

An aerial photograph of a mountainous region with green valleys and brown peaks. A large red outline is drawn around a central valley area, and a smaller blue circle highlights a specific sub-region within that valley. The text is overlaid on the red-outlined area.

FCCIS WP3 Status Placement – environment - MATEX

5 December 2022, CERN

Brief WP3 scope reminder

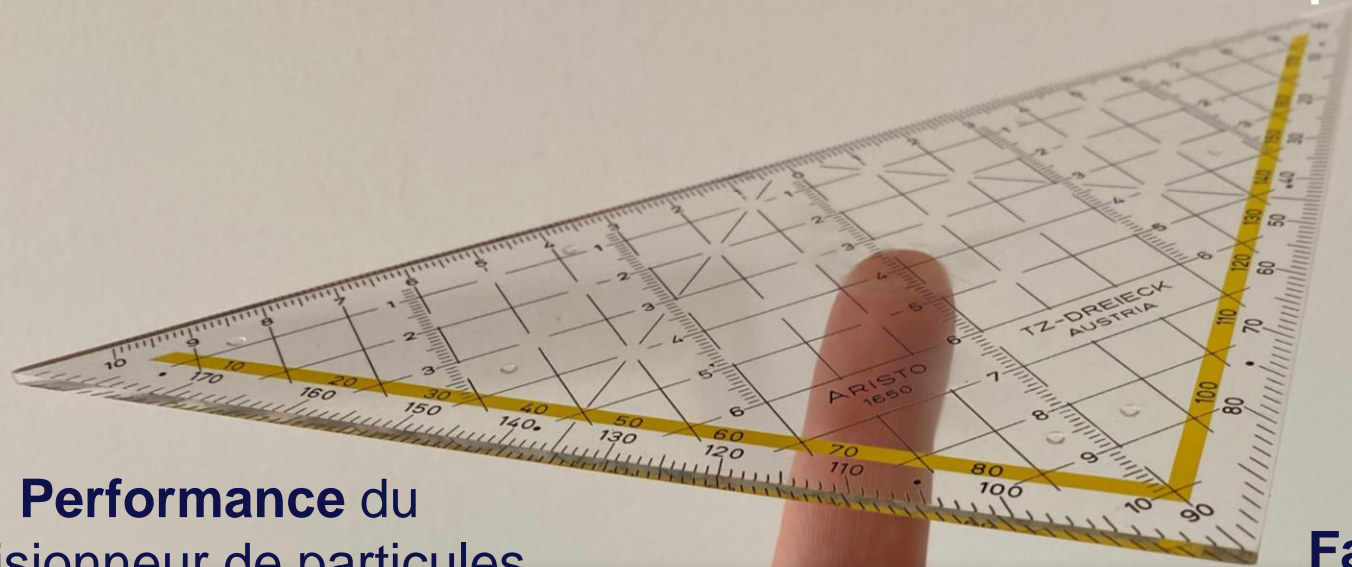
T3.2: Placement optimisation

T3.3: Strategy for transnational environmental impact assessment framework

T3.4: Strategy for managing excavated materials

Un équilibre entre les enjeux

Impacts sur le territoire
= **acceptabilité sociale**



Performance du
collisionneur de particules
= **excellence scientifique**

Faisabilité
technique et coût
= **risques** du projet

Placement optimisation: status, progress, plans

Scenario **PA31-1.0** has been developed as a **working hypothesis** for developing a layout and placement report.

Version 0.29 of the report is an advanced draft with 398 pages in French language.

Meetings took place with prefectures, sous-prefectures, **communes in France and** with communes in **Switzerland** concerning the placement and the planned activities 2023-2025.

Evolution in **progress to come to a final baseline PA31-3.0** for subsurface and environment studies before the end of 2022.

PA31-1.0 (released, documented)

- LSS@IP = 1400 m, **LSS@TEC = 2160 m**
- Total length = 91.172 km

PA31-2.0 (released, minor difference to 1.0)

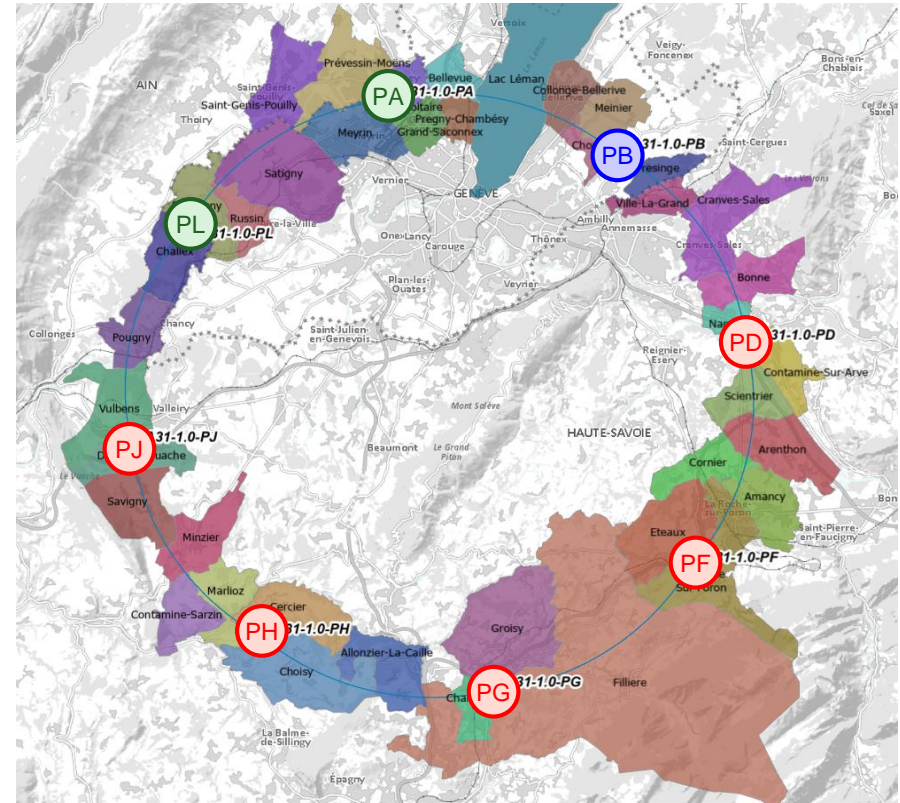
- LSS@IP = 1400 m, **LSS@TEC = 2143 m**
- Total length = 91.104 km

PA31-2.5 (in progress, accelerator tbc)

- LSS@IP = 1400 m, **LSS@TEC = 2030.8 m**
- Total length = 90.653 km

Working hypothesis PA31-1.0/2.x/3.0

1. **PA** – Ferney Voltaire (FR) – site scientifique
2. **PB** – Choulex/Presinge (CH) – site technique
3. **PD** – Nangy (FR) – technique (P1), scientifique (P2)
4. **PF** – Etaux/La Roche-sur-Foron (FR) - technique
5. **PG** – Charvonnex/Groisy (FR) - scientifique
6. **PH** – Cercier/Marlioz (FR) – technique, RF
7. **PJ** – Vulbens/Dingy en Vuache (FR)
- technique (P1), scientifique (P2)
8. **PL** – Challex (FR) – technique, RF



Motivation for micro-optimisation of PA31-1.0

- Emerging strategy for **local, innovative excavated materials use**, calls for adaptation of the site locations and their accesses.
- **Constrained space for PJ** in high ecological and agricultural value zone is a feasibility risk.
 - First feedback of Ecotec site visit confirmed the validity of the goal to optimise PJ
- **Interactions with regional and local elected representatives** of the people called for a maximum preservation of agricultural spaces.
 - **So far no showstopper encountered!**
 - **However, preference to optimise further PA31-1.0**
- **Optimisation of shaft location at PA** (Ferney-Voltaire) is required due to accumulation of strong constraints
 - Road too close
 - Ecological compensation zone to be avoided
 - Visibility towards Mont-Blanc to be optimised
 - Maximum reduction of site footprint needed

Ecodesign considerations

- Adaptation of locations is also motivated by the **need to consider regional climate plans** and publication of unconstructed spaces preservation **law in France (“ZAN”)**
 - Zero Artificialisation Nette des sols
 - Implementation started in January 2022 with “circulaire” of the prime minister
- Environmental evaluation frameworks in host states requires **description of the territory’s evolution with AND without the project**
- **Not limited to GHG**
 - Include particles (PM2.5, PM10)
 - Include volatiles
 - Include ammonia SO2 and others
- **Construction and operation** including the total production value chain must be **considered**
- **Climate footprint estimates** are only valid if carried out **according to applicable norms**
 - E.g. **ISO 1406x** series (model, methods, reporting),
 - nationally validated methods and databases such as **ADEME certified Eva-Carbone** in France for a **mix of level 1 to 4 estimates** and
 - **EU regulation** (EU 2018/2066) and its connected directives and regulations on on the monitoring and reporting of greenhouse gas emissions
- **Relevant are**
 - **absolute figures** and
 - **how far CERN reduces emissions with respect to the base years indicated in the climate plans**
 - Permits estimating the compliance with the reduction requirements

Examples for GHG estimation guidelines

Example

For a road transport service carrying miscellaneous goods weighing a total of 500 kg (i.e. 0,5 tonnes) over a distance of 150 km with a vehicle such as a "straight truck with a GVW of 12 tonnes" operating using diesel, the calculation with level 1 values is as follows (see formula No. 4 described in § 2.3.2):

GHG Information = $0,240 \ell / \text{km} \times 150 \text{ km} \times 3,16 \text{ kg CO}_2\text{e} / \ell \times (0,5 \text{ t} / 1,8 \text{ t}) = 31,6 \text{ kg CO}_2\text{e}$

Where:

- 0,240 ℓ / km is the level 1 value of the energy source consumption rate of the vehicle;
- 0,5 t corresponds to the goods transported;
- 1,8 t is the level 1 value of the number of units transported corresponding to the average tonnage carried by this type of vehicle, integrating unladen journeys;
- 3,16 $\text{kg CO}_2\text{e} / \ell$ constitutes the pumped road diesel emission factor (also provided

French national estimation guideline

EU "Methodology for GHG Emission Avoidance Calculation", V2.0, November 2022
 GHG values and conversion factors are prescribed via EC regulations, such as (EU) 2018/2066 consolidated 28/08/2022

1.1.1 Absolute GHG emission avoidance

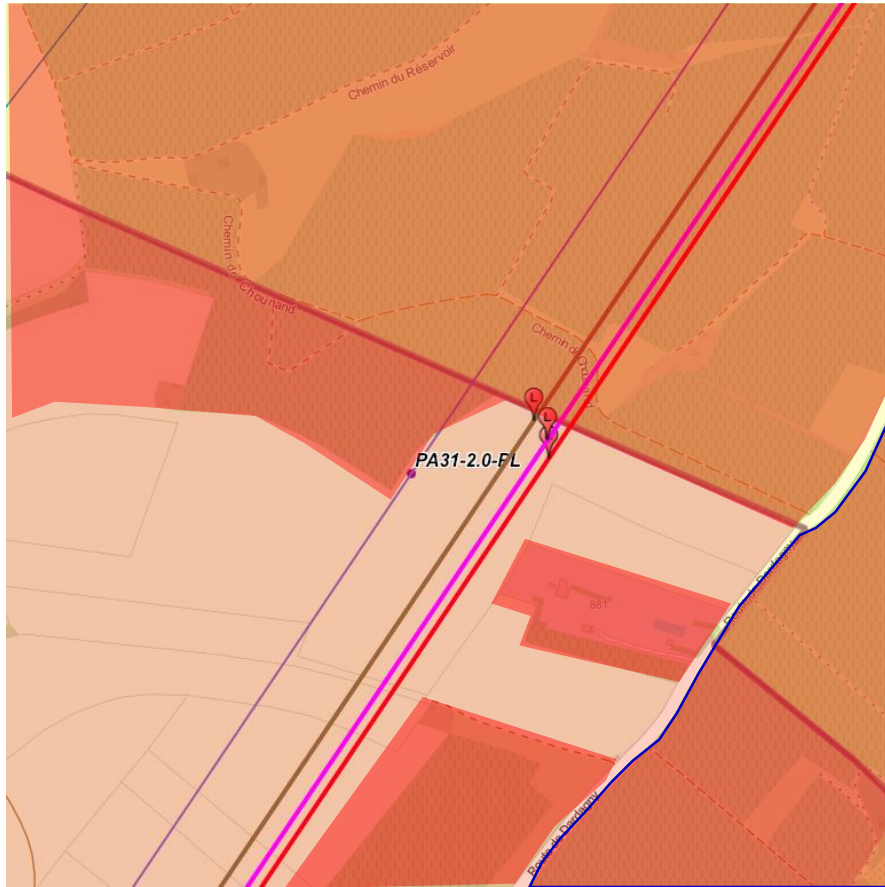
The **absolute GHG emission avoidance** represents the difference, over a defined period, between **all** the emissions that would occur **in a reference scenario** in the absence of the proposed project, and **all** the emissions **from the project activity**. Note that it is necessary to include all the emissions. If "common" emissions would be excluded from both scenarios, then the *relative* emission calculation would be distorted. The absolute GHG emission avoidance shall be calculated based on the expected emissions avoided in each year from the entry into operation over a 10 years' period, using the equation below.

² A project that enters into operation should demonstrate a total amount of GHG emissions planned avoidance of at least 75% for a full grant disbursement.

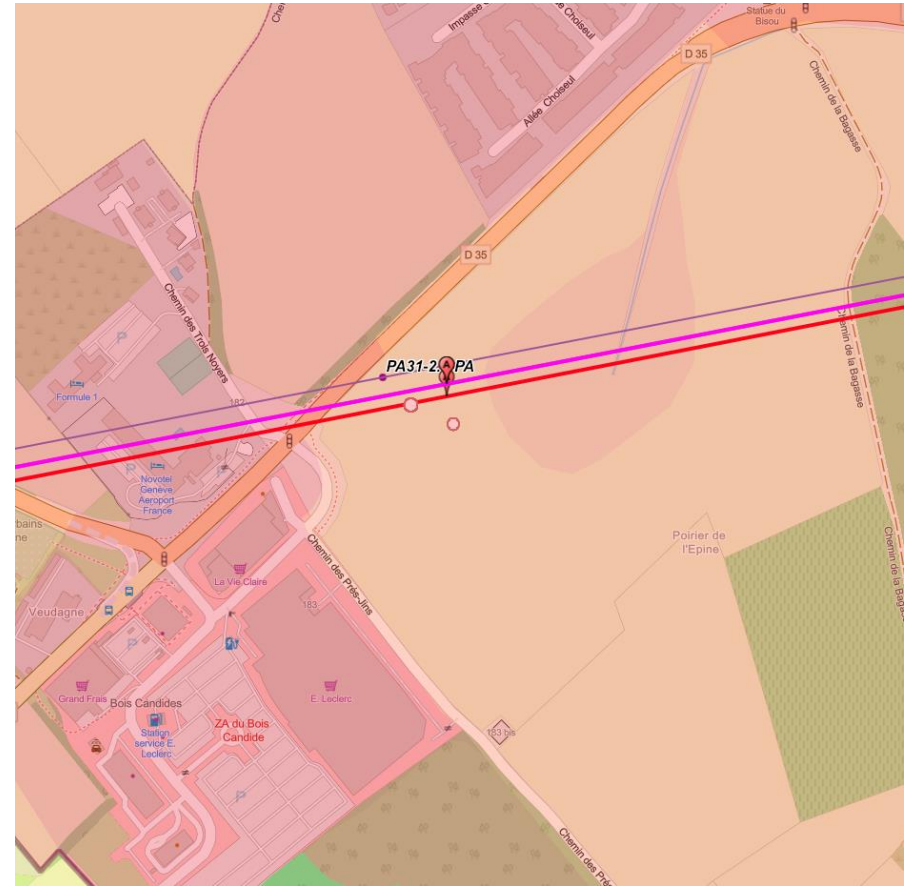
Past, present & future interactions with CH and FR stakeholders

Stakeholder	Meeting date
Commune Satigny	12.12.2022
Commune Dardagny	12.12.2022
Commune Meyrin	9.12.2022
Commune Presinge	14.11.2022
Commune Choulex	7.11.2022
OCEV, OCAN	Various 2022
OCT (Transport)	Various 2022
SCP	11.11.2022

Stakeholder	Meeting date
Communes, senators, MPs Bonneville	29.11.2022
Communes, senators, MPs St. Julien	25.11.2022
Communes, senators, MPs Annecy	28.11.2022
Communes, senators, MPs Pays du Gex	21.11.2022
Prefecture 74	22.11.2022
Prefectures 01, 74	6.10.2022
Grand Elus 01, 74	16.9.2022
President CS 74	2.9.2022
CS 74, Prefecture 74	29.6.2022
DDT 01/74, DREAL	10.6.2022
President CS 01, Prefect Ain	9.6.2022
Sous-prefecture Gex	17.5.2022
President CS74, DDT 74	16.5.2022



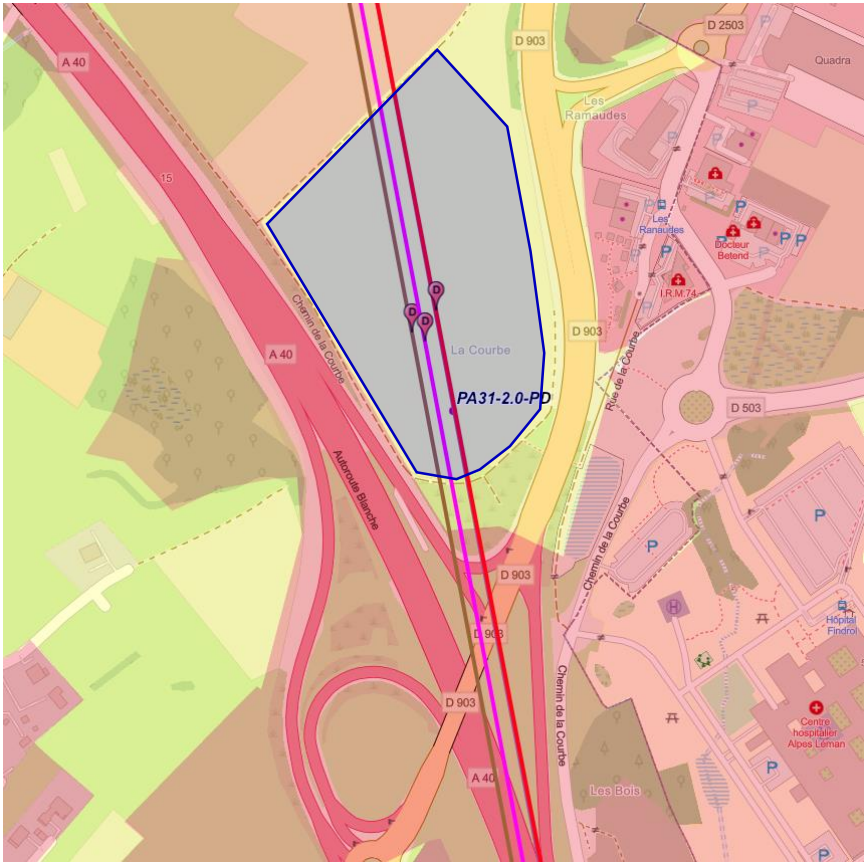
PL – potential site location tbd



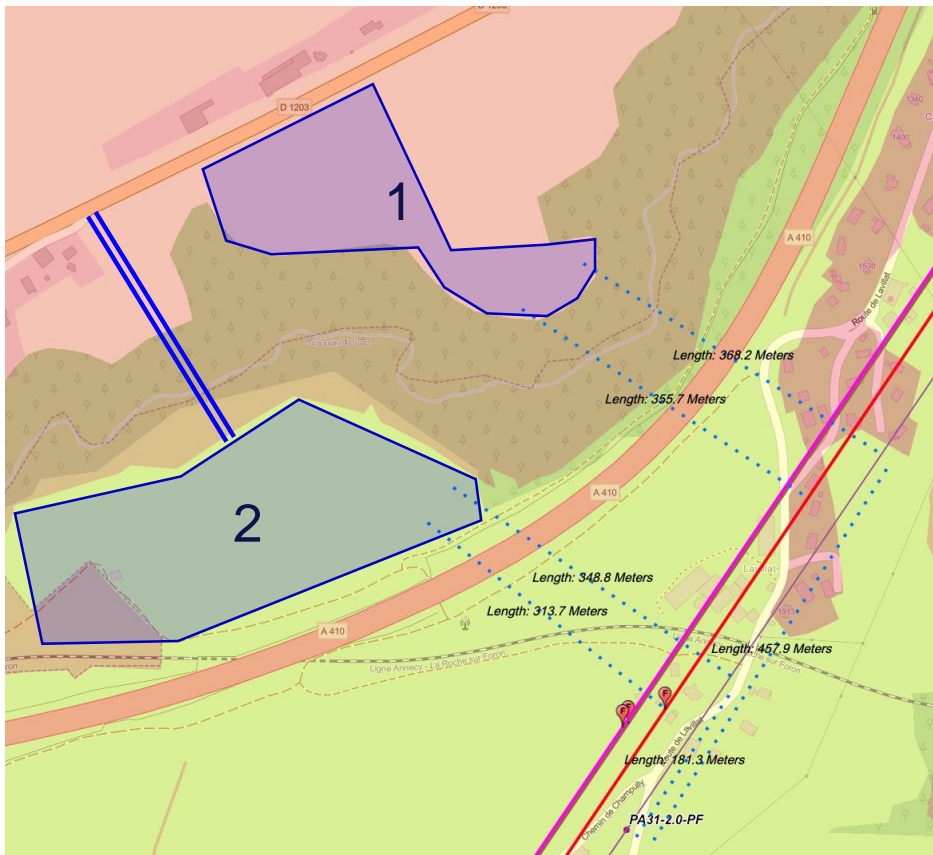
PA – 2.5 significantly better



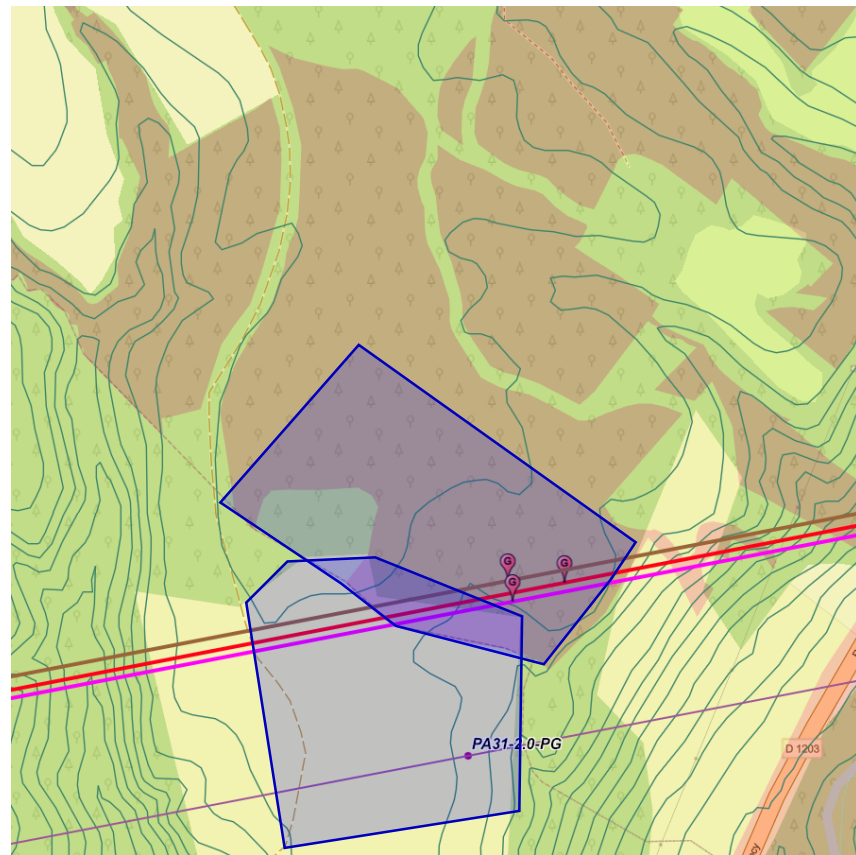
PB – now 2 options for site + access



PD – 2.5 significantly better



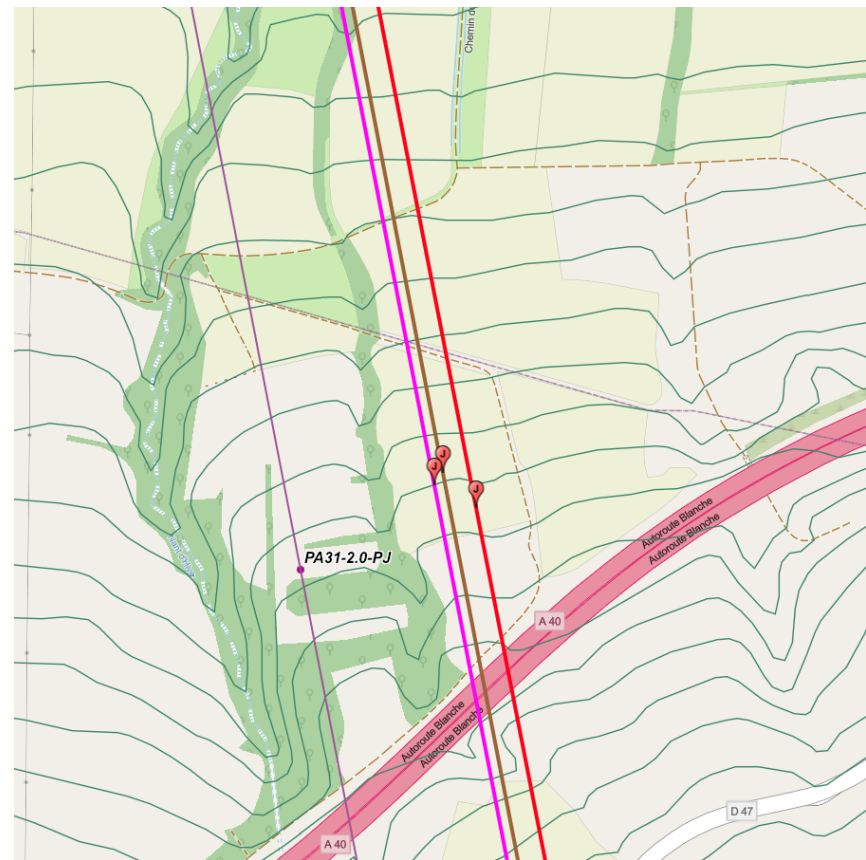
PF – 2 options for site and access



PG – 2.5 in EBC forest



PH – 2.5 in nature zone, closer to road



PJ – 2.5 significantly better

Layout and placement report contents

Done:

- Scenario development **process**
- **Evolution** of the scenarios since 2015
 - 12 sites and 8 sites
 - Multi-criteria analysis results
- Detailed description of the **territorial constraints**
- High-level description of the **subsurface constraints**
- **Detailed description of PA31-1.0**
 - Note: an update will be required in 2023 before the mid-term delivery
- **Direct road accesses**
- **Water intake concept** and legal baselines

To be done:

- **Highway access** concepts
 - Study carried out and concluded (Cerema)
- **Electricity connection** concept
 - Pre-study in progress (RTE)
- **Energy consumption** and sourcing
 - In progress (CERN)
- **Railway access** concept
 - Study ongoing (Egis)
- **Waste heat supply** potentials
 - Client survey in progress (LAPP)
- Local **matex use potentials**
 - In progress (Setec, Ecotec, Cerema)
 - Will be very brief, pointing to MATEX strategic management plan

Strategy for a transnational environmental evaluation

Preliminary report has been published earlier.

Further developments can for now not take place, since AE for Switzerland remains to be clarified for different topics including the consideration of the ongoing work of a sector plan and in France guidance from DREAL, DDT, CGDD and CGEDD remain to be sought after.

Initial state analysis (outside FCCIS)

- Consortium contracted
 - Setec, Ecotec, Marcelleon
- Permitting process started
 - Information of local stakeholder ongoing
- Data layers as basis under preparation
- Planning of field activities in progress
 - 4 season study to commence in spring 2023
 - Methodology based on companies previous experience in the canton of Geneva and in France : requires larger than assumed scope
 - Placement not frozen requires inclusion of additional analysis zones.
 - Local innovative MATEX use concept requires enlargement of zone analysis

Activités prévues



Techniques classiques de mesures avec des relevés métriques et altimétriques, des photographies, des inventaires de la faune et de la flore, des analyses de l'eau, de l'air, du trafic routier ainsi que de la pollution sonore et lumineuse existante.

Forages exploratoires de petite taille et de courte durée lorsque des données précises devront être relevées sur la stabilité des sols, dans des zones qui représentent des défis particuliers pour l'ouvrage souterrain.



Techniques acoustiques de cartographie du sous-sol au moyen de camions-vibreurs et équipement similaire. Elles permettent d'obtenir une image des couches géologiques sans nécessiter de forages.

Identification des opportunités et synergies
Optimiser les emplacements des sites en surface, identifier des opportunités et synergies en vue de créer des retombes pour tous.



www.fcc-faisabilite.eu

- Information sur l'étude
- Questions (FAQ)
- Calendrier
- Formulaire de contact

[Le lieu](#)
[L'étude](#)
[Le projet](#)
[Le calendrier](#)
[Les questions](#)
[Le CERN](#)
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FUTUR COLLISIONNEUR CIRCULAIRE
 Campagne de mesures

Tout savoir sur la campagne de mesures

Le CERN, laboratoire européen pour la physique des particules, effectuera dès 2023 des relevés dans le canton suisse de Genève ainsi que dans les départements français de l'Ain et de la Haute-Savoie afin d'étudier l'environnement et les sous-sols de notre région. Découvrez pourquoi et comment.

Agenda

Rechercher événements

Novembre 2022

VEN	25	25 novembre	Environmental and ecological investigation of surface sites	+ Info
			Presinge & Choulex Canton de Geneva	
VEN	25	25 novembre	Environmental and ecological investigation of surface sites	+ Info
			Ferney-Voltaire Département Ain	

FUTUR COLLISIONNEUR CIRCULAIRE
 Campagne de mesures

Recherche

Où?

Quel est le périmètre géographique de l'étude ?

Le périmètre géographique de l'étude comprend diverses communes dans les départements de l'Ain, de la Haute-Savoie et le canton de Genève.

Un tracé non définitif d'environ 91 km fait l'objet de l'étude en cours.

Cette réponse vous a été utile?

OUI
 NON

Remarque:

Strategic plan for management of excavated materials

Presentation of a strategy for the management of excavated materials is considered by the host states a necessary feasibility condition

General strategy: prevention, preparing for reuse, recycle, recovery

Emerging priorities:

- locally innovative use of the materials as much as possible.
- Create added value for agriculture and forests
- Keep use of truck transports as low as reasonably possible

“Mining the Future” competition has been successfully concluded in autumn, opening promising paths for an integrated, locally innovative matex re-use approach.

Setec has started to produce high-resolution digital-elevation-model (DEM) based volume estimates for local levelising of slopes and uneven topographies in the vicinity of candidate surface sites.

The approach can only be continued with close and solid guidance from competent host state services.

Past and ongoing work relating to MATEX

DONE:

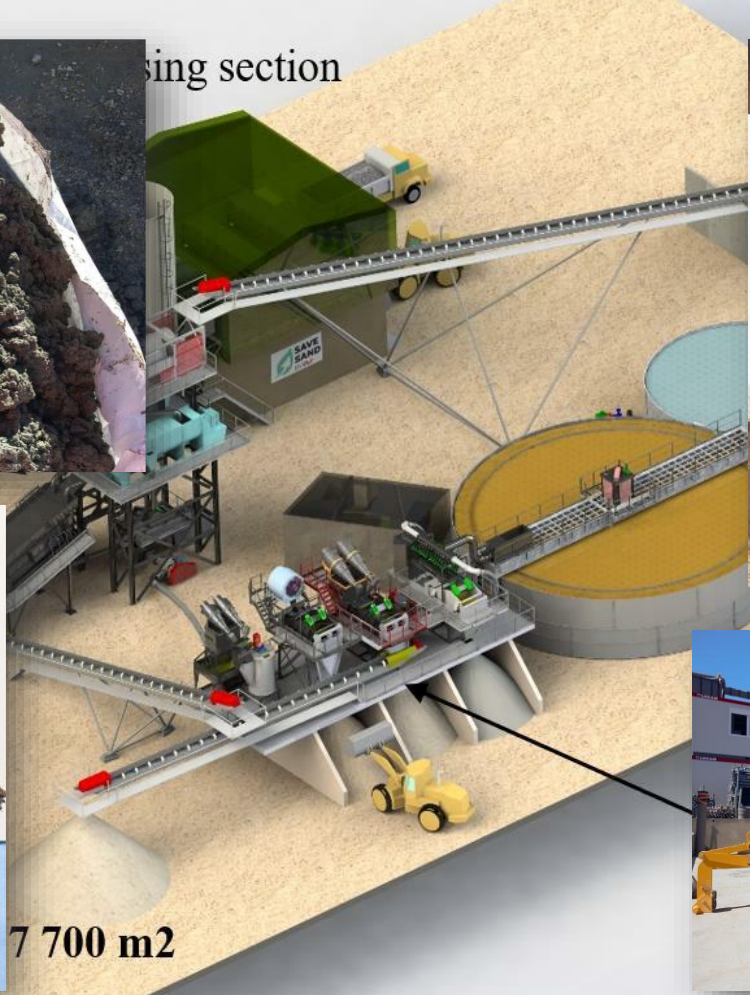
- Inventory of **local opportunities**
(FR: department of Ain, Haute Savoie)
- Study on the **regulatory framework** in France and Switzerland
- Geological and geomechanical study of the molasse on the basis of **available samples (existing boreholes, samples)**

ONGOING:

- Inventory of **local opportunities**
(CH : canton GE, BE, FR, VD, VS)
- Logistics: **railroad access feasibility** analysis (EGIS) is ongoing
- Innovative reuse: based on the outcome of the mining the future competition, definition of the possible **management options**
- A general strategy for handling and treatment of **polluted materials** with respect to the regulatory frameworks (limits for polluted materials in France and Switzerland)



...sing section



er



R

7 700 m2



A "locally innovative" approach

- Use the treated materials to **levelize neighboring agricultural fields and forests**
- **Improve agricultural spaces**
- **Make forests fit for climate change** and accessible to efficiently fight wildfires
- Use **locally produced low-carbon concrete and/or earth bricks** for RI surface site constructions



Local innovative excavation materials re-use

- **AMBERG consortium:** In-situ separation (crossbelt elemental analyzer) and preparation for use as construction material on site (shotcrete, bio-mineral binder), onsite production of low-carbon construction elements without cement/concrete.
- **BG consortium:** Online-analysis and preparation of “molasse” for construction elements from sandstone, filling material for concrete, low-carbon concrete, terra cotta bricks, etc.
- **ARCADIS consortium:** treatment of the materials with calcium-based stabiliser for the production of “pressed bricks” as substitute for high carbon-footprint construction materials using mobile production facilities on site.
- **EDAPHOS consortium:** Combining mineral molasse material and organic material to produce fertile soil with on-site production plants by using microbiology to accelerate humus creation. Fertile soil as top layer for agricultural use, recultivation.

