FORMAL OBJECTION (ALEGACIÓN)

REGARDING: Environmental Impact Report for BESS Solórzano and SET Colectora ALM-14-2022

Location: Fuente Las Varas, Solórzano/Ruesga, Cantabria
BOC Reference: PDF (BOC-2026-521) (BOC 28/1/2016)
and BOC NÚM. 109/2025, 9 June 2025. 7.2. MEDIO AMBIENTE Y ENERGÍA (PDF BOC-2025-4890)
Industria References: ALM-14-2022_Proyecto_BESS-48.3.1.pdf
ALM-14-2022_Proyecto_Infra.Evac-45.5.3.pdf
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Date: 10th February 2026

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Note: References to the three documents which are the subjects of this *alegación* are shortened for ease of reading –

BOC NÚM. 109/2025, 9 June 2025. 7.2. MEDIO AMBIENTE Y ENERGÍA (PDF BOC-2025-4890) >> **PDF BOC-2025-4890**
ALM-14-2022_Proyecto_BESS-48.3.1.pdf >> **BESS-48.3.1**
ALM-14-2022_Proyecto_Infra.Evac-45.5.3 >> **Infra.Evac-45.5.3**

EXECUTIVE SUMMARY

This formal objection challenges the Environmental Impact Report approval for the BESS Solórzano battery storage facility and SET Colectora substation at Fuente Las Varas. The approval, published in BOC 109/2025 (7.2. MEDIO AMBIENTE Y ENERGÍA), contains fundamental failures that render it inadequate to protect the environment.

Documents attached to an online announcement by "D.G. de Industria, Energía y Minas. Consejería de Industria, Empleo, Innovación y Comercio" (22/1/2026) file ALM-14-2022 have also been examined (ALM-14-2022_Proyecto_BESS-48.3.1.pdf and ALM-14-2022_Proyecto_Infra.Evac-45.5.3.pdf) (https://dgicc.cantabria.es/detalle/-/journal_content/56_INSTANCE_DETALLE/16626/117285675) and failures addressed in this document.

Critical Failures Identified:

1. **Complete omission of the Four Valleys System** - A 79.5km cave system with 18 entrances lies beneath the proposed development, carrying water to the public supply at Los Boyones (Secadura, Voto and labelled E.T.A.P. Alto de la Cruz on Google Maps). This cave system is entirely absent from all environmental documentation.
2. **Hydrological misrepresentation** - The catchment area drains through underground karst passages to Los Boyones (ETAP Alto de la Cruz) public water supply (Voto), not to Fuente Aguanaz as stated in the EsIA.
3. **Inadequate drainage planning** - No proper assessment of how 15,200m² of concrete platform runoff will affect underground water systems.
4. **Failure to assess subsurface ecosystem** - No consideration of rare cave fauna including *Cantabroniscus*, a species of conservation concern.
5. **Technical errors** - Ground temperature incorrectly assumed as 30°C instead of actual ~10°C, affecting all cable calculations.
6. **Landscape and cumulative impact underassessment** - Progressive industrialization of nationally recognized geological landscape (LIG 59001 - Valle de Matienzo).
7. **Jurisdictional errors** - Significant portions of SET Colectora located in Ruesga municipality, yet Ruesga not properly consulted or included in affected organizations list.

Recommendation: The Environmental Impact Report approval should be **withdrawn** and a comprehensive new assessment conducted that properly evaluates impacts on the Four Valleys karst system, underground hydrology, and subsurface ecosystems.

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1. INTRODUCTION AND BACKGROUND

1.1 Project Description

The project comprises:

- **BESS Solórzano:** 49.738 MW power capacity, 199.560 MWh energy storage
  - 145 battery units in 13 containers
  - 26 inverters
  - 13 transformation centers
  - Total BESS area: ~21,097 m²
- **SET Colectora Solórzano 220 kV:** Collector substation
  - 56/70 MVA transformer (increased from original 50/55 MVA)
  - Designed to serve BESS Solórzano, BESS Cantabria 1, and future wind farms
  - Shared infrastructure with BESS Solórzano
- **Total concreted area:** Approximately 15,200 m²
- **Location:** Altitude 440-450m, sloping site requiring significant cut-and-fill
- **Construction:** Major earthworks estimated at 43,305 m³ (9,305 m³ excavation, 33,990 m³ fill)

The site sits on the prominent ridge at Fuente Las Varas, making it highly visible from all directions. When combined with the existing REE Solórzano SET (23,600 m² concrete platform), this creates an industrial complex of approximately 38,800 m² in what was previously agricultural countryside.

1.2 The Submitting Organization

The Matienzo Caves Project (MCP) has been exploring and documenting caves in a variable 191 km² area of Cantabria since the 1960s. The Project maintains a comprehensive database currently 5,513 documented cave sites totaling 434.4 km of passages (as of January 2026). The Project works in collaboration with Spanish authorities, has published extensively on the region's karst systems, and maintains the authoritative website matienzocaves.org.uk.

Key qualifications:

- 60+ years of systematic cave exploration and documentation
- Detailed knowledge of the Four Valleys System hydrology
- Collaboration with Cantabrian speleological authorities
- Scientific publications on cave biology, archaeology, and hydrology with collaboration on climate change publications.

See Annex 1 for more information about the Matienzo Caves Project.

1.3 Basis for Objection

This objection is submitted on the following grounds:

1. **Scientific accuracy** - The environmental documentation contains factually incorrect information about local hydrology and geology

2. **Public water supply protection** - The Four Valleys System feeds Los Boyones public water supply in Secadura (Voto municipality)
3. **Ecosystem protection** - Rare and potentially endemic cave fauna will be affected
4. **Legal compliance** - The Environmental Impact Report fails to properly assess impacts on all environmental receptors as required by Law 21/2013
5. **National heritage** - The site affects the nationally recognized Lugar de Interés Geológico (LIG 59001)

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2. THE FOUR VALLEYS SYSTEM: AN OVERVIEW

2.1 System Characteristics

The **Four Valleys System** (Sistema de Cuatro Valles) is one of the most significant karst cave systems in Cantabria:

Current statistics (January 2026):

- **Total surveyed length:** 79,482 metres (79.5 km)
- **Number of entrances:** 18
- **Vertical range:** 200 metres (from 245m altitude to 45m at Los Boyones resurgence)
- **Municipalities affected:** Solórzano, Ruesga, and Voto

Major entrances include:

- Cueva de Riaño (0105) – Riaño, Solórzano
- Cueva de la Hoyuca (0107) – Riaño, Solórzano
- Cueva de Carcavuezo (0081) – Matienzo, Ruesga [main water input]
- Cueva Llueva (0114) – Llueva, Voto
- Cueva-Cubío del Llanío (3234) – Riaño, Solórzano
- Torca la Decepción (0252/4732) – Matienzo, Ruesga
- Los Boyones resurgence (0117) - Secadura, Voto [PUBLIC WATER SUPPLY]

(Bracketed numbers are the codes used throughout the Matienzo Caves Project website: https://www.matienzocaves.org.uk/page1.htm)

2.2 Hydrogeological Function

The Four Valleys System serves as the **primary drainage network** for water from three valleys:

- The upper Riaño valley
- Matienzo depression
- The upper Llueva area

Water flow characteristics:

- Average flow into Cueva de Carcavuezo (main sink): **295 litres per second** (data from Dirección General de Obras Hidráulicas y Ciclo Integral del Agua, 2005)
- Water has been **dye-traced** from multiple injection points to Los Boyones resurgence
- Underground rivers flow continuously through the system
- Average flow out of Los Boyones, **650 litres per second** (data from Dirección General de Obras Hidráulicas y Ciclo Integral del Agua, 2005)

Critical fact: Water entering the ground at Fuente Las Varas will reach the underground passages within **hours to days**, depending on rainfall intensity and infiltration pathways.

2.3 Relationship to BESS/SET Site

Spatial relationship:

- BESS/SET site altitude: 440-450m
- Underlying cave passage roofs: known maximum about 250m altitude
- **Vertical separation: 200-310 metres**

Specific underlying features:

- **Armageddon Bypass** (in Cueva Hoyuca): Roof at ~140m altitude, directly beneath development site (~300m vertical separation). See map B.
- **Other passages:** Multiple passages with roofs at ~240m altitude (~200m vertical separation)
- **Cueva de la Canal (site 0101):** Entrance at base of woodland scar just north of SET Colectora site; 300m long cave with active water flow; roof may approach very close to surface near proposed north slope. See map B.

Hydrological sensitivity: Water infiltrating at the surface does not necessarily sink directly downward. The dip, joints, and faults in Cretaceous limestone and sandstone formations can direct water laterally before it enters cave passages. **All water entering the ground at Fuente Las Varas will eventually join the Four Valleys System and flow to Los Boyones public water supply.**

2.4 Cave Biota and Ecosystem

The Four Valleys System supports a subterranean ecosystem that has been incompletely studied:

Documented fauna:

- Rare endemic species including *Cantabroniscus*
- Bat colonies, e.g. in Torca la Decepción
- Cave-adapted aquatic invertebrates in underground streams

Ecosystem characteristics:

- Extremely stable environment (temperature ~10°C year-round)

- Total darkness except at entrances
- High humidity
- Oligotrophic (nutrient-poor) conditions
- **Extreme sensitivity to pollution** - cave ecosystems have no buffering capacity.

See Annex 2 for detailed information on *Cantabroniscus* and its conservation status.

2.5 Geological and Landscape Context

Geological setting:

- Cretaceous limestones and sandstones
- Intensive karstification with extensive dissolution features
- Surface features include dolines, dry valleys, and sinkholes (though currently none documented at immediate site)
- Subsurface features include caves, shafts, underground rivers

Landscape designation: The Matienzo depression is a **nationally recognized Lugar de Interés Geológico** (LIG código 59001) described as:

Proyecto Geoparque Valles de Cantabria: The area is included in the proposed Valles de Cantabria Geopark, recognizing its exceptional geological and geomorphological values. "El Valle de Matienzo, amplio poljé de gran interés geomorfológico, constituye una singularidad paisajística muy notable por el contraste que presentan las desnudas vertientes calizas que lo circundan y su fondo de valle salpicado de prados y aldeas. Se trata de un poljé sobre calizas aptienses con un aparato kárstico muy desarrollado (simas, torcas, cuevas y ríos subterráneos)."

The BESS/SET development sits on the **northern rim** of this nationally recognized landscape.

See Map A1 showing the Four Valleys System in relation to the BESS/SET site; **map A2** showing the underground hydrology and **Map B** showing detail of cave passage directly underlying the development and Cueva de la Canal.

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3. CRITICAL OMISSIONS IN ENVIRONMENTAL DOCUMENTATION

3.1 Complete Absence of Four Valleys System

Finding: The Four Valleys karst system is **entirely absent** from all environmental documentation.

Documents reviewed:

1. ALM-14-2022_Proyecto_**BESS-48.3.1**.pdf (376 pages)
2. ALM-14-2022_Proyecto_**Infra_Evac-45.5.3**.pdf (537 pages)
3. Environmental Impact Statement (from BOC NÚM. 109/2025, 9 June 2025. 7.2. MEDIO AMBIENTE Y ENERGÍA (**PDF BOC-2025-4890**), 20 pages)

Specific failures:

Document IOES.5320001.00-BESS_1-DOC-005-A-Pliego de condiciones_R0A.docx, (part of **BESS-48.3.1**) Section 10 (CONDITIONS FOR ENVIRONMENTAL PROTECTION) states:

"All necessary preventive measures will be taken to respect the surrounding environment (flora, fauna, water, soil, air quality, etc.)."

Comment: The phrase "etc." cannot substitute for explicit recognition of a 79.5km cave system. There is **no mention** of:

- Underground karst rivers
- Cave passages
- Subsurface drainage networks
- Cave ecosystem
- Underground water routes to public supply

In PDF BOC-2025-4890, page 10: The hydrogeology section describes:

"The body of water that may be affected by the execution of the project corresponds to the Aguanaz river... "

Comment: This is **factually incorrect**. The Fuente las Varas site does not drain to Fuente Aguanaz. It drains through the Four Valleys System to Los Boyones.

3.2 Failure of Consultation Process

Confederación Hidrográfica del Cantábrico (CHC) response (PDF BOC-2025-4890, page 4):

" The Cantabrian Hydrographic Confederation informs that, upon reviewing the submitted documentation, it does not deduce that there will be any variations in the effects and impacts on the waters due to the execution of the project, therefore it does not make any observations

on the file, provided that the proposed preventive and corrective measures and the environmental monitoring plan are applied."

Critical analysis: The CHC likely has no knowledge of the **extensive network of underground streams** behind the public water source at Los Boyones. The CHC's response appears to be based solely on surface hydrology shown in submitted documents, which **omits the entire subsurface system**.

Consequence: A major environmental receptor (79.5km) underground river system feeding public water supply) was never assessed because it was never mentioned in the documentation submitted for consultation.

Dirección General de Montes y Biodiversidad response (PDF BOC-2025-4890, page 4): Reports no protected habitats affected. **However:** No assessment was requested regarding subterranean habitats or cave fauna because these were not mentioned in the submitted documents.

Standard of consultation: The principle of consultation is undermined when the documentation presented to consultees **omits critical environmental features**. Consultees can only comment on what they are presented with.

3.3 Legal Implications

Law 21/2013 de Evaluación Ambiental requires:

- Identification of all environmental factors that may be affected (Article 35.1.b)
- Assessment of effects on biodiversity (Article 35.1.c)
- Assessment of effects on water resources (Article 35.1.c)

Finding: The omission of the Four Valleys System means the EsIA fails to comply with basic legal requirements. An environmental factor of major significance - a 79.5km cave system carrying water to public supply - was neither identified nor assessed.

European Water Framework Directive (2000/60/EC): Requires protection of all water bodies, including groundwater. The underground rivers of the Four Valleys System are water bodies under this definition.

Spanish Water Law (Texto Refundido de la Ley de Aguas, RDL 1/2001): Protects all waters of the public hydraulic domain, including groundwater and underground watercourses.

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4. HYDROLOGICAL MISREPRESENTATION

4.1 Incorrect Catchment Identification

BOC 109/2025, 7.2. MEDIO AMBIENTE Y ENERGÍA, page 10 states:

" The water body that may be affected by the execution of the project corresponds to the Aguanaz River."

This is factually incorrect.

Correct hydrology:

- Water at Fuente Las Varas infiltrates through karst system
- Flows underground through Four Valleys System passages
- **Resurges at Los Boyones** (site 0117), Secadura, Voto municipality. (Shown as "ETAP Alto de la Cruz" on Google Maps)
- This resurgence is a public water supply.

Water tracing evidence:

- Dye tracing from Cueva de Carcavuezo → Los Boyones (confirmed)
- Dye tracing from Cueva Hoyuca → Los Boyones (confirmed)

  See map 1B.

Fuente Aguanaz connection: Fuente Aguanaz (site 0713) is an entirely separate system. While there may be some broader catchment connections at depth, **the primary and direct drainage from Fuente Las Varas is to Los Boyones through the Four Valleys System, NOT to Aguanaz**.

Consequence of error:

- Wrong water body assessed for impacts
- Public water supply protection not considered
- Downstream users not identified
- Monitoring points incorrectly located

4.2 Inadequate Drainage Assessment

Critical requirement from PDF BOC-2025-4890, page 5:

" Definition of the drainage and wastewater disposal system; points and conditions for discharging runoff water, sanitary water, etc., both during construction and operation and cessation."

This deficiency was noted by the environmental authority but NOT adequately resolved.

Specific problems:

4.2.1 Construction Phase Drainage

Volume of earthworks: 43,305 m³

- Excavation: 9,305 m³
- Fill: 33,990 m³
- **Deficit requiring import:** 24,685 m³

Problems identified:

1. **Sediment load:** Extensive earthworks on sloping site will generate large volumes of sediment-laden runoff
2. **Wheel-washing water:** BOC condition mentions wheel-washing system, but:
    - No details of settling system capacity
    - No specification of how solids will be removed before discharge
    - Risk that "muddy water will drain into the cracks possibly blocking future drainage" (**PDF BOC-2025-4890,** page 15)
3. **Settlement ponds:** BOC Requirement 15, page 15 mandates:

    "ditches will be installed at the foot of all slopes of the fill, which will drain into one or more settling ponds"

    However:

    - No drawings show these ponds
    - No dimensions specified
    - No location indicated
    - No details of sediment removal frequency
    - No specification of discharge points

        Critical question: Where does water go after settling ponds?

4. **"Gravel beach":** ALM-14-2022_Proyecto_Infra.Evac-45.5.3.pdf page 69 which is Document 01, page 36 mentions:

    " The platform has been designed with the necessary drainage pipes to evacuate water in a reasonable time, ensuring that there is no accumulation of water in the installation and achieving the maximum possible diffusion of rainwater, being connected to the gravel beach installed outside for its disposal."

    Problems:

    - No drawing of this "gravel beach"
    - No dimensions provided
    - No location shown
    - No indication of how it connects to natural drainage

4.2.2 Operational Phase Drainage

Concreted area: 15,200 m²

Natural infiltration before development:

- Rainfall infiltrated gradually across entire area
- Entered limestone/sandstone through numerous small fissures
- Distributed load over wide area
- Natural filtration through soil and rock

After development:

- 15,200 m² generates concentrated runoff
- All water collected in drainage system
- Discharged at limited number of points

Critical documents:

Infra.Evac-45.5.3, Document 05, Plan 6 (PLANTA DRENAJES):

All collected rainwater drains to the N edge into one 'ARQUETA ENTRE CUNETAS (AC)

Problems:

- No outlet shown
- No indication of where water goes after leaving the drainage system
- **No specification of how water will be dispersed to mimic natural infiltration**

Requirement: Before platform construction, rainwater infiltrated naturally through cracks and fissures in the limestone/sandstone. **The aim of drainage off the concrete platform should be to mimic natural infiltration as much as possible**, dispersing water over a wide area rather than concentrating it at point sources.

Risk: Concentrated discharge at a few points could:

- Cause localized erosion
- Exceed local infiltration capacity, causing surface runoff where none existed before
- Change underground flow patterns
- Introduce contaminants at high concentrations

4.2.3 Water Quality Concerns

Contamination sources during construction:

- Diesel and lubricants from machinery
- Cement and concrete washout
- Hydraulic fluids
- Disturbed sediments
- Explosives residues (if used)

Contamination sources during operation:

- Transformer oils (56/70 MVA transformer contains significant oil volume)
- Battery electrolytes
- Coolant fluids
- Septic tank discharge
- Maintenance chemicals

PDF BOC-2025-4890 Requirements 11-18 (pages 15-16) address contamination:

"13. Precautions must be taken to avoid... direct or indirect discharge into the hydrographic network or soils of contaminating waste used in the work, especially oils and fuels."

"15. The discharge of untreated runoff water containing solids or other contaminating elements into the Public Hydraulic Domain is expressly prohibited."

Critical deficiency: These requirements refer to "public hydraulic domain" and "hydrographic network" but make **no specific mention of the karst groundwater system**. The underground rivers of the Four Valleys System ARE part of the public hydraulic domain but are not identified as such in any document.

Consequence: Without explicit recognition of the underground drainage, monitoring and protection measures may be inadequate or misdirected.

4.3 Absence of Karst-Specific Considerations

Karst systems are fundamentally different from surface water systems:

1. **Rapid transmission:** Water can travel kilometres underground in hours
2. **No filtration:** Direct conduit flow means no natural filtration through soil
3. **No dilution:** Underground streams have limited flow volume for dilution
4. **Limited access:** Difficult to monitor and impossible to remediate after contamination
5. **Ecological sensitivity:** Cave ecosystems have no resilience to pollution

Standard karst protection measures (absent from project documentation):

- Karst-specific pollution risk assessment
- Identification of sinking streams and infiltration points
- Monitoring of underground water quality at cave access points
- Contingency plans for pollution incidents
- Restricted use of certain chemicals
- Enhanced containment requirements

International standards: The project would benefit from applying standards such as:

- ISO 31000 (Risk Management) as applied to karst
- ASTM D5717 (Standard Guide for Design of Ground-Water Monitoring Systems in Karst Terrain)
- European Karst Aquifer Protection guidelines

Finding: None of these considerations appear in the environmental documentation because the karst system was never identified.

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5. THREATS TO UNDERGROUND KARST ECOSYSTEM

5.1 Cave Ecosystem Characteristics

Cave ecosystems are among the most fragile on Earth:

Characteristics:

- **Oligotrophic:** Extremely low nutrient input
- **Stable:** Temperature constant at ~10°C year-round
- **Dark:** No photosynthesis, all energy from external sources
- **Slow-growing populations:** Cave species have low reproductive rates
- **No resilience:** No ability to buffer or recover from pollution
- **Specialized fauna:** Species highly adapted, cannot survive elsewhere

Energy input pathways:

1. Infiltrating water carrying dissolved organic matter
2. Sediment from surface
3. Animal droppings (bats, occasional animals entering caves)
4. Tree roots penetrating from surface

Any change to these inputs can affect the entire ecosystem.

5.2 Rare and Endemic Species

5.2.1 Cantabroniscus

Conservation status: *Cantabroniscus* is a rare terrestrial isopod (woodlouse-like crustacean) apparently endemic to the Asón region of Cantabria. Its exact distribution is poorly known, but it is considered a species of conservation concern.

Characteristics:

- White/unpigmented (adapted to darkness)
- Small size (~5-8mm)
- Cave-obligate (cannot survive on surface)
- Slow-moving
- Long generation time

Threats:

- Habitat destruction
- Water pollution
- Chemical contamination
- Changes to microclimate
- Disturbance of cave environment

See Annex 2 for more information on *Cantabroniscus*.

5.2.2 Other Cave Fauna

Documented in Four Valleys System:

- Cave spiders (Meta menardi and others)
- Diptera (cave-adapted flies)
- Coleoptera (beetles)
- Collembola (springtails)
- Gastropods (snails/slugs)
- Amphipods and isopods in underground streams
- Bat sightings

Matienzo Karst Entomology Project: In 2018, a systematic study collected specimens from multiple caves in the system. Results are being analyzed but indicate a diverse cave invertebrate fauna.

5.3 Contamination Pathways

Potential contaminants from BESS/SET:

5.3.1 During Construction

- **Diesel fuel and oils:** From construction machinery
- **Hydraulic fluids:** From excavators and drilling equipment
- **Cement washout:** Highly alkaline, toxic to aquatic life
- **Concrete additives:** Various organic and inorganic compounds
- **Explosives residues:** If blasting is used (see Section 5.4)
- **Sediment load:** Suspended solids reducing water quality

5.3.2 During Operation

- **Transformer oils:** Mineral oils from 56/70 MVA transformer
    - Volume: Several thousand litres
    - Risk: Catastrophic if containment fails
- **Battery electrolytes:** Various chemistries depending on battery type
- **Coolant fluids:** From HVAC systems
- **Fire suppressants:** If fire suppression systems activated
- **SF6 gas:** From electrical equipment (extremely potent greenhouse gas)
- **Septic tank effluent:** Human waste from site facilities
- **Maintenance chemicals:** Cleaning agents, degreasers, etc.

5.3.3 Transmission Routes

1. **Direct infiltration:** Through limestone fissures
2. **Concentrated flow:** Via drainage system outlet points
3. **Sediment transport:** Attached to particles
4. **Solution:** Dissolved in water
5. **Vapor phase:** Some compounds volatile

Travel time from surface to cave passages: Hours to days, depending on rainfall intensity and infiltration pathways.

Once contamination enters the karst system:

- Detection is difficult
- Containment is impossible
- Remediation is impractical
- Effects are long-lasting
- Downstream receptors (Los Boyones public water supply) are at risk

5.4 Explosives Use and Cave Stability

Document IOES.5320001.00-BESS_1-DOC-005-A-Pliego de condiciones_R0A.docx (part of the **BESS-48.3.1**) **states:**

"In rocky terrain, in addition to the compressor hammer, the use of explosives may be necessary."

Critical concern:

Large cave chamber (*El Gordo*) discovered 2021:

- Location: Approximately 500m east of site
- Depth: ~250m below surface
- Approximate dimensions at the widest point: 100m × 165m × 50m high
- Floor: Large boulders from roof collapse
- **Roof: May be unstable**

Other chambers with boulder floors: Many sections of the Four Valleys System have floors composed of roof-collapse boulders, indicating:

- Roofs are subject to failure
- Large blocks can detach
- Vibration may trigger collapse

Assessment questions:

1. What quantity of explosive will be used per blast?
2. What peak particle velocity (PPV) will be generated at 200-300m depth?
3. Are there unstable features that could be triggered?
4. Has any assessment been done of vibration transmission through rock?

Standard blasting criteria for sensitive structures:

- Peak Particle Velocity (PPV) < 50 mm/s for residential structures
- PPV < 25 mm/s for sensitive structures
- PPV < 10 mm/s for highly sensitive operations

For unstable cave roofs: No established criteria exist, but conservatively should be < 10 mm/s.

Calculation needed:

- Vibration from blasting attenuates with distance: PPV = K × (W^0.5 / R)^β
- K and β are site-specific constants
- W = charge weight per delay
- R = distance

Without this assessment, blasting poses unknown risk to cave stability.

See Annex 3 for detailed explosives scenarios and vibration calculations.

5.5 Inadequacy of Generic Environmental Measures

PDF BOC-2025-4890, page 15, Requirement 19:

"Se delimitarán las zonas de desbroce y movimiento de maquinaria, acotándolas sobre el terreno..."

PDF BOC-2025-4890, page 15, Requirement 21:

"Se prohibirá a los contratistas realizar vertidos de todo tipo, arrojar o depositar basuras o restos de obra..."

These are generic good practice measures applicable to any construction site. They are NOT specific to karst protection.

What is missing:

- Karst-specific risk assessment
- Underground water monitoring plan
- Cave access restrictions during construction
- Protocols for pollution incidents
- Enhanced containment for all fluids
- Pre-construction survey of accessible caves
- Post-construction monitoring of cave ecosystem

Analogy: Saying "we will avoid spills" is not a karst protection plan, any more than saying "we will avoid fires" is a fire safety plan. Specific measures, equipment, training, and monitoring are required.

6. TECHNICAL ERRORS AND INADEQUACIES

6.1 Ground Temperature Error

Document: PDF BOC-2025-4890 / IOES.5320001.00-BESS_1-DOC-002-A-Calculos_R0.0.docx, Section 2.2.2

States:

"2.2.2 Ground Temperature. In the absence of data regarding the ground temperature, a conservative temperature has been assumed for calculation purposes for this site. Ground temperature: 30 °C."

This is factually incorrect.
Correct ground temperature: Approximately 10°C
Basis:
Cave temperature in Four Valleys System: Constant 10-11°C year-round

1. Rock temperature at 200-300m depth: ~10-12°C (below seasonal variation zone)
2. This is a limestone/sandstone karst region - standard thermal gradient does not apply in the same way as in solid bedrock due to air circulation through fissures

Implications of error:

Cable thermal calculations are based on ground thermal resistance:

- Limestone: ~2.0-2.5 K·m/W
- Sandstone: ~2.0-2.5 K·m/W
- At 30°C assumed ground temperature: Cable ampacity is reduced
- At 10°C actual ground temperature: Cable ampacity is higher

Consequence:

- Cables may be oversized (economic waste)
- OR calculations may be wrong in other ways that compensate
- Either way, the fundamental assumption is incorrect by 20°C

Document does state:

"NOTE: During the execution of the construction work, it must be verified that this assumption is realistic. If the values obtained in the field differ from those assumed here, the calculations presented in this project must be reviewed."

Comment: It is extraordinary that no attempt was made to determine actual ground temperature before assuming 30°C. A simple measurement in any nearby cave would have given accurate data. This error suggests a **lack of familiarity with the local environment and absence of site-specific investigation**.

6.2 Inadequate Alternatives Analysis

PDF BOC-2025-4890, page 9 states:

"The alternatives analysis included in the DA is not adequate. A multi-criteria analysis of the studied alternatives should be carried out, mainly from the point of view of environmental effects, studying, in addition, other alternatives in a wider spatial scope not linked to the SET 'Solórzano' of REE."

This deficiency was noted but the analysis remains inadequate.

Five alternatives were considered:

- Alternative 0: Do nothing
- Alternative 1: East of REE SET (selected)
- Alternative 2: South of REE SET
- Alternative 3: West of REE SET
- Alternative 4: North of REE SET

Problems with this analysis:

1. **All alternatives clustered around existing SET?:** No consideration given to entirely different locations?
2. **No karst assessment:** None of the alternatives assessed for karst impacts (because karst not recognized)
3. **No consideration of distributed storage:** No alternative considered of multiple smaller facilities in less sensitive locations
4. **Not enough information about the alternatives is given.** Where are they?

A proper alternatives analysis should have considered:

- Lower altitude sites (out of sight from valleys)
- Sites not over major karst system
- Sites not in recognized geological landscape
- Sites with existing industrial character
- Sites with better grid connection not requiring new SET

Conclusion: The alternatives analysis was a box-ticking exercise, not a genuine search for the most environmentally appropriate solution.

6.3 Errors in Documentation

6.3.1 Jurisdictional Errors

Infra.Evac-45.5.3, Document 01, Annex II, page 7:

"The SET COLECTORA SOLÓRZANO 220 kV substation is located in the municipality of Solórzano."

This is incorrect. A significant portion of the SET Colectora (~3,000 m² of a total ~13,000 m²) is located in **Ruesga municipality**, not Solórzano.

Consequence:

- Ruesga not properly consulted as affected municipality
- Ruesga not included in consultation responses table (BOC page 2)
- Municipal planning regulations for Ruesga not properly assessed
- Public participation rights of Ruesga residents potentially denied

6.3.2 Map Errors

BESS-48.3.1, Document 03 (maps):

- Parcel 1 shown as SET Collector land rather than BESS land
- "Solórzano" label placed in Ruesga territory

These errors suggest a lack of attention to detail and local knowledge.

6.3.3 Reference Errors

IOES.5320001.00-BESS_1-DOC-007-A-Estudio Residuos_R0A.docx, page 5 in BESS-48.3.1:

The Royal Decree 1619/2005 (tyre recycling) was repealed and replaced by Royal Decree 712/2025 on August 27, 2025

6.4 Incomplete Geotechnical Assessment

No mention of:

- Karst features (cave roofs, voids)
- Risk of ground collapse
- Irregular bedrock surface
- Potential for solution features

In karst terrain, standard geotechnical investigation is insufficient. Specialized karst geotechnical investigation is required:

- Ground penetrating radar (GPR) to detect voids
- Seismic reflection to map bedrock surface
- Borehole camera surveys
- Cavity detection methods

Risk: Foundation failure if cave void is present at shallow depth beneath major structures (transformer, buildings).

Cueva de la Canal (site 0101): Entrance at base of woodland just north of SET site. The cave is 300m long with active water flow. The roof altitude and its proximity to the surface near the proposed north slope **must be checked before heavy machinery is deployed**.

7. CUMULATIVE AND VISUAL IMPACTS

7.1 Progressive Industrialization

Existing development at Fuente Las Varas:

- REE Solórzano SET 220 kV: Concrete platform 23,600 m²
- Pylons and transmission lines converging from multiple directions

Approved in this Environmental Impact Report:

- BESS Solórzano: ~21,097 m²
- SET Colectora (portion for BESS): Additional infrastructure
- Acoustic barriers: 5m and 3.5m high
- Perimeter fencing

Total industrialized area: >38,800 m² of concrete platforms plus pylons and overhead lines

Future expansion explicitly planned:

- SET Colectora transformer increased from 50/55 MVA to 56/70 MVA specifically to accommodate BESS Cantabria 1 (12.38 MW)
- Large unused but concreted area on SET Colectora site for future expansion
- Multiple wind farms projected to connect to SET Colectora
- More transmission lines and pylons will be required

Reading PDF BOC-2025-4890, pages 5 and 6:

Apparently, this battery storage and SET Collector facility is expected to serve several wind farms and other BESS if approved. This is very likely to involve more pylons with associated ground disturbance and make Fuente las Varas and the surroundings even more of an industrial eyesore.

Municipality of Solórzano comment (PDF BOC-2025-4890, page 2) states:

"There exists a synergistic effect on the environment due to the convergence of various industrial energy initiatives in the Municipal Term of Solórzano; wind parks or energy storage installations, of which there is no information about the state of administrative processing."

Finding: This site is becoming a major electrical infrastructure hub without any comprehensive planning for the cumulative impact. Each project is assessed individually, but the **combined effect is to transform agricultural countryside into an industrial zone**.

7.2 Visual Impact

Site characteristics:

- Located at 440-450m altitude
- On prominent ridge
- Land drops away to north and south
- Visible from kilometres in all directions

Municipality of Solórzano comment (PDF BOC-2025-4890, page 2):

"The initiative is located in a singular place in the landscape as are geographically and historically the colladas or the ports. Especially unfortunate is the location of the preceding industrial installation (REE's substation), which breaks the visualization of the mountain pass and its perception, especially from (or towards) the north, towards Solórzano..."

Proposed mitigation (PDF BOC-2025-4890, Requirements 30-37):

- Vegetative screening around perimeter
- Native tree and shrub species
- Green/ochre colors for containers
- Stone masonry for buildings
- Clay tile roofing

Assessment: While these measures are positive, they cannot overcome the fundamental problem that this is a **large industrial complex on a skyline in agricultural countryside**. Even with vegetative screening:

- Structures will remain visible, especially in winter when deciduous trees are bare
- Vegetation takes years to mature
- Acoustic barriers (5m and 3.5m high) will be prominent
- Night-time lighting will be visible from great distances

7.3 Impact on Nationally Recognized Landscape

LIG 59001 - Valle de Matienzo: A nationally recognized Lugar de Interés Geológico (Place of Geological Interest). The development sits on the northern edge of this landscape.

Proyecto Geoparque Valles de Cantabria: Describes Valle de Matienzo as:

"...amplio poljé de gran interés geomorfológico, constituye una singularidad paisajística muy notable..."

Finding: The progressive industrialization of Fuente Las Varas is **incompatible** with the geological and landscape values that have led to national recognition and geopark nomination. The area is valued specifically for its natural landscape character, which is being degraded by each successive industrial development.

7.4 Inadequate Assessment of Synergistic Effects

PDF BOC-2025-4890, page 12 states:

- The surface of affected habitats is negligible with respect to other projects.
- The affection to connectivity both the individual analysis of the reference project and the synergies with other installations is considered NOT SIGNIFICANT.
-The landscape impact of the project will not be elevated, and it will integrate perfectly with other industrial installations in the zone, such as REE's Substation."

Critical analysis of this conclusion:

"Integrate perfectly with other industrial installations": This is perverse logic. The fact that one industrial installation already exists does not mean another one "integrates perfectly." Rather, each successive installation **degrades the landscape further**. The cumulative effect is multiplicative, not additive.

Connectivity: Assessment focused only on terrestrial habitat connectivity. **No assessment of underground connectivity** (because subsurface ecosystem not recognized).

Noise impacts: PDF BOC-2025-4890 notes:

"Respecting noise, the synergistic effect with the other storage installation projected (BESS Cantabria 1) has not been valued, such synergistic effects should be valued when the noise data of this second installation are known."

Comment: This is backward. Synergistic effects should be assessed **before** approving either project, not afterwards. Cumulative noise from BESS Solórzano + BESS Cantabria 1 + SET Colectora + any future wind farm transformers could exceed acceptable limits even if each individually complies.

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8. SPECIFIC DOCUMENT ERRORS AND CONTRADICTIONS

8.1 Drainage System Contradictions

Multiple documents refer to drainage but with incomplete or contradictory information:

Document BESS-48.3.1 / IOES.5320001.00-BESS_1-DOC-001-A-Memoria descriptiva_R2A.docx: Section 3.11.5.3 states:

"Discharge channels will be placed at the outlets of the drainage works to evacuate water outside the project site. The discharge channels will be made of riprap and their purpose will be to reduce the speed of the water to prevent erosion at the outlet of the drainage works, as well as to facilitate the infiltration of the flows into the natural ground."

Infra.Evac-45.5.3, Document 01, page 36:

"Throughout the entire substation, a rainwater drainage system has been installed to collect water through drains or via DREN pipes... connected to the gravel beach installed outside for its disposal."

ALM-14-2022_Proyecto_Infra.Evac-45.5.3.pdf, Document 05, Plan 6: Shows all collected rainwater draining to north edge into "ARQUETA ENTRE CUNETAS (AC)" - but no drawing of this structure or its outlet.

Contradictions:

- Are discharge channels riprap-lined?
- Or is there a "gravel beach"?
- Where do these systems discharge?
- How is infiltration "facilitated" after concentration of flow?

The documents do not present a coherent description of the drainage system.

8.2 Promoter Identity Confusion

Municipality of Solórzano comment (PDF BOC-2025-4890, page 3):

"An incongruence is noted between the DA and the preliminary project of the SET regarding the promoter; in the DA, which contemplates the BESS and the SET, BESS DEVELOPMENT 6, S.L appears as promoter, however, in the SET project, in addition to the previous company, ARENA GREEN POWER, S.L.U. appears, the latter being the promoter of the wind farm 'Las Américas 14', linked to the SET colectora Solórzano."

Significance:

- Multiple promoters suggest shared facility

- "Las Américas 14" wind farm connection suggests BESS may become hybridized rather than stand-alone
- If combined BESS + wind farm > 50 MW, jurisdiction transfers to national government
- Possible attempt to fragment project to avoid higher level of scrutiny

PDF BOC-2025-4890 conclusion: The document states BESS is "stand-alone" but the single-circuit connection means when wind farms are generating, BESS cannot draw from grid - only from wind farms. Legal note provided (Annex 8 of DA) but question remains whether this is truly "stand-alone" operation.

8.3 Access and Connection Permits

Municipality of Solórzano comment (PDF BOC-2025-4890, page 3):

"The access and connection permits to the Grid are not provided."

Red Eléctrica de España comment (PDF BOC-2025-4890, page 3):

"The corresponding access and connection permits [are] an essential prior condition for granting the administrative authorization of generation installations, according to Law 24/2013 of the Electricity Sector (Article 53)."

Status unclear: Have these permits been obtained? The EsIA approval should not proceed without confirmed grid connection permits.

8.4 Archaeology Requirements

PDF BOC-2025-4890, page 19 Requirement 42:

"An archaeological control of all earth movements during project execution must be carried out, especially of roads and installations..."

Concern: Archaeological monitoring will add time and cost. More importantly, **if significant archaeology is found, work will stop**. Has any preliminary archaeological assessment been done? The area has Bronze Age and earlier human presence. Discovery of significant remains during construction could cause major delays and redesign.

8.5 Public Interest Declaration

PDF BOC-2025-4890 page 3, CROTU decision:

"The intended installation has a place in article 49.2.d) of Law 5/2022, of July 15, provided that they are declared of public or social interest by the corresponding Sectoral Administration, in this case, the Dirección General de Industria, Energía y Minas..."

Status: Has this declaration been made? The environmental approval is conditional on this declaration. The urban planning compatibility depends on it.

Question: What criteria will be used to determine "public or social interest"? Will local opposition be considered? Will impacts on nationally recognized landscape be weighed against claimed benefits?

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9. LEGAL AND PROCEDURAL DEFICIENCIES

9.1 Failure to Identify and Assess Major Environmental Receptor

Law 21/2013 de Evaluación Ambiental, Article 35.1: Environmental Impact Studies must include:

"b) An exposition of the main alternatives studied, including the proposed solution, and a justification of the main reasons for the choice made, taking into account the environmental effects."

"c) Evaluation and quantification of the effects that the project may have on all factors: population, human health, flora, fauna, biodiversity, land, water, air, climatic factors, material goods, cultural heritage, landscape, and the interrelation between these factors."

Finding: The Four Valleys System affects multiple factors:

- **Water:** 78.7km underground river system
- **Biodiversity:** Cave fauna including rare species
- **Land:** Subsurface geology and karst features
- **Cultural heritage:** Caves with archaeological remains
- **Population/human health:** Public water supply at Los Boyones

None of these were identified or assessed. This is a fundamental failure of the Environmental Impact Report.

9.2 Inadequate Public Participation

Aarhus Convention (1998): Requires effective public participation in environmental decision-making. Spain is a signatory.

Key principles:

- Access to information
- Opportunity to comment
- Consideration of public input
- Access to justice

Failures in this case:

1. **Information access:** The most critical environmental feature (Four Valleys System) was not disclosed in any public documents
2. **Consultation with affected municipalities:**

    - Ruesga not properly included despite significant area being in Ruesga
    - Municipality of Solórzano raised multiple concerns (PDF BOC-2025-4890, pages 2-3) but most were dismissed or inadequately addressed
3. **Affected population:** Residents using Los Boyones water supply are downstream receptors but were not identified or consulted
4. **Access to justice:** This objection is being filed to exercise that right, but the procedural deficiencies make it harder to challenge approval

9.3 Conflict with Water Protection Legislation

Water Framework Directive 2000/60/EC: Requires:

- Protection of all water bodies (including groundwater)
- Prevention of deterioration
- Achievement of good status

Spanish Water Law (Texto Refundido de la Ley de Aguas, RDL 1/2001):

- Protects all waters of public hydraulic domain
- Includes groundwater and underground watercourses
- Prohibits activities that may contaminate

Conflict: The Four Valleys underground river system is part of the public hydraulic domain. Approval of development directly overhead without assessment of impacts **conflicts with water protection duties**.

9.4 Conflict with Nature Conservation Legislation

Law 42/2007 del Patrimonio Natural y de la Biodiversidad: Requires protection of:

- Natural habitats
- Wild species
- Geological heritage
- Ecosystem services

Regional legislation (Ley de Cantabria 4/2006): Establishes Red de Espacios Naturales Protegidos de Cantabria

Conflict: While Four Valleys System is not within designated protected area, it contains:

- Biologically important caves
- Archaeological caves
- Nationally recognized geological features (LIG 59001 adjacent)
- Rare and potentially endemic species

Absence of these factors from the EsIA means legal duties under nature conservation legislation were not fulfilled.

9.5 European Environmental Liability Directive

Directive 2004/35/EC: Establishes framework for environmental liability for:

- Water damage
- Land contamination
- Damage to protected species and habitats

Preventive action: Operators must take preventive action when there is imminent threat of environmental damage.

Relevance: Once development is built, any contamination incident affecting the Four Valleys System and Los Boyones water supply will trigger liability. **However, the system was not identified in the Environmental Impact Report, so liability considerations were not properly evaluated.**

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10. CONCLUSIONS AND RECOMMENDATIONS

10.1 Summary of Critical Failures

This objection has identified systematic and fundamental failures in the Environmental Impact Report for BESS Solórzano and SET Colectora:

1. **Complete omission of 78.7km Four Valleys karst system** lying beneath the development
2. **Hydrological misrepresentation** - wrong catchment identified, Los Boyones public water supply not recognized as receptor.
3. **Failure to assess subsurface ecosystem** including rare cave fauna
4. **Technical errors** (ground temperature, jurisdiction, mapping)
5. **Inadequate drainage planning** with no coherent description of how concentrated runoff from 15,200m² of concrete will be managed
6. **Insufficient cumulative impact assessment** as site becomes major electrical infrastructure hub
7. **Legal and procedural deficiencies** violating requirements of Law 21/2013 and related legislation

These are not minor oversights. They represent fundamental failures that render the Environmental Impact Report inadequate to protect the environment.

10.2 Implications of Failures

If development proceeds as approved:

Environmental risks:

- Contamination of 78.7km cave system from construction or operational incidents
- Sediment clogging of underground drainage routes
- Changes to underground water flow patterns
- Harm to rare cave fauna including *Cantabroniscus*

- Potential contamination of Los Boyones public water supply
- Possible roof collapse in unstable chambers if blasting is used
- Long-term degradation of nationally recognized geological landscape

Legal risks:

- Violation of Water Framework Directive
- Violation of Spanish water protection laws
- Violation of nature conservation legislation
- Potential liability under Environmental Liability Directive
- Non-compliance with Aarhus Convention (public participation)
- Vulnerability to legal challenge

Practical risks:

- Discovery of karst features during construction causing delays and redesign
- Archaeological discoveries stopping work
- Pollution incidents with no remediation possible
- Failure of foundations if cave voids present
- Public outcry if water supply contaminated

10.3 Why the Approval Should Be Withdrawn

Legal grounds:

1. **Failure to identify major environmental receptor** (Four Valleys System) violates Law 21/2013 Article 35.1
2. **Incorrect hydrological assessment** means wrong water body evaluated
3. **Inadequate alternatives analysis** acknowledged by environmental authority but not corrected
4. **Procedural failures** including jurisdictional errors (Ruesga) and inadequate public participation

Environmental grounds:

1. **Unassessed risks to public water supply** at Los Boyones
2. **Unassessed risks to rare and endemic cave fauna**
3. **Unassessed risks to 78.7km cave system** of national importance
4. **Cumulative impacts** not properly evaluated

Technical grounds:

1. **Fundamental errors** in documents (ground temperature, hydrological catchment)
2. **Incomplete engineering information** (drainage system incoherent)
3. **Lack of karst-specific geotechnical investigation**

Ethical grounds:

1. Development proceeding on basis of **inadequate information** is inconsistent with precautionary principle

2. **Failure to consider primary environmental receptors** (underground ecosystem, public water supply) is contrary to principles of environmental stewardship
3. **Progressive industrialization** of recognized landscape without strategic planning

10.4 Recommendations

10.4.1 Immediate Actions Required

1. Withdrawal of Environmental Impact Report approval The current approval (BOC 109/2025) should be withdrawn as inadequate.

2. Comprehensive karst assessment A completely new environmental assessment must be conducted that:

- Maps the Four Valleys System in relation to the development site
- Assesses all underground water routes
- Evaluates karst-specific risks (contamination pathways, ground stability, ecosystem impacts)
- Identifies monitoring points in accessible caves
- Develops karst-specific protection measures

3. Correct hydrological assessment

- Recognize Los Boyones as the resurgence (not Aguanaz)
- Identify public water supply as receptor
- Consult with Los Boyones water supply authority (Voto municipality)
- Assess risks to public water supply
- Develop water supply protection measures

4. Cave ecosystem survey

- Access all reachable cave passages in Four Valleys System within potential impact zone
- Document baseline conditions (water quality, sediment load, biology)
- Identify sensitive locations
- Establish monitoring regime

5. Comprehensive geotechnical investigation

- Use karst-specific investigation methods (GPR, seismic, etc.)
- Map shallow cave features (especially near Cueva de la Canal)
- Assess foundation design for karst terrain
- Evaluate blasting impacts if explosives required

6. Strategic cumulative assessment

- Consider all planned developments at Fuente Las Varas as a whole
- Assess whether this location is appropriate for major electrical infrastructure hub
- Consider alternative strategies (distributed storage, different locations)

10.4.2 If Project is to Proceed (Not Recommended)

If, despite the inadequacies identified, authorities decide to permit the project to proceed, the following **absolute minimum requirements** must be implemented:

Pre-construction:

1. **Underground baseline survey:**
    - Access all caves in Four Valleys System within 2km radius
    - Photograph and document current conditions
    - Sample water quality in underground streams (full suite: pH, conductivity, turbidity, major ions, trace metals, hydrocarbons)
    - Survey cave biology (bat colonies, invertebrates)
    - Establish permanent photo-monitoring points
2. **Surface investigation:**
    - Detailed survey of Cueva de la Canal and proximity to north slope
    - GPR survey of entire construction area
    - Borehole investigation with camera surveys
    - Test blasting with seismic monitoring if explosives to be used
3. **Enhanced design requirements:**
    - Drainage system completely redesigned to disperse flow over wide area mimicking natural infiltration
    - All fluid storage in double-containment systems
    - Transformer bund sized for 110% of oil volume plus firewater
    - All concrete work: washwater collection and off-site disposal (no discharge to ground)
    - Explosives prohibited or restricted to < [X] kg per delay (to be determined from vibration study)

During construction:

1. **Continuous monitoring:**
    - Water quality monitoring in accessible caves (weekly samples)
    - Turbidity monitoring in underground streams (continuous probes where accessible)
    - Settlement ponds: silt removal daily or more frequently
    - All discharge water: monitored for pH, turbidity, hydrocarbons
    - Seismic monitoring if blasting used
2. **Enhanced controls:**
    - All machinery: drip trays, daily checks
    - All fueling: over impermeable surface with containment
    - Wheel wash: full settlement system with silt removal before discharge
    - No concrete washout on site (trucked to off-site facility)
    - Sediment barriers inspected and maintained daily
    - Immediate response protocol for any spill
3. **Stop-work triggers:**
    - Turbidity in cave streams exceeds baseline by >10 NTU: stop all earthworks
    - Any oil sheen observed in cave streams: stop all work
    - pH outside range 6.5-8.5 in cave streams: stop all work
    - Discovery of any cave feature: stop work in that area

- Seismic monitoring exceeds threshold: stop blasting
- Any sign of ground instability: stop work

During operation:

1. **Long-term monitoring:**
   - Water quality in accessible caves: monthly for first 2 years, then quarterly
   - Cave biology surveys: annually
   - Visual inspections of cave passages: annually
   - Transformer oil level: weekly checks
   - All fluid storage: weekly inspections
2. **Restricted operations:**
   - No transformers may be filled/drained without secondary containment in place
   - Oil changes: pumped directly to tanker, no intermediate storage
   - Battery replacement: damaged units removed intact, no draining on site
   - All maintenance activities: drip trays and absorbent materials required
3. **Emergency response:**
   - On-site spill kits pre-positioned
   - Staff trained in spill response
   - Cave access personnel on call for emergency monitoring
   - Direct line to Los Boyones water authority for immediate warning
4. **Reporting:**
   - Annual environmental report to authorities and public
   - All monitoring data publicly available
   - Any spills reported within 24 hours to authorities and Los Boyones water authority

These measures, while costly and onerous, are the MINIMUM necessary to operate an industrial facility above a major karst system carrying public water supply.

However: Even with all these measures, **significant risk remains**. The precautionary principle suggests this location is inappropriate for this development.

10.4.3 Alternative Approaches

1. Alternative locations:

- Lower altitude sites (less visible)
- Sites not overlying major karst systems
- Sites with better existing grid connection
- Sites with existing industrial character

2. Distributed storage:

- Multiple smaller BESS facilities
- Co-located with solar/wind farms
- Reduced transmission infrastructure required
- Lower individual site impacts

3. Redesign of SET network:

- Strategic planning for Cantabria's electrical infrastructure
- Avoid concentration in single location
- Consider underground cables for transmission (expensive but eliminates visual impact of pylons)

10.5 Final Statement

The Environmental Impact Report approval of BESS Solórzano and SET Colectora, as documented in PDF BOC-2025-4890, is fundamentally flawed. The complete omission of the Four Valleys karst system - 79.5 km of caves carrying public water supply - is not a minor oversight but a failure so basic that it invalidates the entire assessment.

An Environmental Impact Report that fails to identify and assess the primary environmental receptor (underground karst system with public water supply) cannot be considered adequate under any reasonable interpretation of environmental law.

The Matienzo Caves Project respectfully but urgently requests that the authorities:

1. **Withdraw the current Environmental Impact Report approval** as inadequate
2. **Require a comprehensive new assessment** that properly evaluates the Four Valleys System
3. **Consider whether this location is appropriate** for major industrial development
4. **Protect the underground ecosystem** and public water supply that depend on this karst system
5. **Honor Spain's commitment** to environmental protection, water quality, biodiversity conservation, and geological heritage preservation

The Four Valleys System ecosystem is irreplaceable. Los Boyones (E.T.A.P. Alto de la Cruz) provides drinking water to nearby populations. The nationally recognized geological landscape is part of Cantabria's natural heritage.

These values must not be sacrificed for inadequately assessed industrial development.

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11. ANNEXES and Maps

Annex 1: The Matienzo Caves Project
Annex 2: *Cantabroniscus* - Species Information
Annex 3: Explosives Impact Assessment

Map A1: Four Valleys System
Map A2: Four Valleys System underground water flow
Map B: Close up of BESS / SET with areas of concern

Annex 1

El Proyecto de Cuevas de Matienzo

El Proyecto de Cuevas de Matienzo es una iniciativa de larga trayectoria dedicada a explorar, documentar y preservar los extensos sistemas de cuevas en y alrededor de la depresión de Matienzo en el norte de España desde la década de 1960. Operando con permisos oficiales del Gobierno de Cantabria, el proyecto realiza expediciones sistemáticas que han documentado miles de cuevas, creando un archivo digital y físico integral de topografías, fotografías, descripciones de cuevas y datos geológicos.

El proyecto sirve como un centro de colaboración internacional donde espeleólogos experimentados y novatos trabajan juntos para ampliar el conocimiento de estas formaciones kársticas únicas, promoviendo la conservación de cuevas y apoyando la investigación científica en campos como la arqueología, hidrología, biología y cambio climático.

A través de su sitio web interactivo, el Proyecto de Cuevas de Matienzo hace sus hallazgos accesibles al público, permitiendo a investigadores y entusiastas de todo el mundo beneficiarse de sus sesenta y cinco años de exploración espeleológica, mientras crea conciencia sobre la importancia de proteger estos frágiles ecosistemas subterráneos.

The Matienzo Caves Project

The Matienzo Caves Project is a long-standing initiative dedicated to exploring, documenting, and preserving the extensive cave systems in and around the Matienzo depression of northern Spain since the 1960s. Operating with official permits from the Cantabrian Government, the project conducts systematic expeditions that have documented thousands of caves, creating a comprehensive digital and physical archive of surveys, photographs, cave descriptions and geological data.

The project serves as an international collaborative hub where experienced and novice cavers work together to expand knowledge of these unique karst formations while promoting cave conservation and supporting scientific research in fields such as archaeology, hydrology, biology and climate change.

Through its interactive website, the Matienzo Caves Project makes its findings publicly accessible, allowing researchers and enthusiasts worldwide to benefit from its sixty-five years of speleological exploration while raising awareness about the importance of protecting these fragile underground ecosystems.

Annex 2: *Cantabroniscus* - Species Information

A request for information to Claude AI about this crustacean came back with the information below

Cantabroniscus primitivus is a fascinating cave-dwelling isopod crustacean endemic to the Cantabrian Mountains in northern Spain.

Biology and Classification

- It belongs to the family Trichoniscidae within the suborder Oniscidea (terrestrial isopods or woodlice)
- It's considered a relict species with primitive characteristics, reflected in its species name "primitivus"
- It's the only species in its genus (Cantabroniscus)

Habitat and Distribution

- Found exclusively in limestone caves of the Cantabrian Mountains in northern Spain
- Inhabits subterranean aquatic environments, particularly in karst systems
- Restricted to a very limited geographical range, making it extremely endemic

Adaptations

Like many cave organisms, it displays troglomorphic adaptations including:

- Lack of pigmentation (typically appearing whitish or translucent)
- Reduced or absent eyes
- Elongated appendages for sensing its environment
- Slow metabolism adapted to the resource-limited cave environment

Conservation Status

- Due to its extremely limited range and specialized habitat requirements, it's considered vulnerable to environmental changes
- Threats include groundwater pollution, disturbance of cave systems, and climate change impacts on the karst hydrology

This species represents an important example of specialized evolution in subterranean environments and is of significant interest to biospeleologists.

Cantabroniscus has been photographed at least 6 times in different caves in and around Matienzo.



Above: Cantabroniscus in Orillonzuco (#1162)
Photo: Juan Corrin



Above: Cantabroniscus in Cueva de Fresnedo 2 (#0841)
Photo: Simon Cornhill

Annex 3: Explosives Impact Assessment

1. Explosives and Techniques for Surface Leveling

For creating a level platform in karst terrain to 2m depth, appropriate methods would include:

Controlled Blasting Techniques:

- **ANFO (Ammonium Nitrate/Fuel Oil)** or **emulsion explosives** - standard for rock excavation
- **Precision drilling and small charges** - holes typically 50-75mm diameter, 1.5-2m deep
- **Line drilling** on the perimeter to create a pre-split that limits vibration propagation
- **Delay detonators** (millisecond delays between holes) to reduce peak vibration levels
- **Decking** (smaller charges spread vertically in boreholes) rather than single large charges

Key Parametres:

- Maximum charge per delay: 5-15 kg (much smaller than typical quarry blasts)
- Burden and spacing: 1-1.5m between holes
- Stemming: careful backfill of holes to direct energy downward, not outward

2. Risk Assessment for *El Gordo* Chamber

Critical factors to consider:

Distance Analysis:

- Horizontal distance: 500m
- Vertical distance: 250m below
- **Straight-line distance: ~559m** ($\sqrt{[500^2 + 250^2]}$)

Vibration Attenuation: Ground vibration follows the relationship: PPV = K × (D/√W)^-b

Where:

- PPV = Peak Particle Velocity
- D = distance (559m)
- W = maximum charge weight per delay (kg)
- K and b are site-specific constants

Realistic Scenario Analysis:

✓ POSITIVE FACTORS (low risk):

- Distance of 559m is substantial

- Using controlled blasting with small charges per delay (5-15kg) rather than mass blasting
- 250m of rock overburden provides excellent dampening
- Controlled techniques can keep PPV at chamber < 10-25 mm/s

✗ **CONCERNING FACTORS:**

- **Karst geology is inherently unpredictable** - fractures, solution channels, and bedding planes can create preferential vibration pathways
- Chamber size (100m × 165m) indicates a **major void** - the roof span is very large
- The roof is described "could be unstable" - this is the critical concern
- In Matienzo karst, caves often have **breakdown zones** and **weathered roof sections**
- Any existing cracks or loose blocks could be destabilized by repeated vibration

Verdict: With **proper controlled blasting**, the chamber is **unlikely to experience catastrophic collapse** from vibration alone at this distance. HOWEVER, if the roof is already unstable (loose blocks, wide fractures, previous rockfall), even low vibrations could trigger local failures.

3. Should Explosives Be Used? Alternative Methods

Recommendation: Proceed with extreme caution or avoid explosives

Given the chamber's size and described instability, I would **strongly recommend alternatives** or **extensive pre-blast investigation**.

Alternative Methods:

1. **Hydraulic Rock Breakers (Excavator-mounted)**
    - Zero vibration to distant chambers
    - Slower but completely controllable
    - Ideal for 2m depth work
    - Cost: Higher labor, but eliminates risk
2. **Expansive Grout/Chemical Rock Breaking**
    - Non-explosive demolition agents (calcium oxide-based)
    - Drill holes, insert grout, wait 24-48 hours for expansion
    - Zero vibration, very slow crack propagation
    - Silent and vibration-free
3. **Ripping with Heavy Machinery**
    - For weathered or fractured limestone
    - Bulldozer-mounted rippers
    - Depends on rock quality
4. **Hybrid Approach**
    - Hydraulic breakers for bulk work
    - Very light, highly controlled blasting only where necessary
    - Pre-split around perimeter only

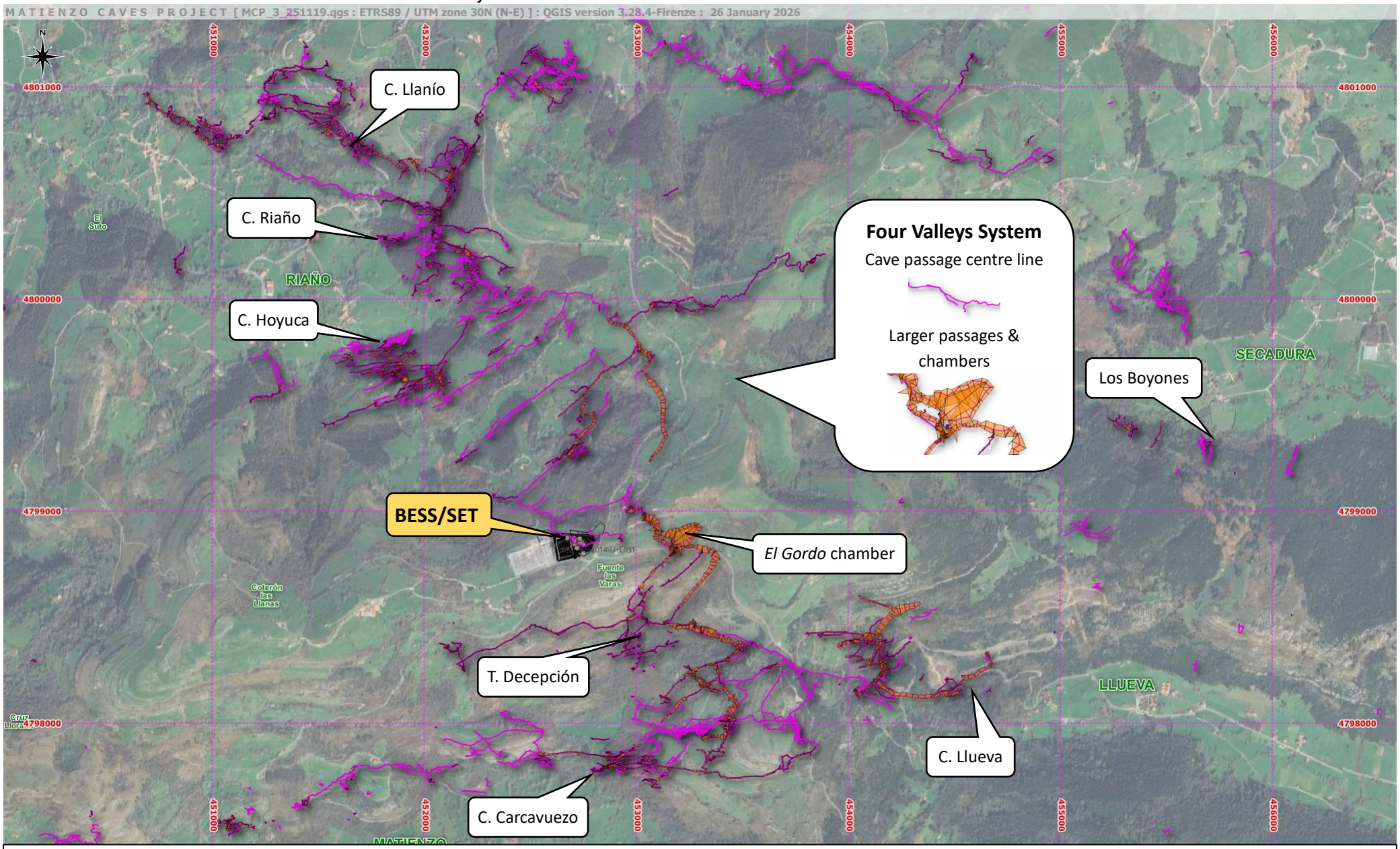
If Explosives MUST Be Used:

Essential precautions:

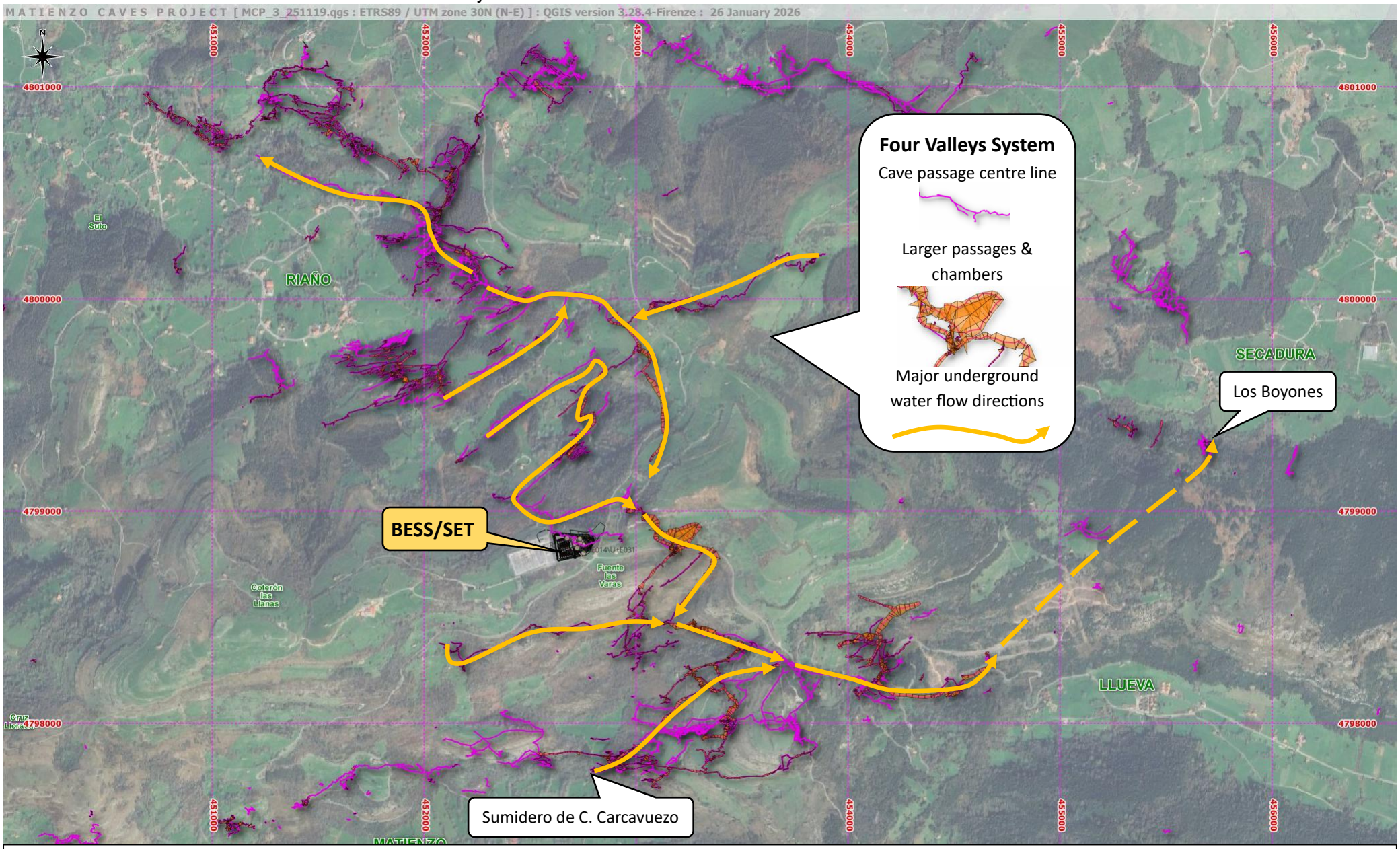
1. **Conduct pre-blast cave survey** - document existing roof condition, identify loose blocks
2. **Trial blasts** - start with single holes, 1-2kg charges, monitor chamber
3. **Install seismographs** - at surface above chamber and ideally inside if accessible
4. **Set strict vibration limits** - PPV < 10-15 mm/s at chamber location
5. **Progressive approach** - blast small sections, inspect chamber, continue only if safe
6. **Consult with the Matienzo Caves Project -** They have the most comprehensive knowledge of the area's cave systems and can advise on the specific chamber location, known instabilities, and historical collapse events in the area.

Bottom line: For a potentially unstable chamber of this size, the safest approach is mechanical breaking methods. The modest savings from blasting aren't worth the risk of losing a significant cave chamber.

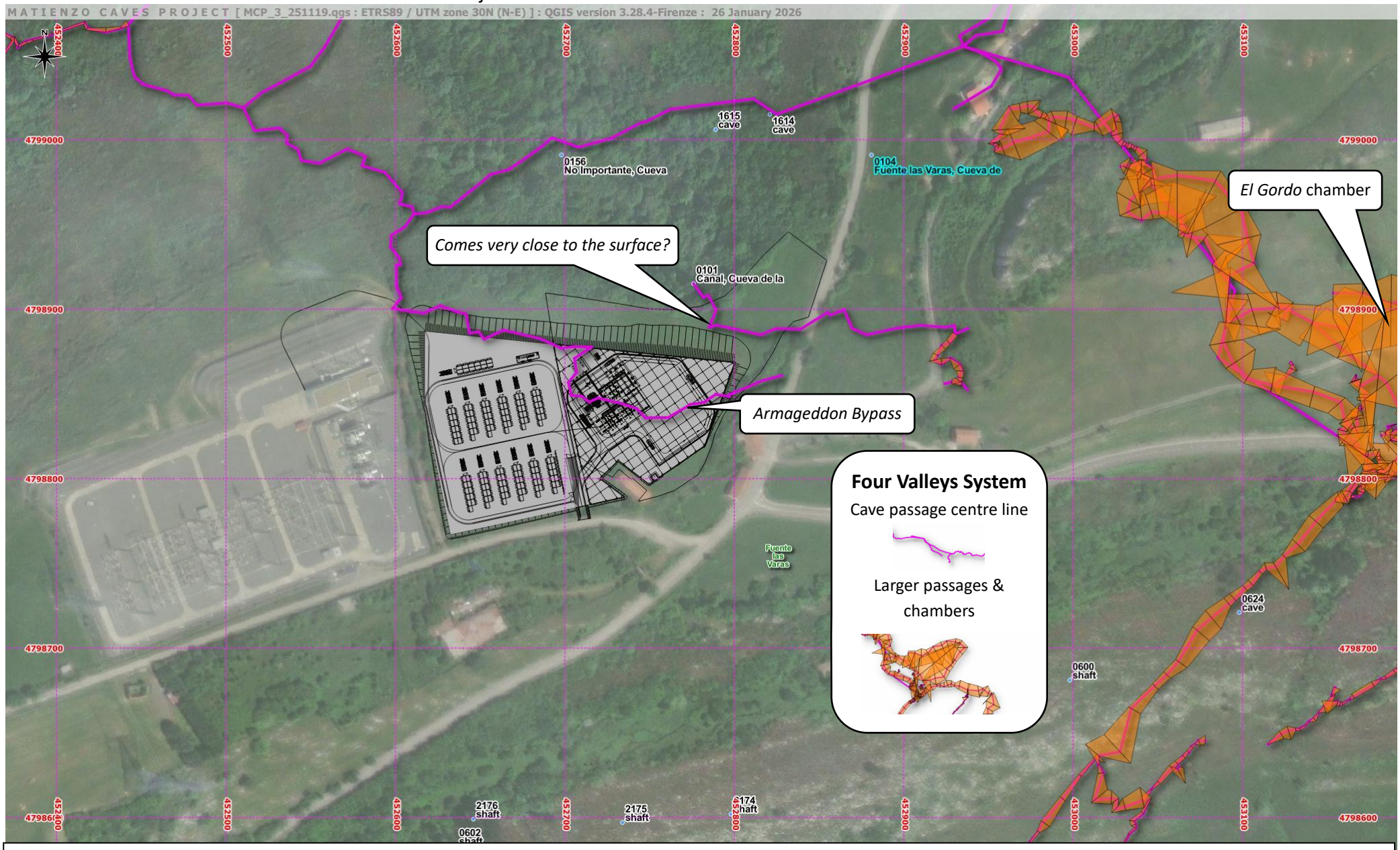
Maps follow ...



Map A1 with 60% opacity background showing the **BESS / SET** proposal over the **Four Valleys System** with **selected entrances**. 1km grid.



Map A2 with 60% opacity background showing the **BESS / SET** proposal over the **Four Valleys System** with **underground water flow**. 1km grid.



Map B with 60% opacity background showing the **BESS / SET** proposal over the **Four Valleys System** with **points of concern**. 100m grid.

END OF OBJECTION DOCUMENT

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On behalf of Matienzo Caves Project

Signature

10th February 2026
