



Urban Regeneration: Managing Complex Social and Regulatory Challenges in Chile

SESSION 15

Sustainable management of contaminated sites

WSP Golder – Raul Victor, LATAM Remediation Business Leader

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FCAB – Jaime Henríquez

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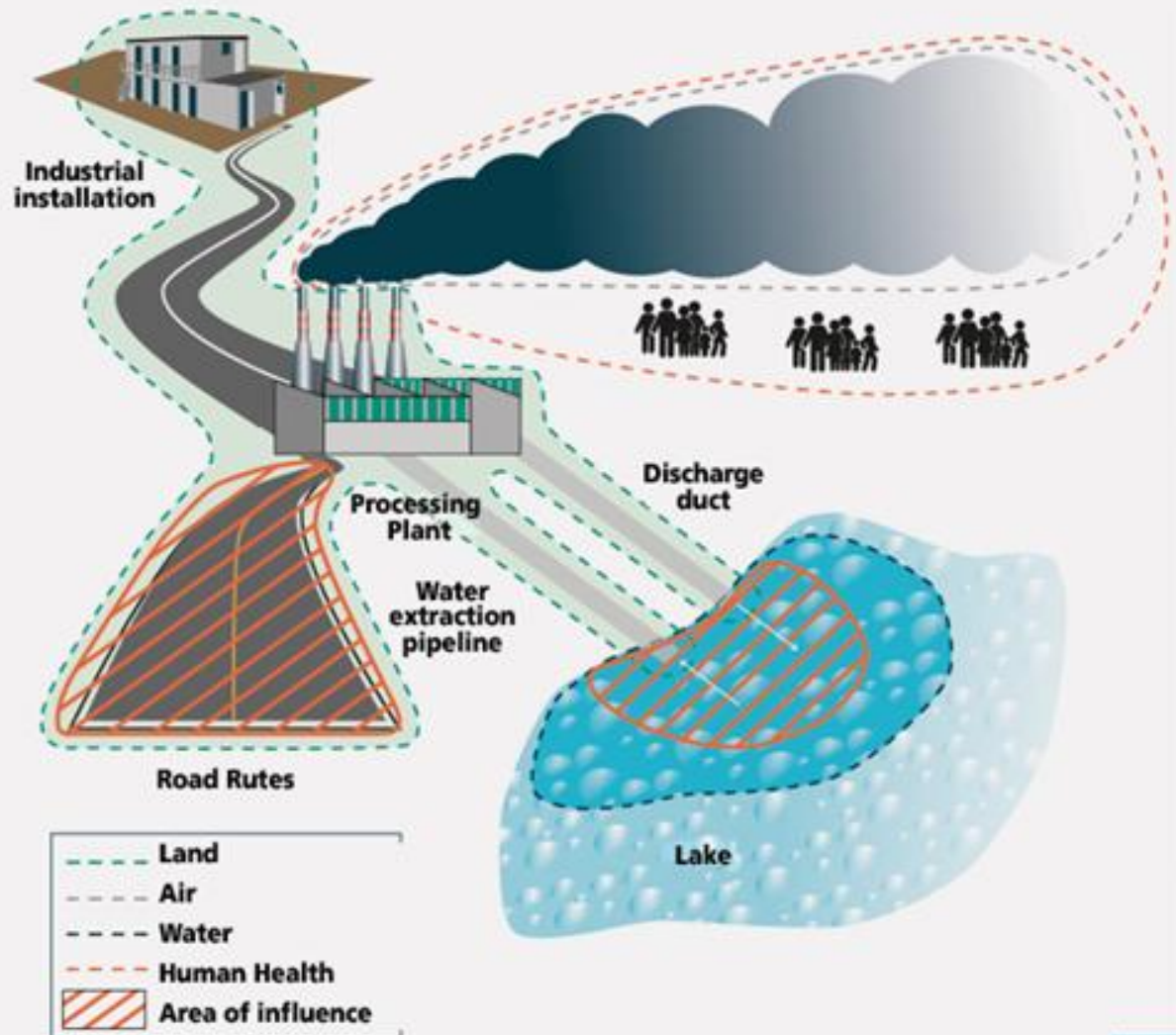
CONTEXT CHILE

- South America's most economically and socially stable and prosperous country.
- Population: 19+ million – 26 per km² with 87% of the population living in urban areas.
- World bank high-income economy
- Growing middle class
- Expanding cities driving redevelopment needs
- Environmental regulations lagging growth and development



INTRODUCTION BACKGROUND/OBJECTIVES

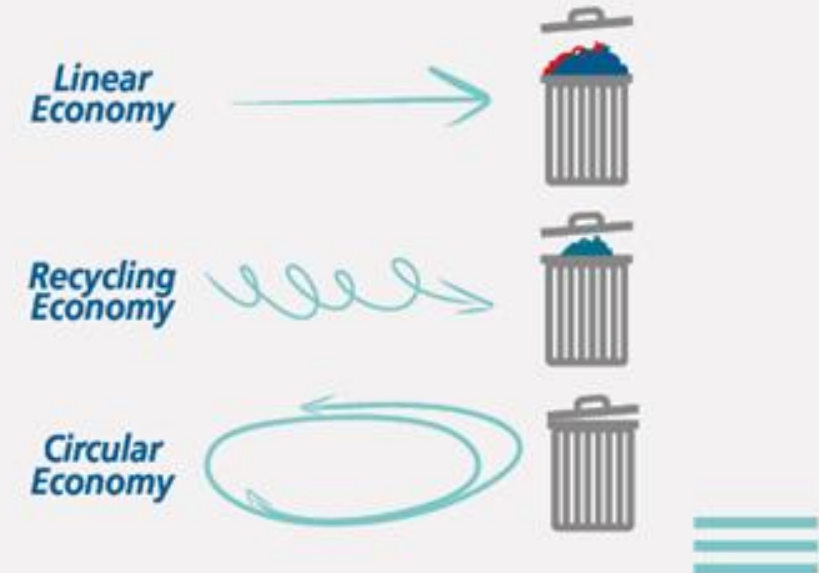
- The regeneration of contaminated sites in urban centers is a relatively new topic in Chile, with limited regulatory guidance and no soil and groundwater quality regulations;
- Existing law requires large remediation projects to be approved within the environmental impact assessment (EIA) system – using the same criteria as a thermoelectric plant or a mine site.
- These projects are approved by a commission that includes more than 20 agencies – the authorities reviewing the project generally have limited experience in human health risk assessment and remediation.



Sections of the area of influence with significant environmental impacts

INTRODUCTION BACKGROUND/OBJECTIVES

- The EIA system includes a mandatory public consultation, which integrates community participation in the approval process.
- There is no direct link between environmental and urbanistic regulations – limiting the feasibility of considering engineering and/or administrative controls as part of a remediation strategy.
- Issues related to residual contamination restrict property transfer, force the property owner to resort to contractual obligations or use highly conservative remediation endpoints – all of which reduce the feasibility of redevelopment/reuse projects.
- In this context, the drivers for these projects are predominantly
 - Company reputational gains
 - Sustainability goals
 - Financial benefits from the urban redevelopment





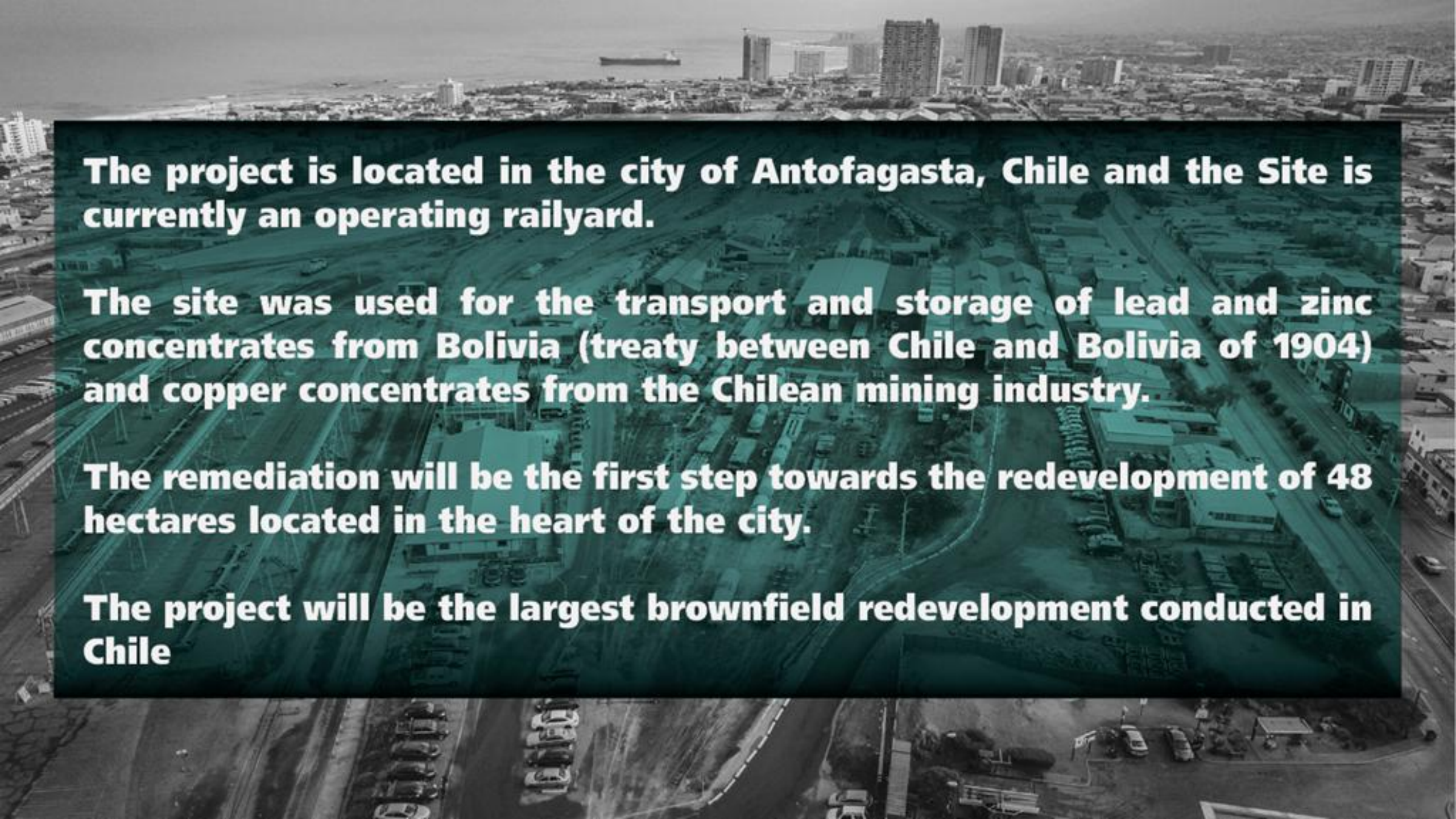
THE PROJECT

AND THE CLIENT'S VISION





FCAB has transported the minerals and supplies that allowed the development of northern Chile for more than 130 years.



The project is located in the city of Antofagasta, Chile and the Site is currently an operating railyard.

The site was used for the transport and storage of lead and zinc concentrates from Bolivia (treaty between Chile and Bolivia of 1904) and copper concentrates from the Chilean mining industry.

The remediation will be the first step towards the redevelopment of 48 hectares located in the heart of the city.

The project will be the largest brownfield redevelopment conducted in Chile

FCAB anticipates that this project will set critical precedents related to both the technical approach to Brownfield Redevelopment in Chile and the importance of a strong community/stakeholder engagement process.



PROJECT APPROACH/ACTIVITIES

In this challenging context, Antofagasta Railway Company (FCAB) presented an Environment Impact Assessment for the risk-based remediation of their railyards. The EIA included the following:

- Detailed environmental characterization plan
- Human Health Risk Assessment
- Remedial Action Plan
- Community/Stakeholder Engagement Plan

As well as baseline studies related to other environmental variables that form part of an EIA.





- The project's stakeholder engagement plan ensured that the strategy and overall goals were clearly communicated and feedback from the engagement process was incorporated into the project design.

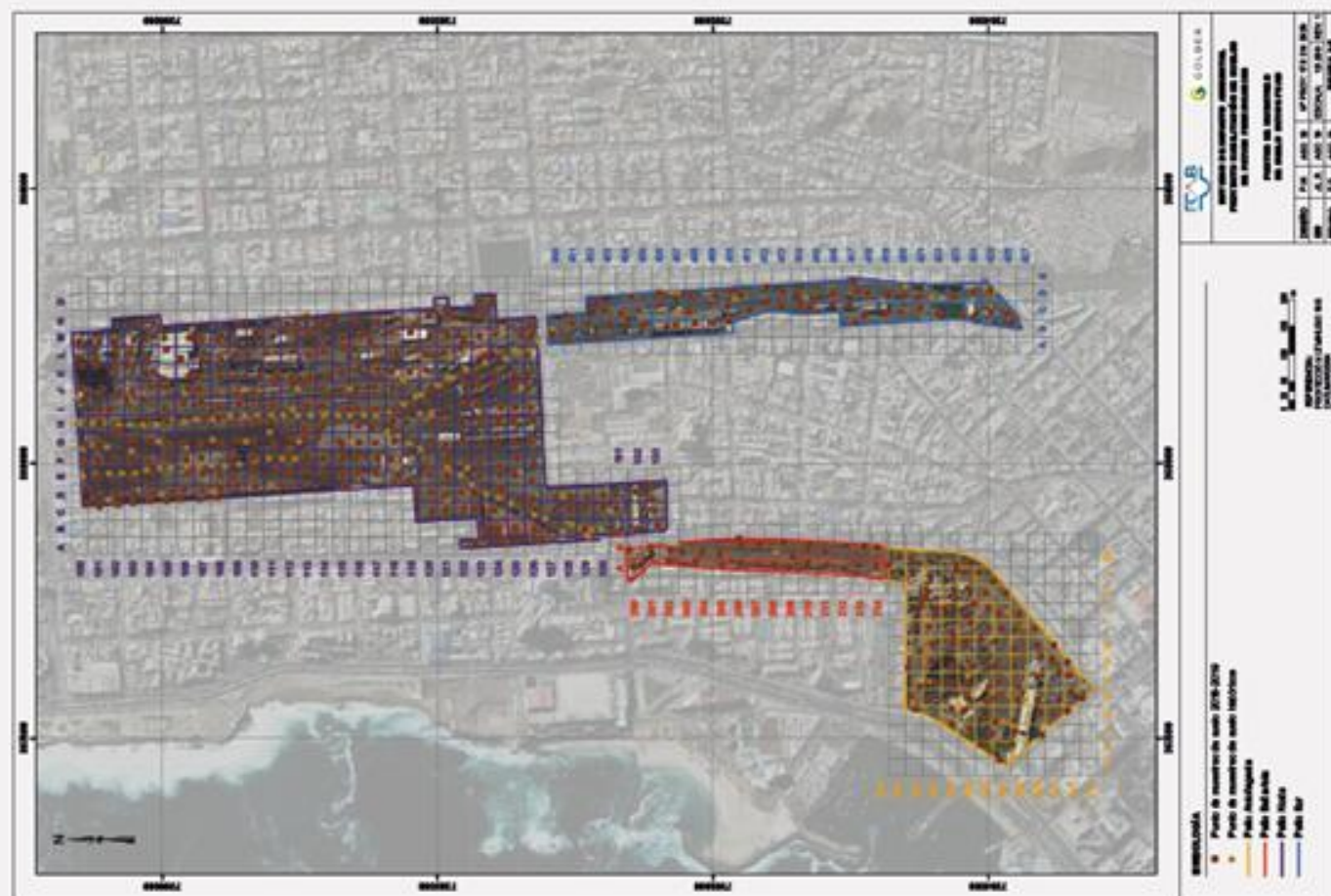
- The plan included meetings, presentations, and workshops with authorities, community leaders, workers and neighbors and more than 1,000 people participated in the process.

- The stakeholder engagement plan will continue until project completion, ensuring transparency and building trust during all phases of the project.



RESULTS

Following a detailed soil and groundwater investigation, impacts were identified primarily in shallow soils due to surface stockpiling of lead concentrates.

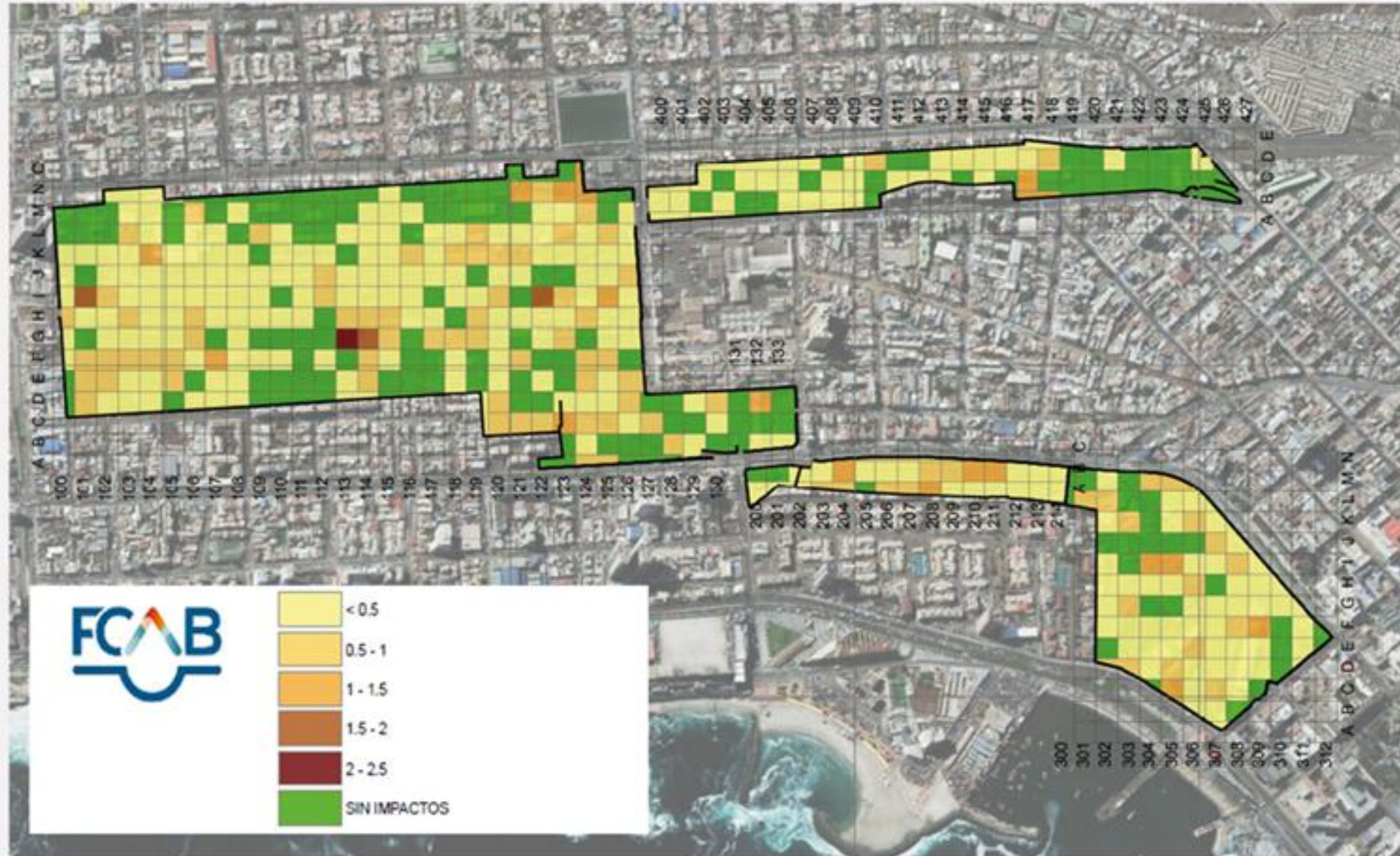


ENVIRONMENTAL CHARACTERIZATION SOIL SAMPLING

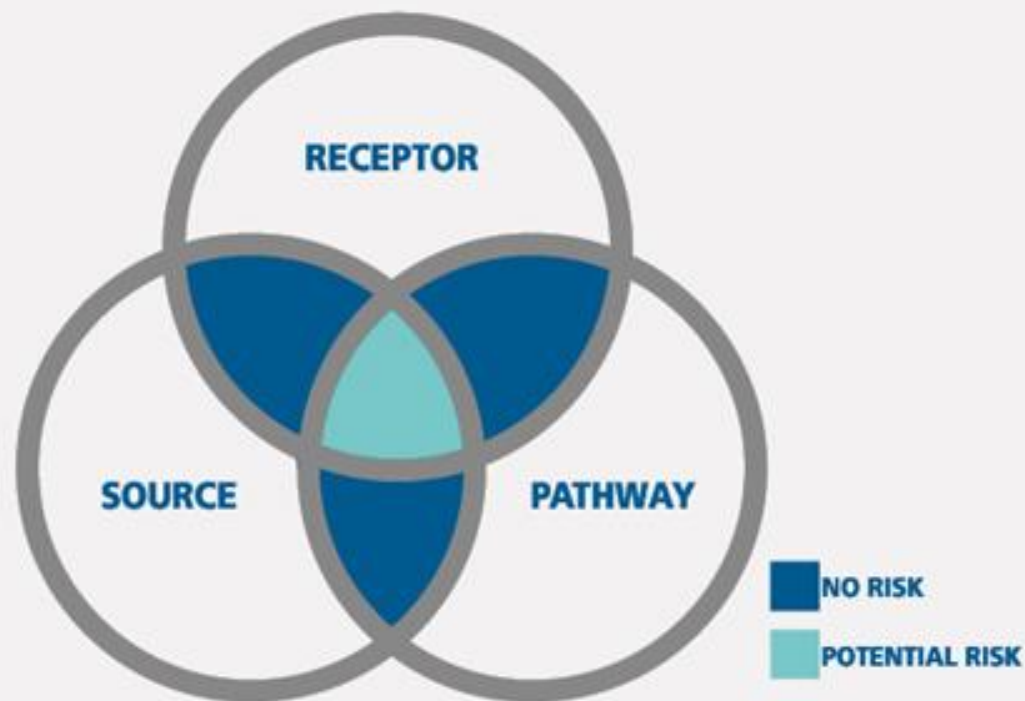
RAILYARDS	QUADRANT NUMBER	SAMPLES ANALYZED	TOTAL SAMPLES
NORTE	321	642	833
SUR	64	128	160
BELLAVISTA	30	30	74
ANTOFAGASTA	93	186	238
TOTALES	508	986	1305

- ARSENIC
- LEAD
- ANTIMONY
- CADMIUM
- THALIUM
- LITHIUM

RESULTS



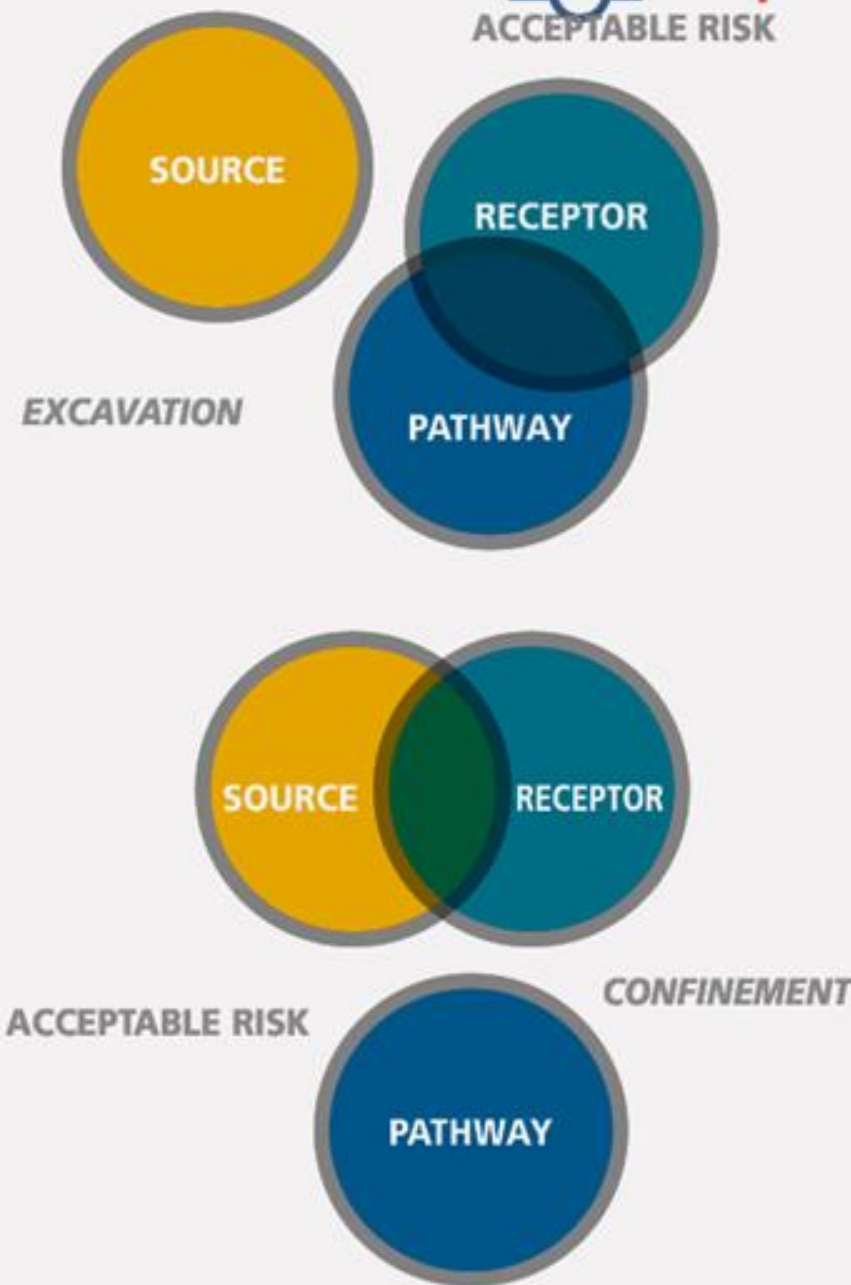
RISK MANAGEMENT METHODOLOGY REMEDIATION



The focus of remediation should be risk management to ensure the protection of human health and the environment.



REMEDIAL ACTION PLAN



REMEDIAL ACTION PLAN

- Consequently, the remediation strategy considers excavation and offsite disposal – based on maximizing viability of the future redevelopment project and providing certainties for the local community.
- Stabilization and confinement were also considered but discarded based on the current regulatory framework, public perception and potential future use restrictions.



POST REMEDIATION PATIO ANTOFAGASTA



CURRENT SITE CONDITION

CONDITION POST REMEDIATION AND URBANIZATION





wsp GOLDER

RESULTS & LESSONS LEARNED



- The EIA was approved in June 2021 with a positive vote from all authorities.
- Ejecution : 6 a 9 años
- Investment : 50 U\$ M
- The project's positive reception by the community and the authorities has shown that the strategy undertaken by FCAB, which focused on sustainable decision-making processes, a robust stakeholder engagement strategy and ensuring the long-term reputation of the company has been successful in overcoming the regulatory and social challenges that exist in Chile regarding remediation of contaminated land.



RESULTS/ LESSONS LEARNED

- The focus of the process must always be the regeneration of our spaces – always seeking the protection of human health and the environment.
- The social benefit of the project is critical for acceptance.
- Collaboration is key - with both local stakeholders and international experts.
- Following Steps for the Project:
 - EIA for the modification of áreas protected as Cultural Heritage (2022 – 2024)
 - Development of the final Master Plan for the future redevelopment.





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