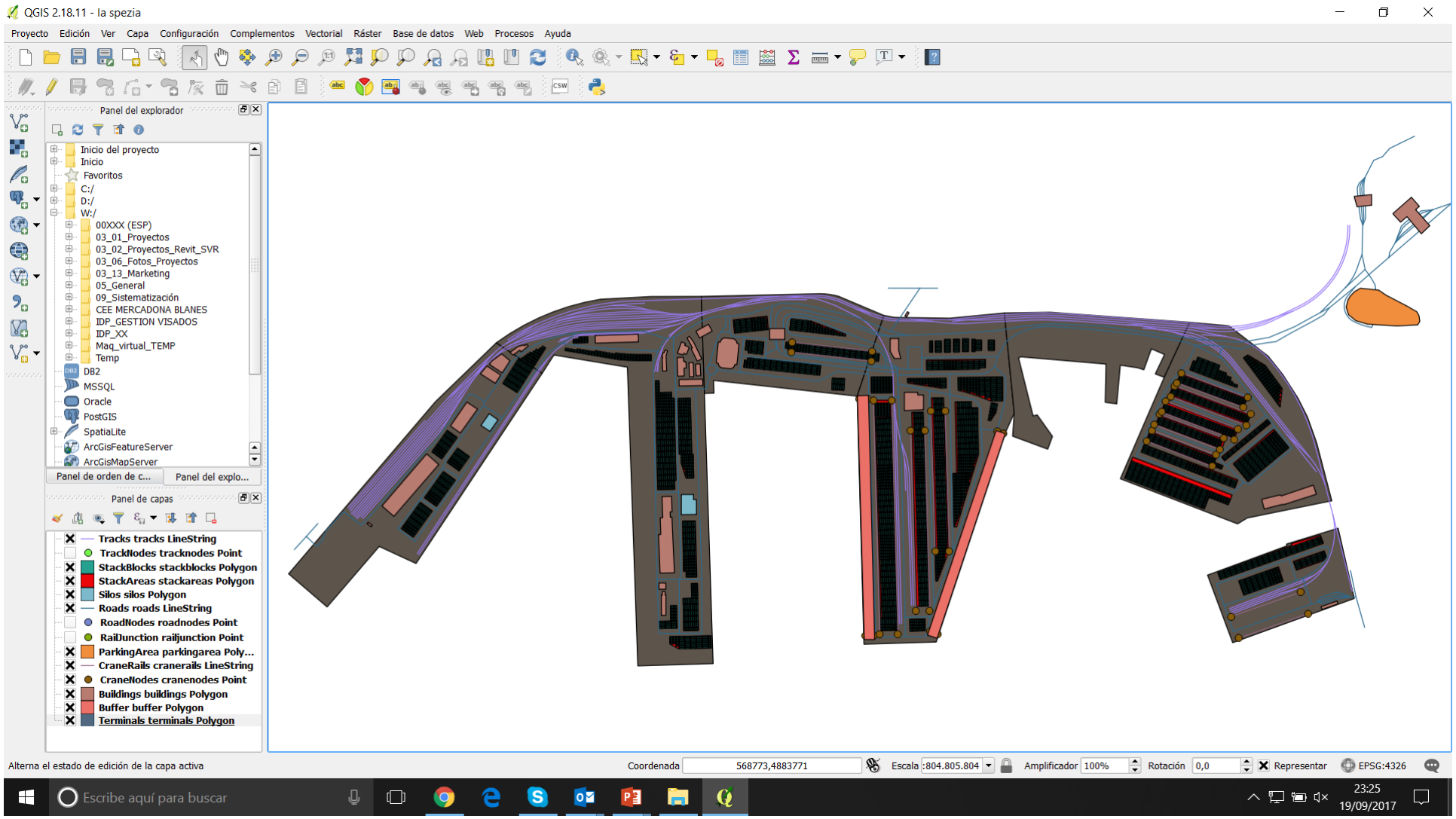

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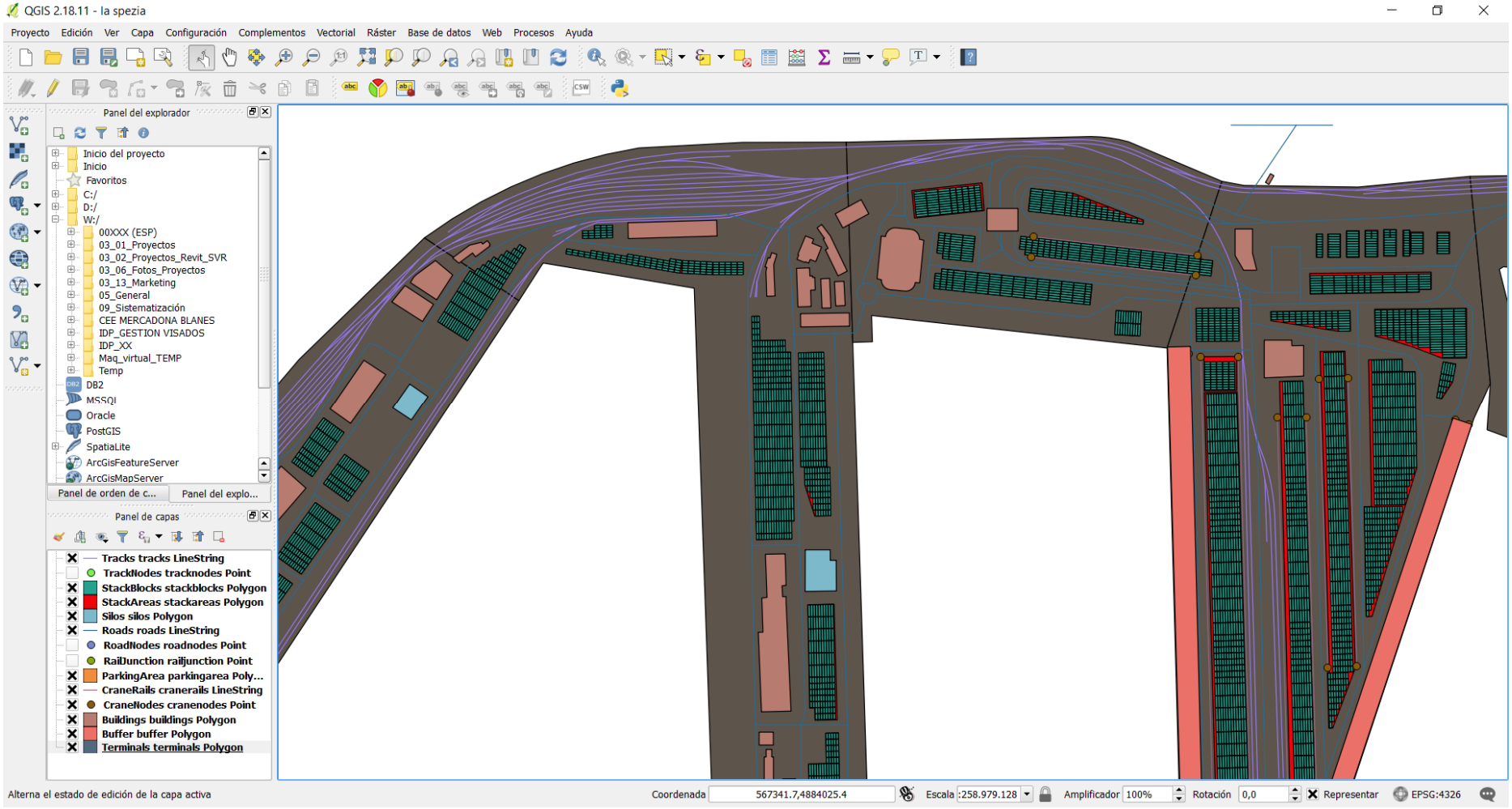

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