

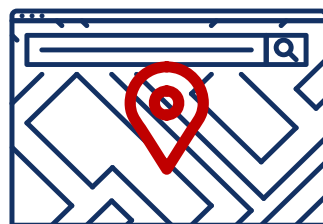
Modelos BIM vinculados con entidades GIS para decisiones estratégicas basadas en análisis espacial

Nerea Arribas Corrales



Nerea Arribas Corrales

- Ingeniera de Obras Públicas
- Especialista BIM-GIS. Ineco
- Miembro CTN 332 BIM and SC2 BIM/GIS. UNE



GIS



BIM



BI

INECO FIGURES

+6,600
professionals

+440 M€
Turnover

+300
disciplines

+55
years of experience

+80%
Of our clients actively
recommend us

SECTORS AND SOLUTIONS



We have been involved in the development of more than 12,000 km of high-speed rail around the world. We're the most efficient



We are one of the largest providers of IT services to the Spanish Administration



We have been present at all stages of the development of Aena's airport network



We contribute to rail intelligence and port improvement in 22 port authorities



We are a key player in the ERTMS deployment in 10,000 km in Europe and 3,550 km in Spain



Giving support to all State Roads Demarcations by contributing to the digitalisation of the sector



First Spanish company certified by the ICAO for the design of instrumental flight procedures (200 procedures per year)



Commitment to an innovation model based on co-creation with our clients



We are one of the largest architectural studios in Spain



110% revenue growth in 2023 over 2022 on resilience and climate change



More than 50 own software developments for mobility and digitalisation

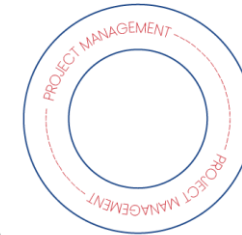


More than 10 years applying AI to our solutions and more than 15 pilots projects currently underway

Consultancy and planning

Strategic planning
Preliminary studies and reports
Development of technical standards

Offers
Calls for tenders
Procurement



Projects

Functional/conceptual design
Detailed design/construction project
Project supervision

Operation and maintenance

Safety inspections
Supervision and control
Pre-maintenance

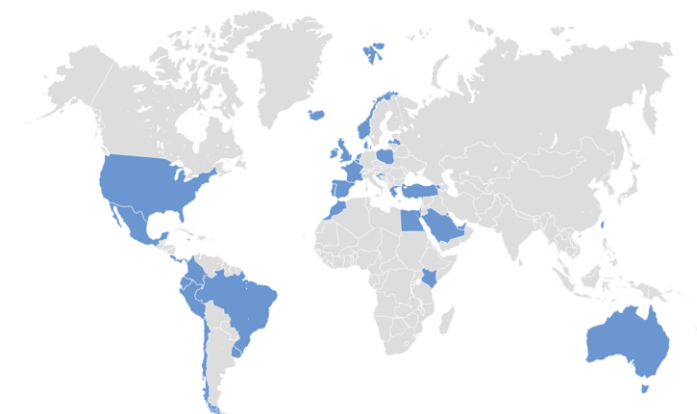
Commissioning

Operational testing
Commissioning
Operation development
Training

Works

Control and monitoring/auditing
Health and safety coordination
Environmental Management
Works management

INECO IN THE WORLD



¿Por qué?

1





60 km 11 Estaciones

208 modelos IFC

Tramos
115 modelos IFC
6 alineaciones
6 movimientos de tierras
6 vía
6 drenaje
6 sistemas ferroviarios
4 instalaciones de túneles
20 túneles
61 puentes
6 geotecnia

Estaciones
44 modelos IFC
11 arquitectura
11 estructuras
11 urbanización
11 MEP

Subestaciones
19 modelos IFC
9 subestaciones
2 celdas de alimentación
2 anillos
4 transformadores

Cocheras
15 modelos IFC
5 arquitectura
5 estructuras
5 MEP

Catenarias
6 modelos IFC

Parque Eólico
3 modelos IFC

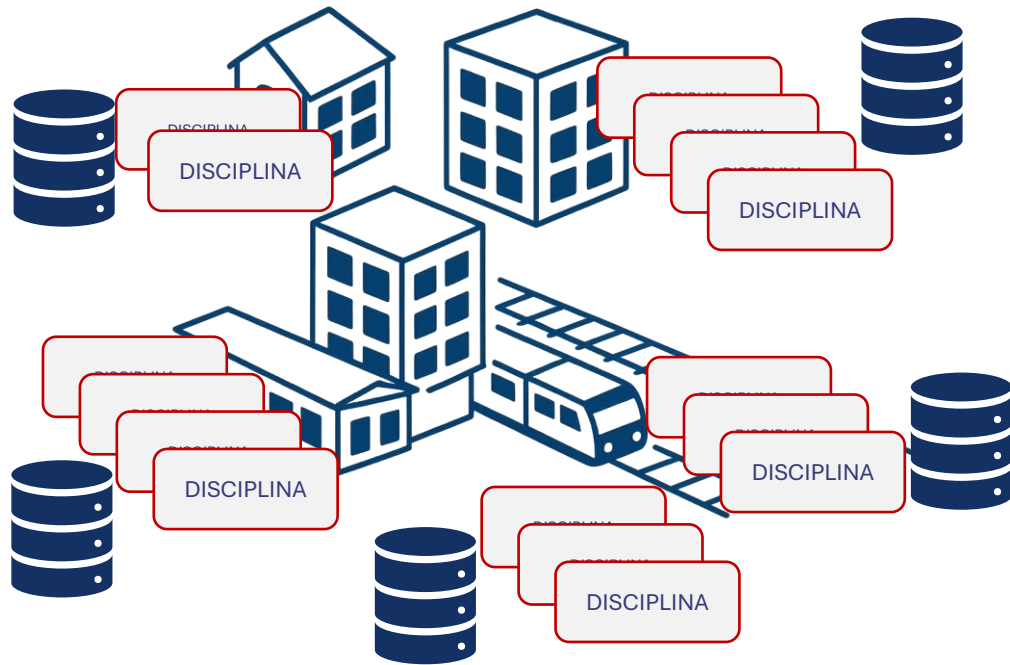
Reducir para gestionar. Integrar para decidir

Los usuarios (que toman decisiones)
no suelen ser expertos en BIM ni en GIS



Más usuarios, menos complejidad y herramientas
más accesibles

Reducir para gestionar. Integrar para decidir



Modelos BIM 3D pesados en datos que requieren muchos recursos

Gran número de modelos IFC disponibles

Exceso de información no explotada para los usos adecuados

MODELO FEDERADO

DISCIPLINAS
IFC (ARQ-MEP...)
CLASES/FAMILIAS

JERARQUÍA IFC

PARAMETROS
SISTEMAS CLASIFICACIÓN

CDE

COLISIONES

ISO 19650



SISTEMA

FEATURES LAYERS
(2D-3D)

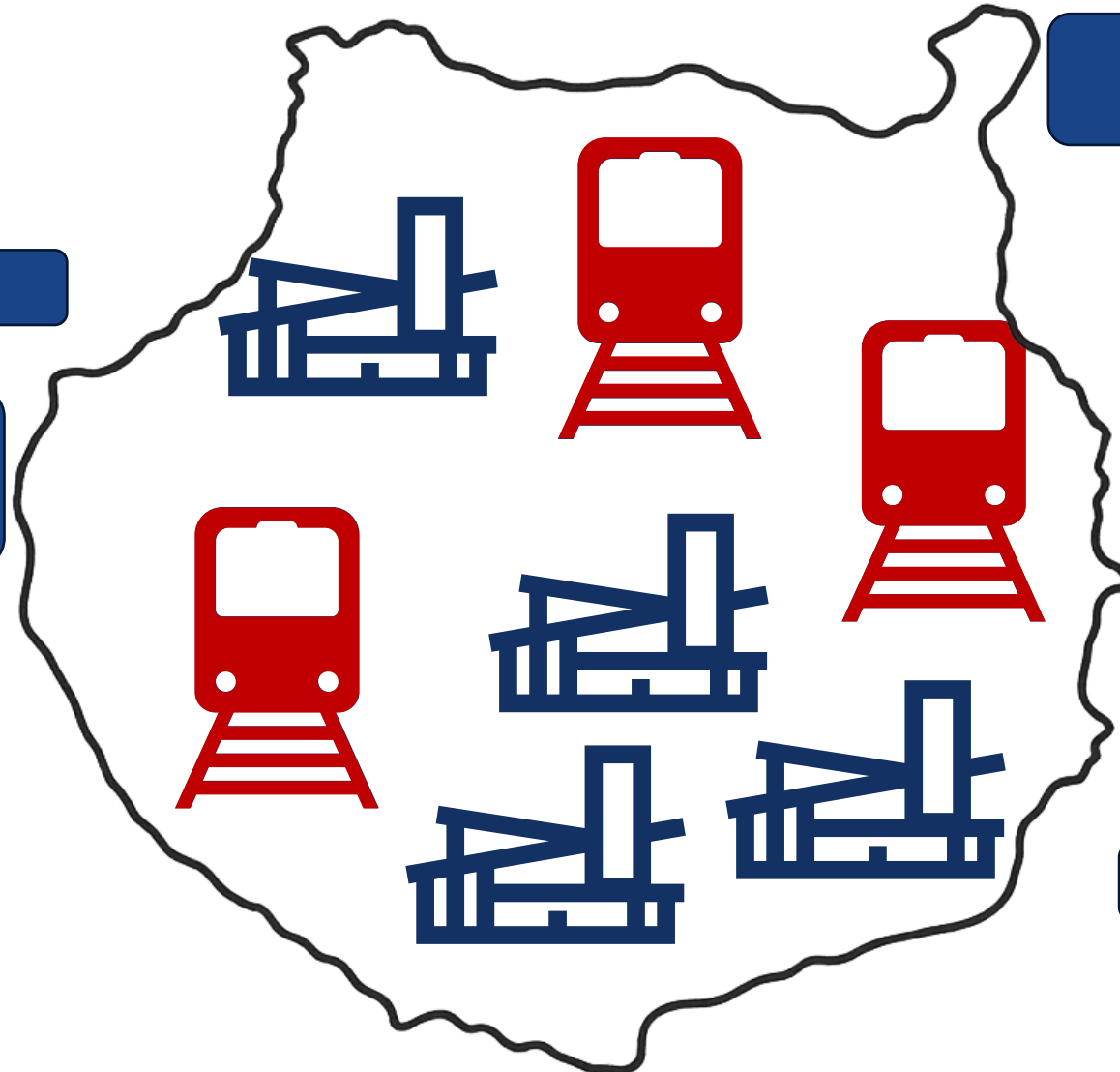
TOPOLOGIA MODELO
DE DATOS

ATRIBUTOS
DOMINIOS

GEOPORTALES

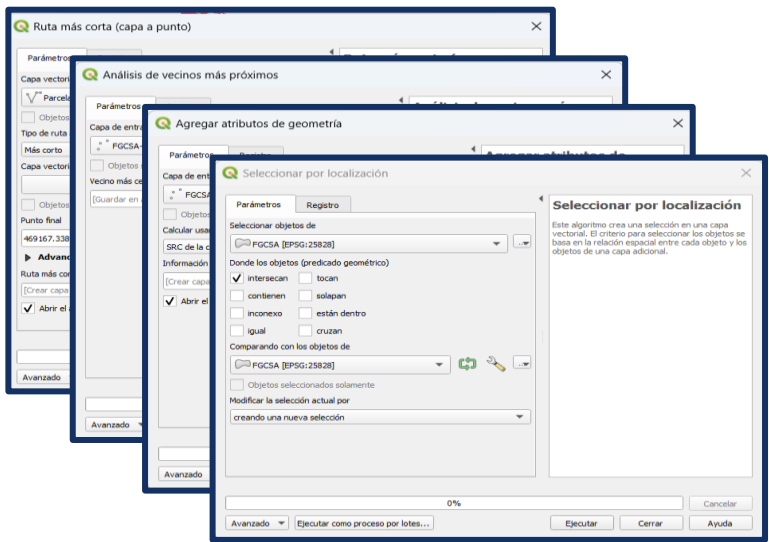
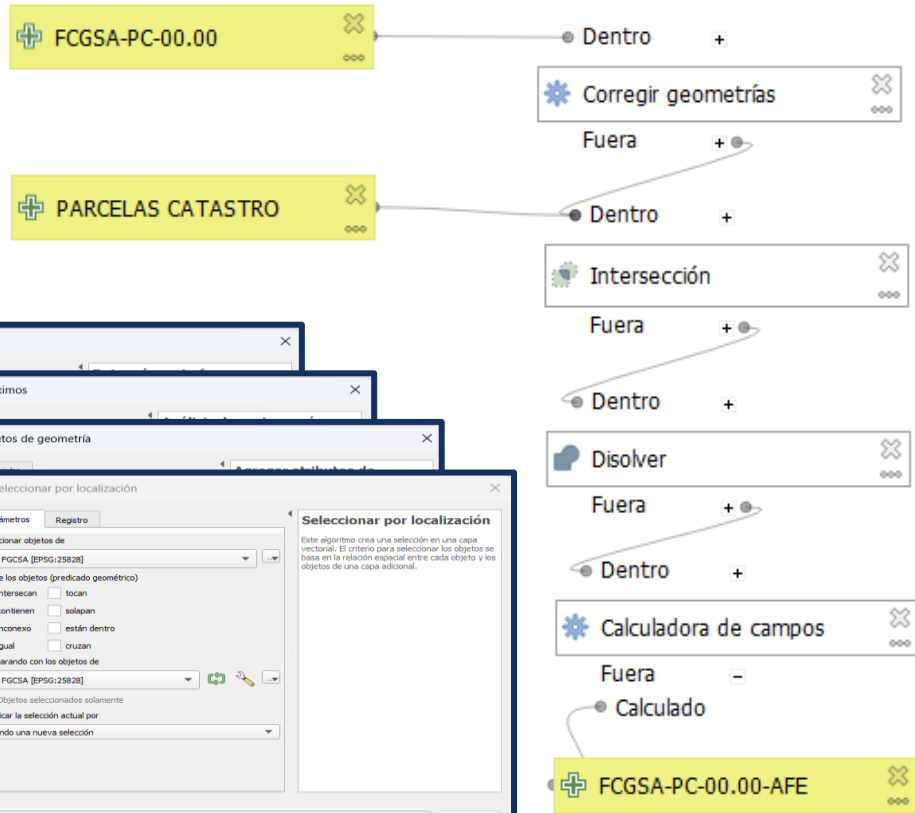
AFECCIONES

INSPIRE / ISO 19115

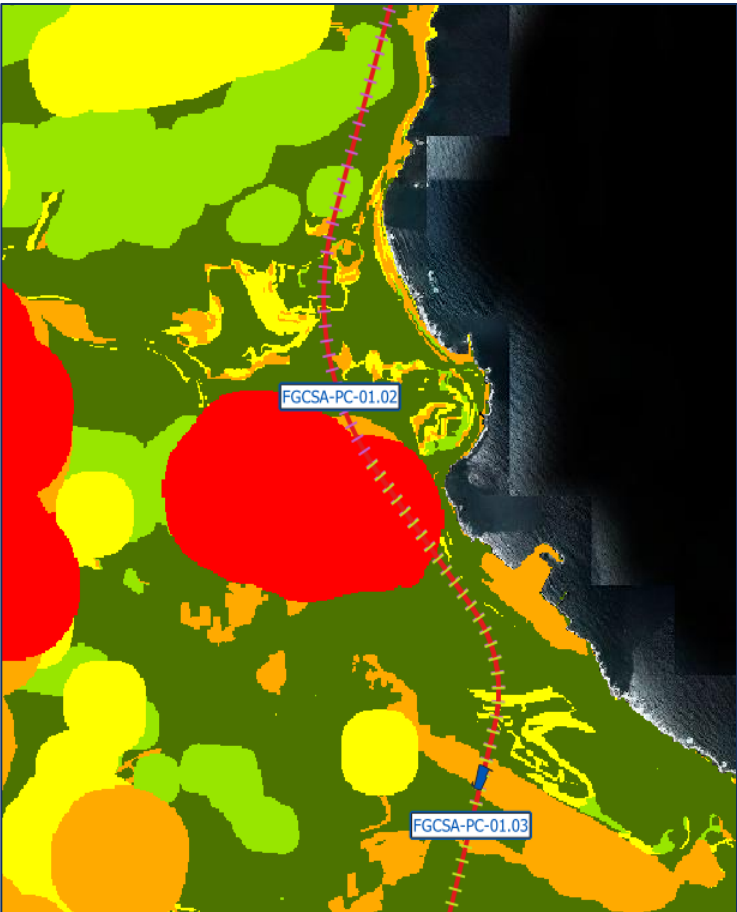


PROYECTO BIM-GIS

Geoprocesos



Contexto



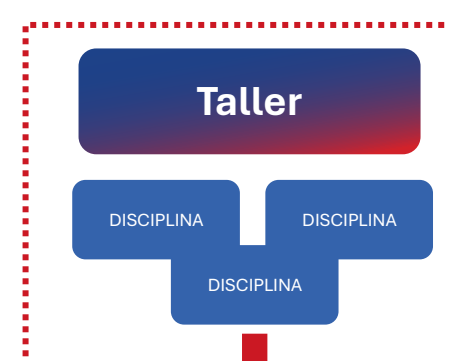
¿Como?

1



Project

- Site 00.01
- Site 00.02
- Site 00.03
- Site 00.04
- Site 00.05



3D

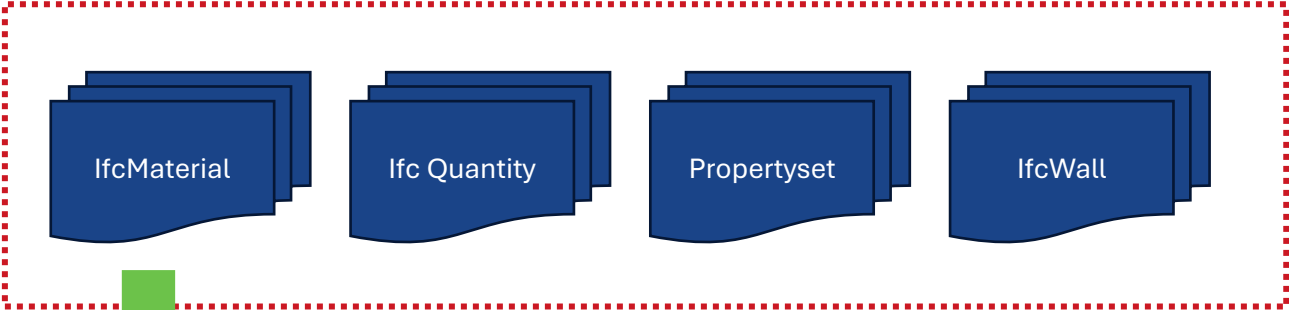


2D



¿Qué hacemos con la geometría?

Project

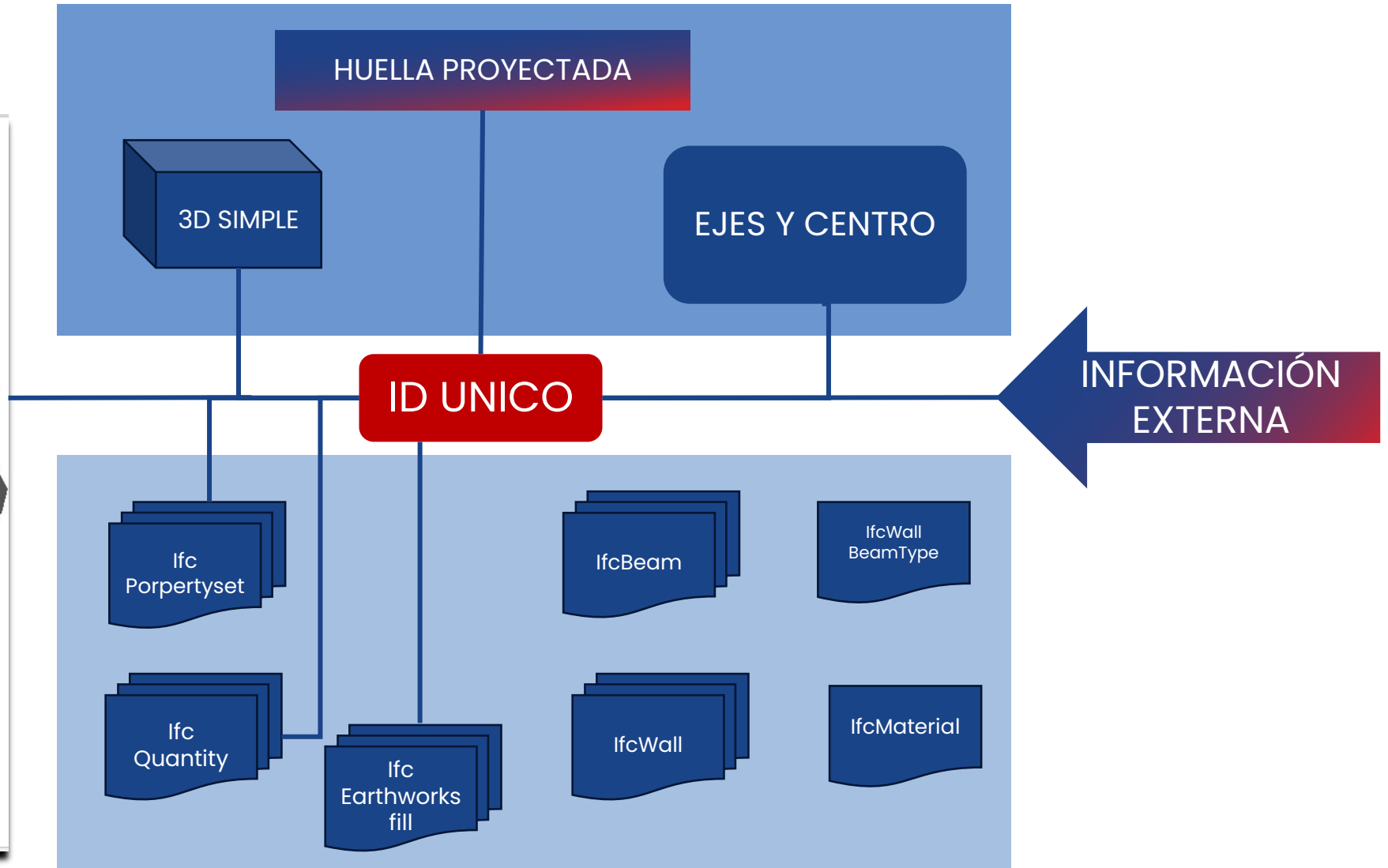


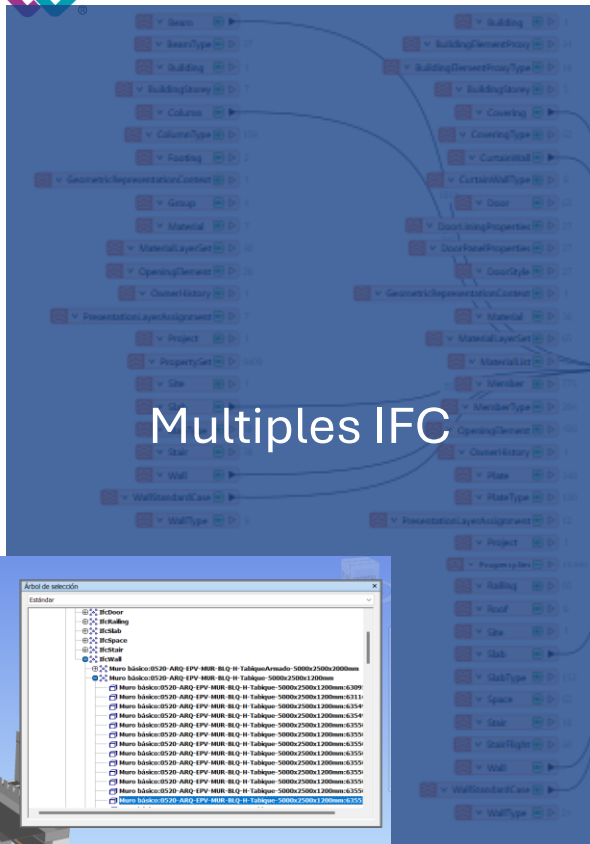
Extraemos solo la información necesaria



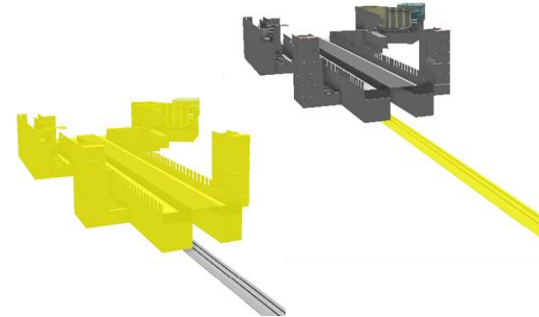
¿Qué hacemos con la información?

Relaciones

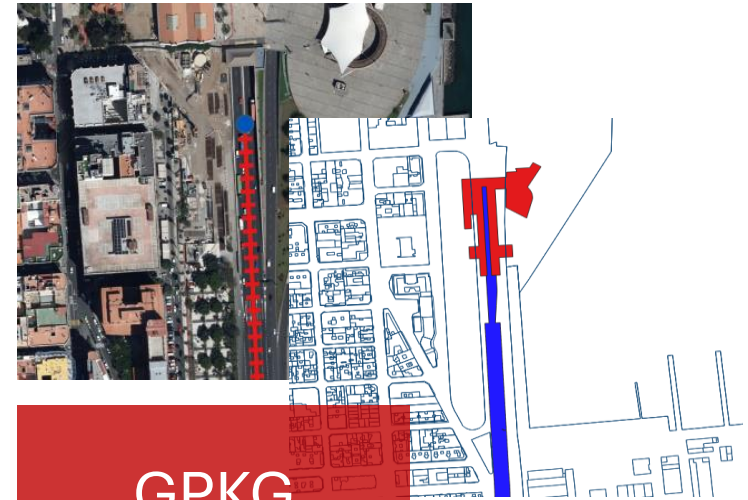




Multiples IFC

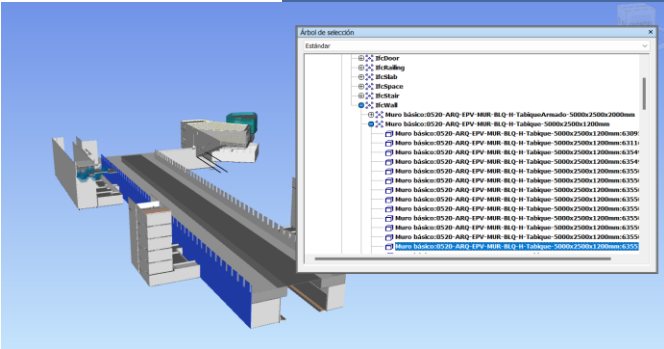


Consolidamos en una geometría 3D simplificada



GPKG
3D + 2D

Generamos su huella proyectada



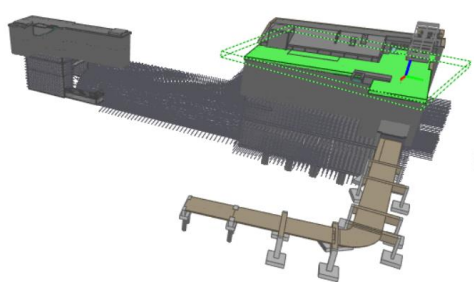
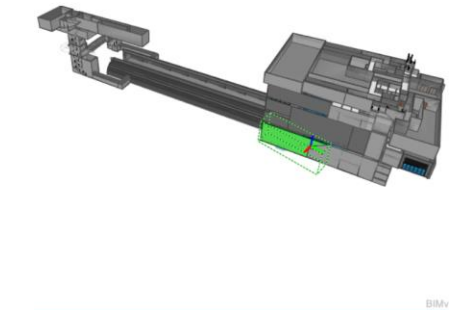
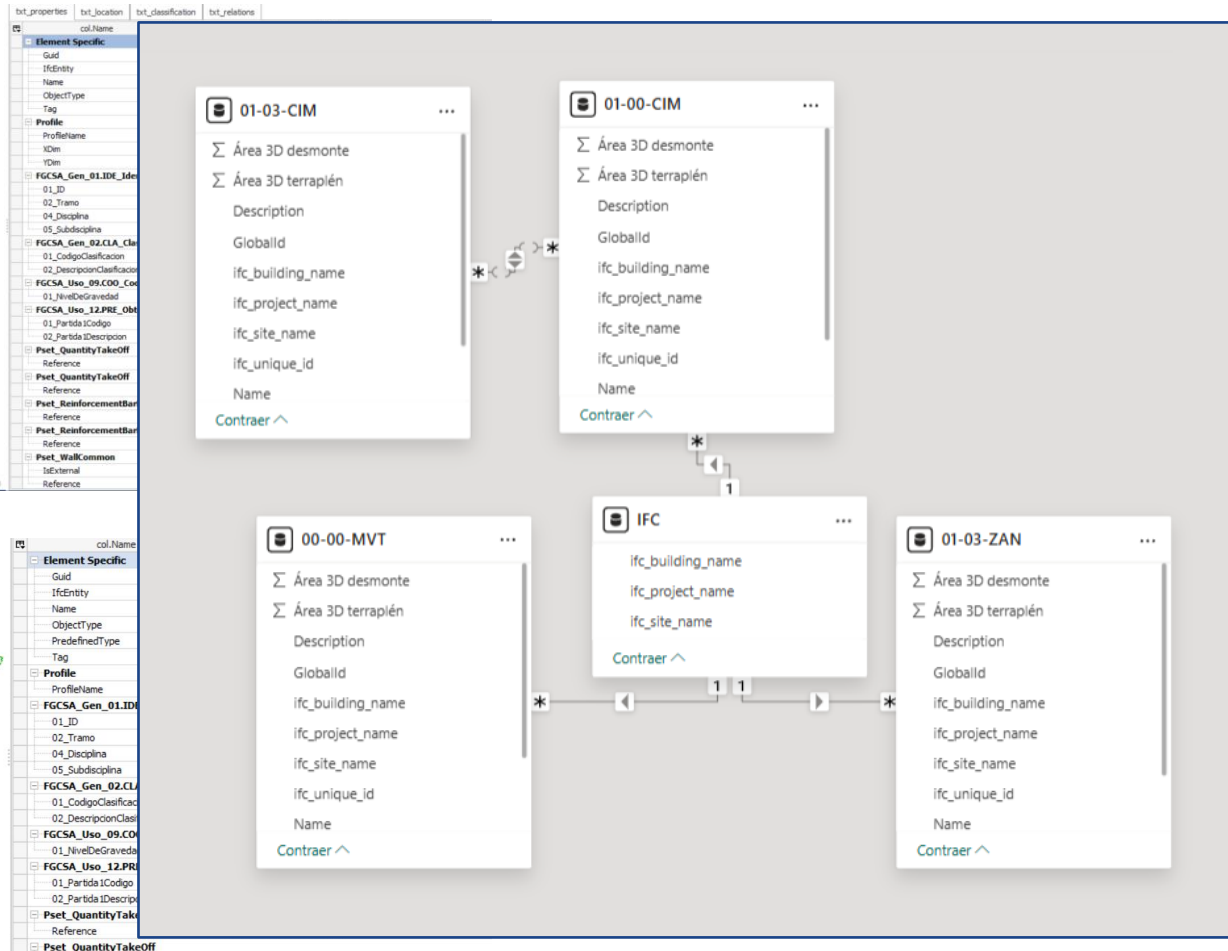
IfcProject-IfcSite-IfcBuilding/IfcFacility





IfcProject-IfcSite-IfcBuilding/IfcFacility-GUID

Modelo de datos



ifc_project_name	ifc_site_name	ifc_site_name2	Área 3D terraplén	Área 3D desmonte
FGCSA-PC-00.00	FGCSA-PC-01.00	FGCSA-PC-01.03		124,6336817
95530	FGCSA-PC-00.00	FGCSA-PC-01.00	FGCSA-PC-01.03	124,6336817
ifc_project_name	ifc_site_name	ifc_site_name2	Área 3D terraplén	Área 3D desmonte
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00400000_97747	FGCSA-PC-00.00	FGCSA-PC-01.00	FGCSA-PC-01.03	94,04175739
00400000_99274	FGCSA-PC-00.00	FGCSA-PC-01.00	FGCSA-PC-01.03	96,83787386
00400009_99862	FGCSA-PC-00.00	FGCSA-PC-01.00	FGCSA-PC-01.03	59,92115467
00400000_101024	FGCSA-PC-00.00	FGCSA-PC-01.00	FGCSA-PC-01.03	83,82389615
04000000_102194	FGCSA-PC-00.00	FGCSA-PC-01.00	FGCSA-PC-01.03	83,73692492
04000002_103109	FGCSA-PC-00.00	FGCSA-PC-01.00	FGCSA-PC-01.03	67,31441466
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000000000_17839	FGCSA-PC-00.00	FGCSA-PC-02.00	FGCSA-PC-02.01	1981,410625
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000400000_23602	FGCSA-PC-00.00	FGCSA-PC-02.00	FGCSA-PC-02.01	690,6903471
1000000000_23967	FGCSA-PC-00.00	FGCSA-PC-02.00	FGCSA-PC-02.01	29,58065071
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400040000_32032	FGCSA-PC-00.00	FGCSA-PC-02.00	FGCSA-PC-02.02	1227,137731
000058000_32125	FGCSA-PC-00.00	FGCSA-PC-02.00	FGCSA-PC-02.02	3,243120321
20001C000_32877	FGCSA-PC-00.00	FGCSA-PC-02.00	FGCSA-PC-02.02	279,9309483
10000G000_33093	FGCSA-PC-00.00	FGCSA-PC-02.00	FGCSA-PC-02.02	13,97319995
200018000_34249	FGCSA-PC-00.00	FGCSA-PC-02.00	FGCSA-PC-02.02	102,4142026
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000018dbm_37366	FGCSA-PC-00.00	FGCSA-PC-02.00	FGCSA-PC-02.02	1623,919251
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000001sLG_26699	FGCSA-PC-00.00	FGCSA-PC-03.00	FGCSA-PC-03.01	8,058537075
00000C000_26909	FGCSA-PC-00.00	FGCSA-PC-03.00	FGCSA-PC-03.01	6,755025602

Tipo de Construcción

Estaciones

Emisiones Material (tCO2eq)



Emisiones Transporte (tCO2eq)



POINT_Y y POINT_X



Municipio

Todas

Nombre

Santa Catalina

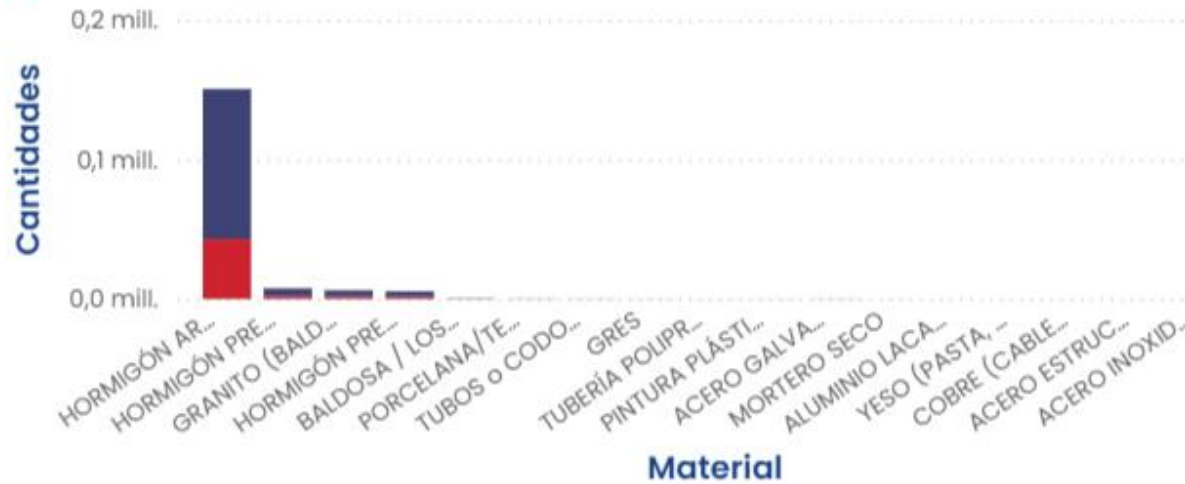
Modo de transporte

Barco

Carretera

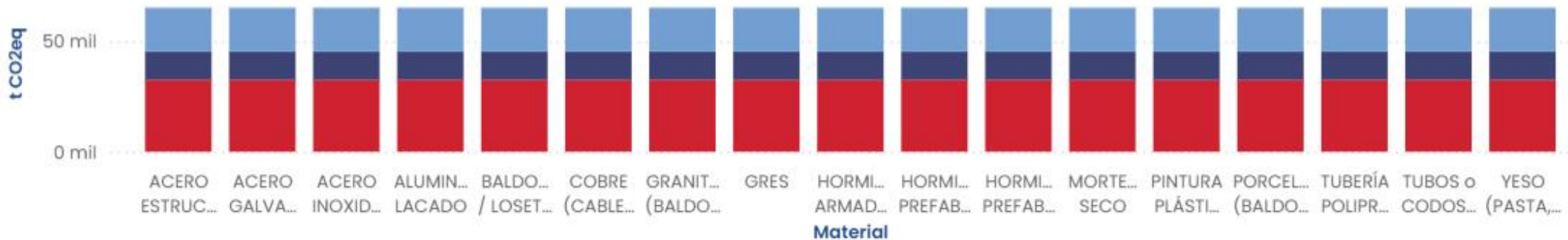
Volumen (m3) y Suma de Peso (t) por Material

Volumen (m3) Suma de Peso (t)



Emisiones por Material

Emisiones total Emisiones por material Emisiones por transporte



Total Emisiones

32,63 mil (t CO2eq)

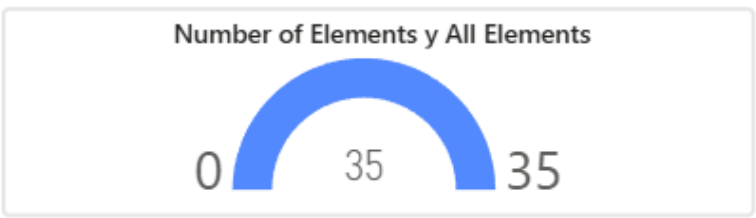
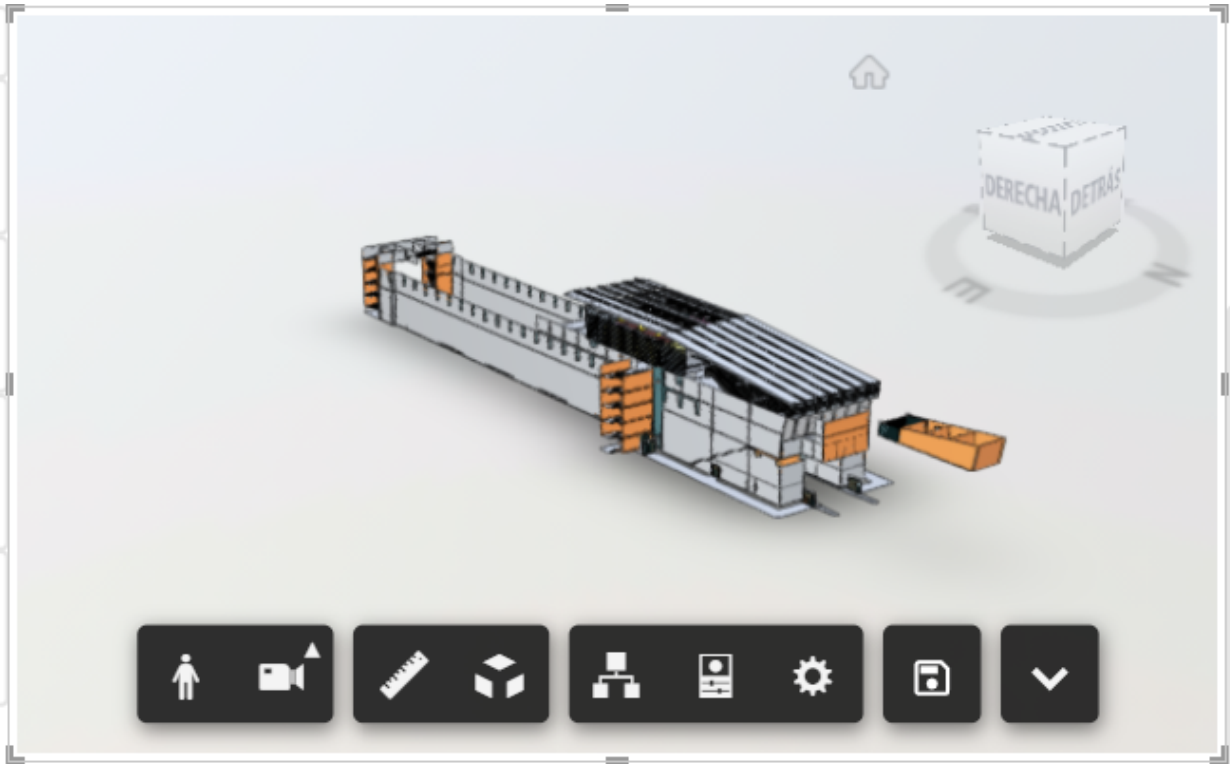
Clear Filters

Element Type
Todas

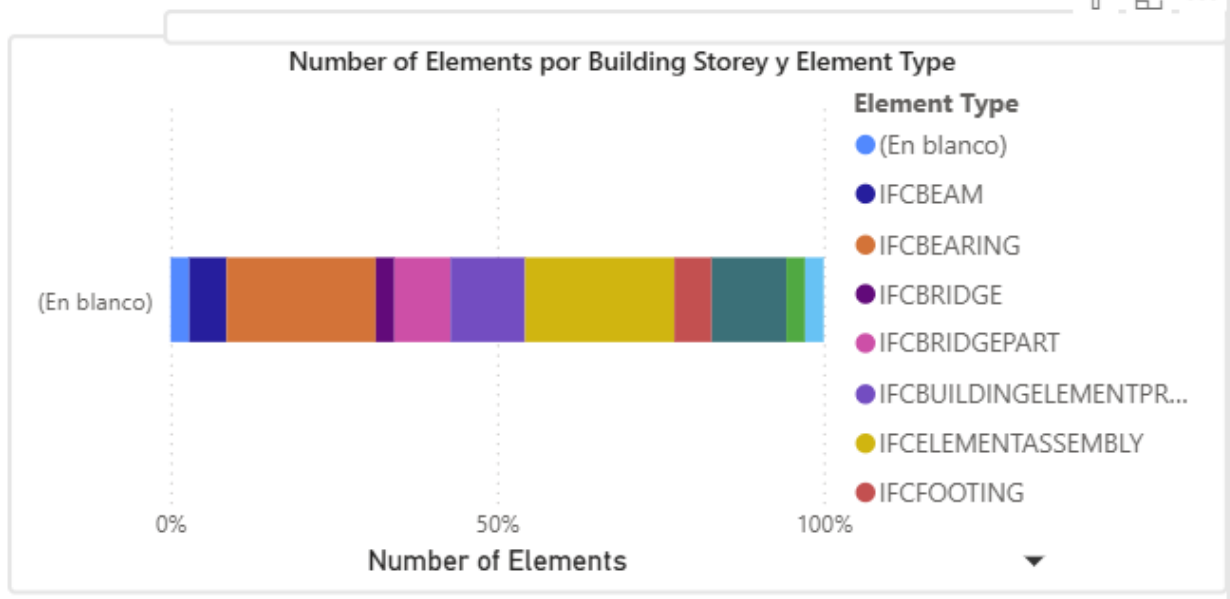
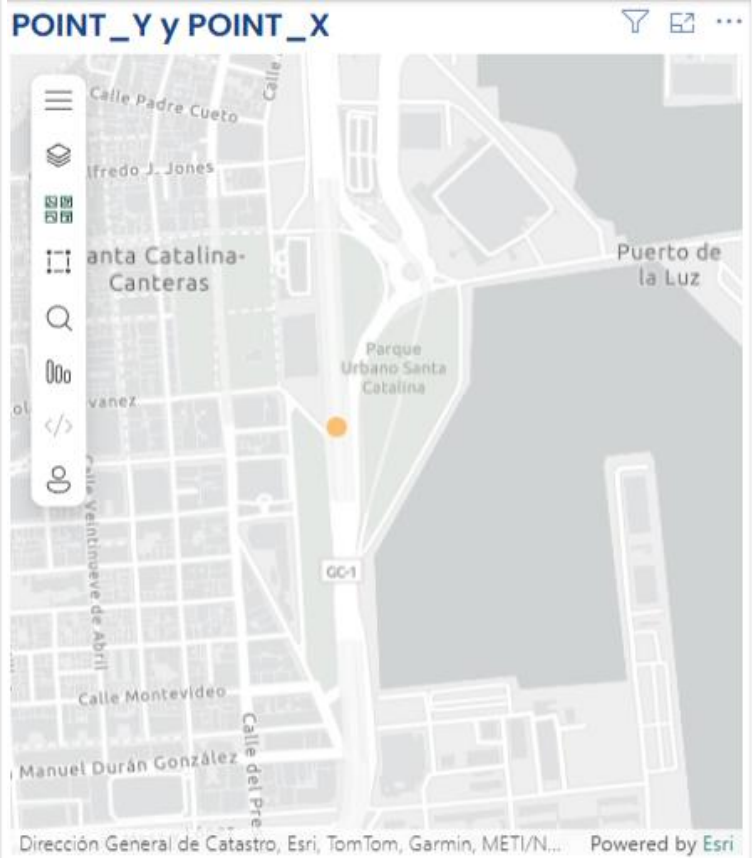
Property Set Name
Todas

Property Name, Property Value
Todas

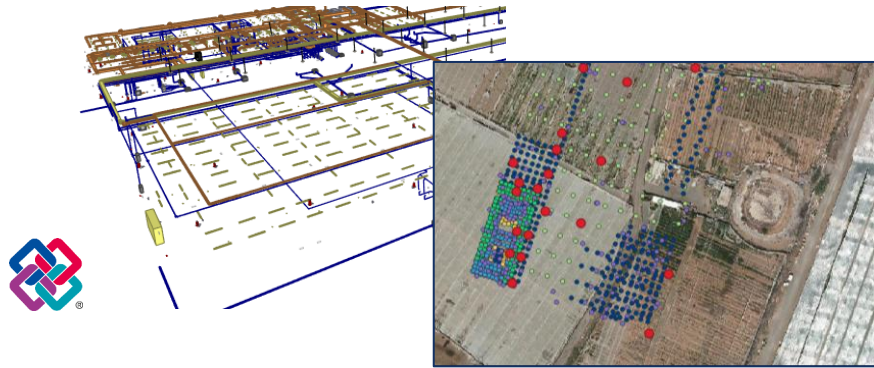
Building Storey
Todas



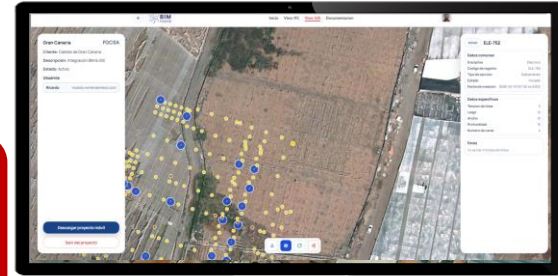
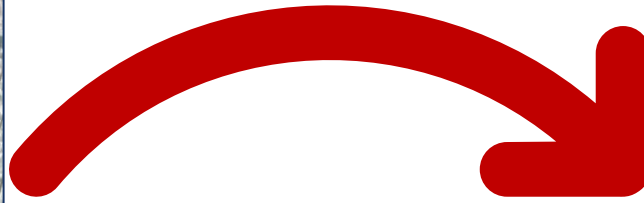
Element Name	Primera fecha: Property Value
Carretera Quintanar del...	
Datos de identidad	
Autor	INECO (Par\X\E1 metro de ir
Nombre del edificio	PK Obra 510-957



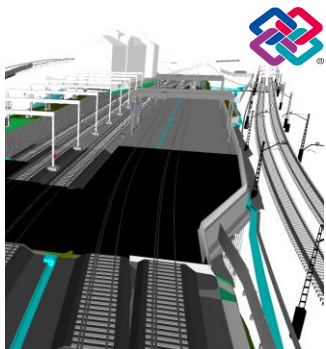
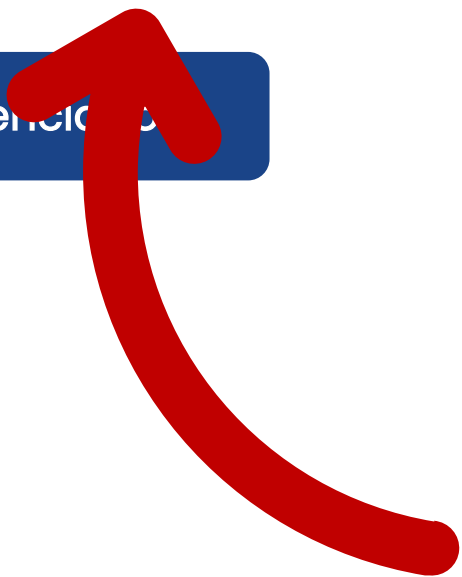
Flujo de Trabajo



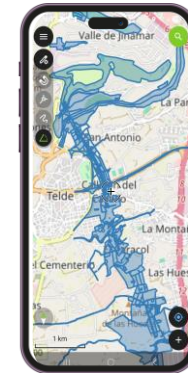
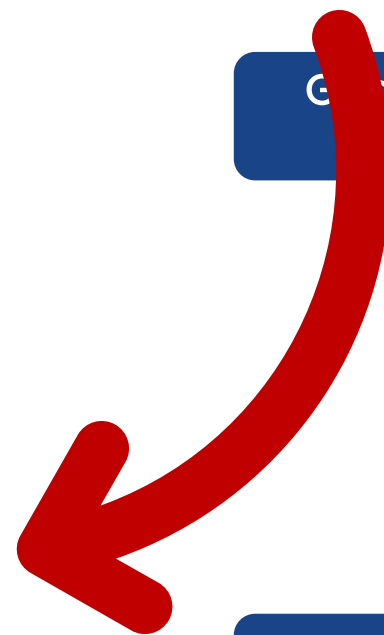
Inventario vivo georreferenciado



Portales como punto de acceso único



Actualización IFC



Edición en campo

¿Qué hemos conseguido?



Optimizar el tamaño

- 75% reducción del volumen
- Tiempos de carga, transferencia y procesamiento optimizados



Mejora la lectura

- Consolidación de múltiples IFC en un único elemento
- Modelos más claros, manejables y fáciles de interpretar



Geoanálisis avanzado

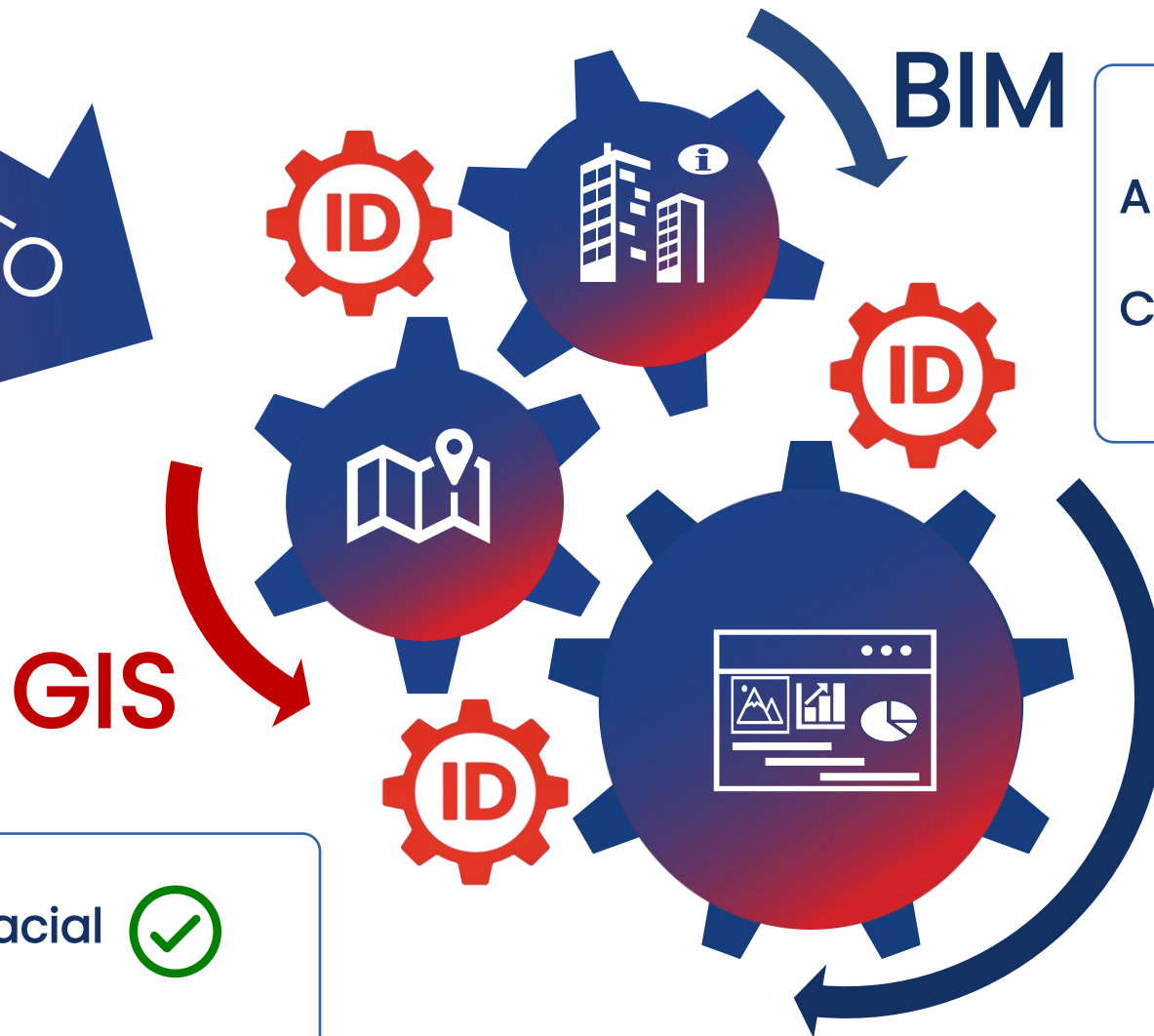
- Entidades Coplanares 2D
- Detección de solapes, patrones, análisis multicriterio



Cuadros de mando

- Business Analyst Georreferenciado
- Toma de decisiones informadas

PROYECTO



BIM

Alto detalle constructivo

Contexto territorial limitado

BI

Gran capacidad analítica

Dependencia de datos coherentes e integrados

Contexto geospacial

Limitada para diseño constructivo



¡Gracias por su atención!

ana.corrales@ineco.com

