

# STUDIO SARDINIA: HOW TO LIVE WITH STONES





# PROCESS & METHODS

The work that our studio group has produced leaves ample opportunity for further exploration of this topic. The methods outlined below provide a guide to the work we conducted both in Toronto and in Sardinia. These processes can be replicated in other contexts or used to further understanding of the Santu Miali mine.

## Where we Started

This product was developed as part of Ryerson University’s Master of Planning studio course, PL8109. In September, 2019, our team of six Master of Planning students and our supervisor began this studio research project titled, *How to Live with Stones: Landscape and Planning Beyond Closure* (Sardinia, Italy). This work is the continuation of ongoing research hosted by our client, the Centre for Biocultural Landscape and Seascape at the University of Sassari. Our team was given the task of providing research and materials at the intersection of mine closure planning, landscape design and critical geography. Utilizing these research and materials, our work intends on developing strategies for future land use plans that encourage an open, publicly accessible, living environment, for the Santu Miali gold mine located in the town of Furtei in southern Sardinia. Understanding that the gold mine, now closed and in its first year of fill and cap remediation, exists in contrast to the image many have of Sardinia’s idyllic coastline, our team worked closely with quantitative and qualitative data, and looked to the stories of those affected by mining internationally, with a particular emphasis of those held by local individuals connected to the mine in Sardinia. Based on local knowledge, this required spatial analysis quantitative and qualitative methods, while working with local individuals and organizations to tell the story of the mine from the point of view of those who lived in the area.

As our research is based on Toronto, our work also looked to the means and institutions that facilitate transnational mining, understanding the intricate role Toronto’s financial geography plays in advancing global mining operations and implicating the lives of those affected by mining. This document compiles our research in a format that challenges conventional cartographic representations and embeds storytelling into our work as a means of speaking between the data, both qualitative and quantitative.

## Toronto

### The Walking Tour:

In attempting to collapse the distance between foreign sites of extraction and the concentrations of capital situated in Toronto, our team participated as a stop in The Bank, The Mine, The Colony, The Crime, a walking tour organized by WalkingLabs, ReImagining Value Action Lab, and with the support of the Toronto Biennial of Art. The tour assembled a temporary community of activists, artists, scholars and other counter-speculators to investigate and challenge Toronto’s role in the mining industry by walking together. Its description stated: “Toronto’s financial district, built on stolen Haudenosaunee and Mississauga lands, is home to many ghosts, notably those dispossessed by the global extractive industry headquartered on the city’s infamous Bay Street. The violence of (neo)colonialism haunts the corporate towers and cleansed streets of the financial district; it also haunts the pensions and savings of millions of Canadians who, knowingly or not, are invested in the industry via the neighbourhood’s preeminent financial institutions.”

Our teams’ specific stop on this tour was named “Golden Reflections, Ghostly Projections: A projection installation on absence and the collapsing of distance”. Our project presented a series of visual interventions that repurpose space in the city to make evident connections between extractive violence and the core of Canada’s financial systems. The projection is inspired by the powerful work that haunting can perform within urban space. The project was a collaboration with Zannah Matson, an organizational partner and PhD Candidate in Geography from the University of Toronto School of Geography and Planning.

### The Site:

Our site was located in a Privately Owned Public Space (POPS) by Royal Bank Plaza, situated near the corner of Front and University Ave. Our teams’ installation took the Royal Bank Plaza, headquarters to many major Canadian mining companies that perpetuate violence and environmental destruction, as an entry point to make visible the hidden power of major Canadian financial institutions.

The POPS in which our stop was situated in typically acts as an active space for the people who work in the area, to break for lunch or a smoke. Often, POPS are mere patches of concrete, a negative space between two forms, as is the case here. In setting up our projection, we’ve activated the POPS, and in projecting our ghostly images, we’ve attempted to bridge the gap between the financial headquarters of the extractive industry, and the people and places in far-away developing countries that are actually impacted by the violence imposed by these companies. While meant to furnish a vibrant public realm network, POPS are not democratic spaces... most often, they are hostile and surveilled. While setting up and delivering our presentation, we did find that though this space was meant to be a “public space”, we were constantly being surveilled, with CCTV

camera’s constantly pointed at us, security having walked several times back and forth staring at us, and even police following the tour group. Even for us, as an academic group of students, it was clear that this “public space” was in fact, hostile, and undemocratic.

### The Plan:

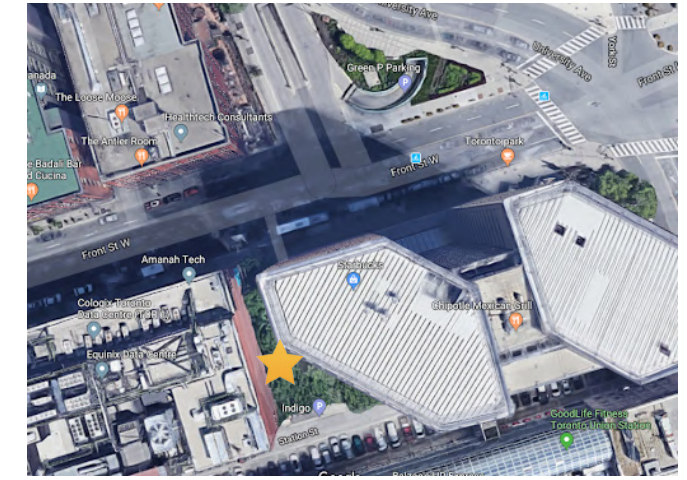
In combating the “institutional forgetfulness” of human rights violations, Daniel Hernandez-Salazar deploys geographically rich photographic installations to help his own society remember its difficult past: “I am convinced that the lack of collective memory in my country and the world is not an accident. It is something formed by those in power.” (Salazar, 2003). Working between the “site” and the imagery of memory through superimposition, visual materials included as a part of this projection looked to close the distance between sites of extraction and the co-constitutive concentrations of capital, collapsing them to tell the ways in which Toronto is complicit in the violence of resource extraction. The ghostly images we projected reveal Canada’s extractive financial industry lurking behind every gilded façade. In developing our projection installation, our team decided to highlight three key themes: Blasts & Graphs, Slow & Fast Violence, and People, Places & Propaganda.

### Logistics:

The team tested multiple options on how to situate our projection within the POPS. We made decisions on how powerful of a projector we needed, what would be the most effective backdrop, and established multiple contingency plans based on weather conditions. The final set-up we came up with for our installation was a projection against a white backdrop. We set up the projector screen against the western-most wall of the POPS. We had our projector sitting on a stone, which was fitting given our studio theme of “How to Live with Stones”. The projector was hooked up to our battery pack to keep it powered. The projector was also linked to a laptop generating the video projection. In figuring out logistics, we ended up deciding on using a 5000Lumen projector, which we found to be much stronger than the standard 3000Lumen - classroom standard projector. The daytime sunlight superimposed with our projection allowed for it to have a “ghostly” feel to it, driving our theme of “haunting” within urban spaces. A crowd of roughly 70 people showed up for the walking tour, and arrived with a mic and speaker set for our team to use.

### Postcards:

At the end of our presentation, we handed out postcards with our three different themes. These were meant as a souvenir of our stop on the walking tour that would remind participants of the violences and injustices done at the hands of these mining companies situated in Toronto’s financial district. On the front of each postcard was “Greetings from Toronto” in a fun font, contrasted with pictures of the actual impacts of mining within the Toronto bubble lettering to make for a more shocking effect. On the back of each postcard included a message as well as a QR code for the tour participant to scan, which would take them to a reading list of resources.



Our teams’ site located in a POPS near royal bank plaza



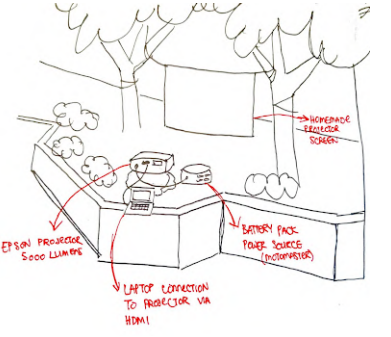
A rendering of our site



Testing the projector at Kerr Hall North



Testing the projection against different backdrops



Initial sketch of our setup



Epson PowerLite 2255U 5000-Lumen 3LCD Projector



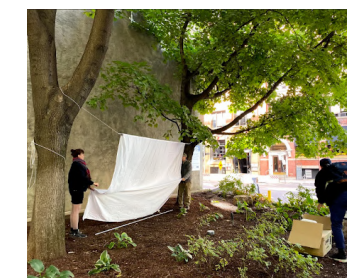
MotoMaster Eliminator Powerbox 2000



Trying different locations



The location our team decided on



The final setup

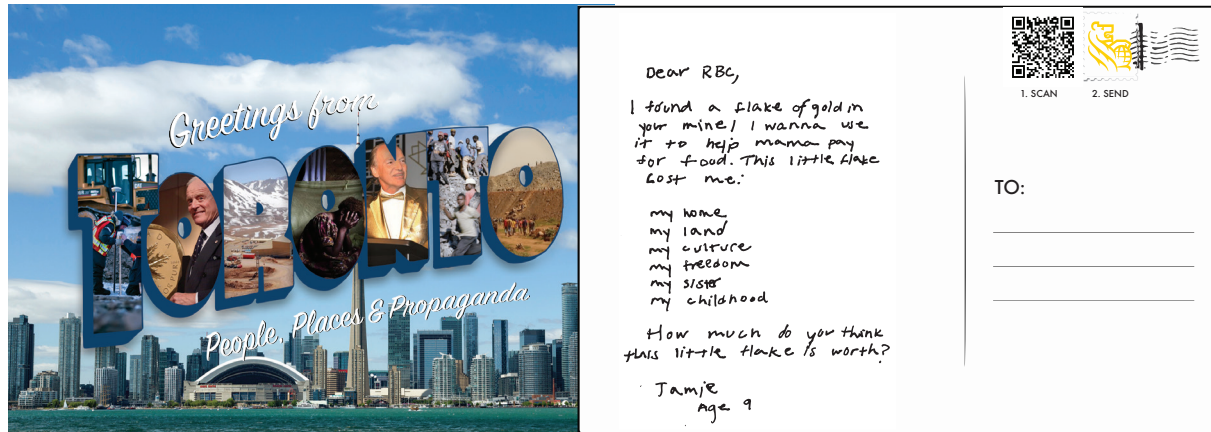


The presentation



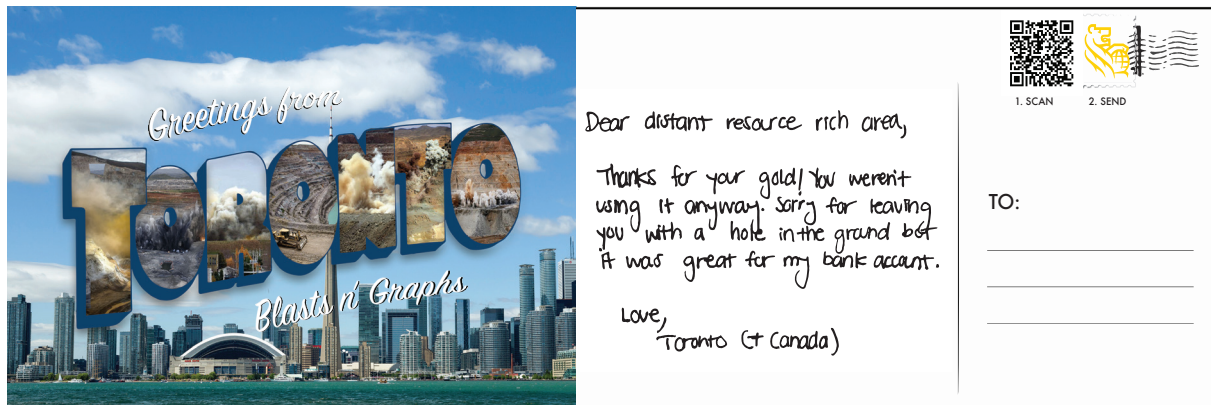
A crowd of approximately 70 showed up





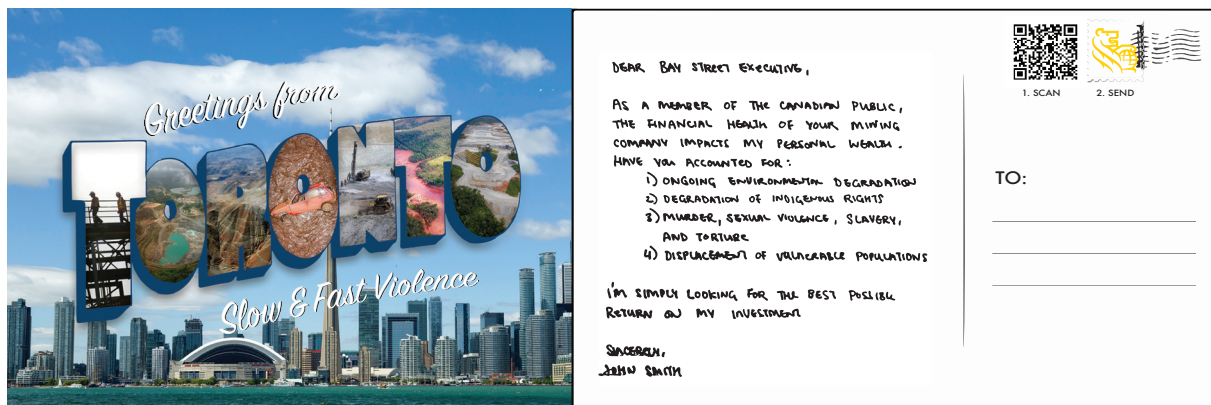
People, Places & Propaganda: Front

People, Places & Propaganda: Back



Blasts n' Graphs: Front

Blasts n' Graphs: Back



Slow & Fast Violence: Front

Slow & Fast Violence: Back

## Sardinia

An integral part of this project was the visit to the site on location in Sardinia, Italy. Half of the team was able to travel to the Santu Miali gold mine and surrounding regions in order to collect data and gain context and local knowledge.

### Day: 1

**Location:** Cagliari

**Tools Needed:** Camera for photos, notebook

**People:** Team + Local Expert: Alessandra Lai - Engineer and Architect

We received a comprehensive walking tour of Sardinia's capital city, Cagliari. This tour helped to inform our understanding of the intersection between Sardinia's historical features, architecture, and cultures that were prevalent in the island's most urban environment.

### Day: 2

**Location:** Furtei, Guasila, Segariu, Serrenti

**Tools Needed:** Ford Fiesta, Map of Sardinia, Camera, Microphone, Tripod

**People:** Team

We visited the towns in and around the Santu Miali Gold Mine to gather information on the site's surrounding context. This allowed us to understand the geography and typologies of these towns and aided in our preparation for the upcoming workshop.

### Day: 4

**Location:** Montevecchio Mine

**Tools Needed:** Ford Fiesta, Map of Sardinia, Camera, Microphone, Tripod

**People:** Team + President of Parco Geominerario Mr. Tarcisio Agus + Retired Miners + Parco Geominerario Tour Guide

On this day we visited the Montevecchio Mine. Closed in 1991, this historical site was once home to 3000 miners from across Italy, that lived and worked exclusively in this planned community. Half of the site now serves as a historical attraction with a museum, while the remainder of the site is neglected and has fallen into disrepair. This site was an important example of a remediated mine site we could draw inspiration from, both for its successes and failures.

### Day: 5

**Location:** Santu Miali Mine

**Tools Needed:** Camera, Microphone, Tripod, Strava App

**People:** Team + Maro Diana - IGEA

This day was instrumental in our understanding and preparation. It provided clarification on the research and work we produced up until that point, while also providing context on the work we had to produce moving forward. We also used this opportunity to run preliminary tests on our documentation methods by testing out all equipment which would be used for our upcoming workshop.

### Day: 6

**Location:** Argentiera

**Tools Needed:** Participant Worksheets, Pens, Camera

**People:** Team + Professor Gloria Pungetti + UNISS Masters Students + Participants

This was the first of the two workshops we facilitated while in Sardinia. In collaboration with UNISS, we worked with primary, secondary, bachelors and masters students at a multi-generational session that discussed the mine, landscape and seascape of Argentiera. The remediated site expanded our thinking for our own site, while the workshop provided us with insight on how to run our workshop on the Santu Miali mine.

### Day: 7

**Location:** Furtei

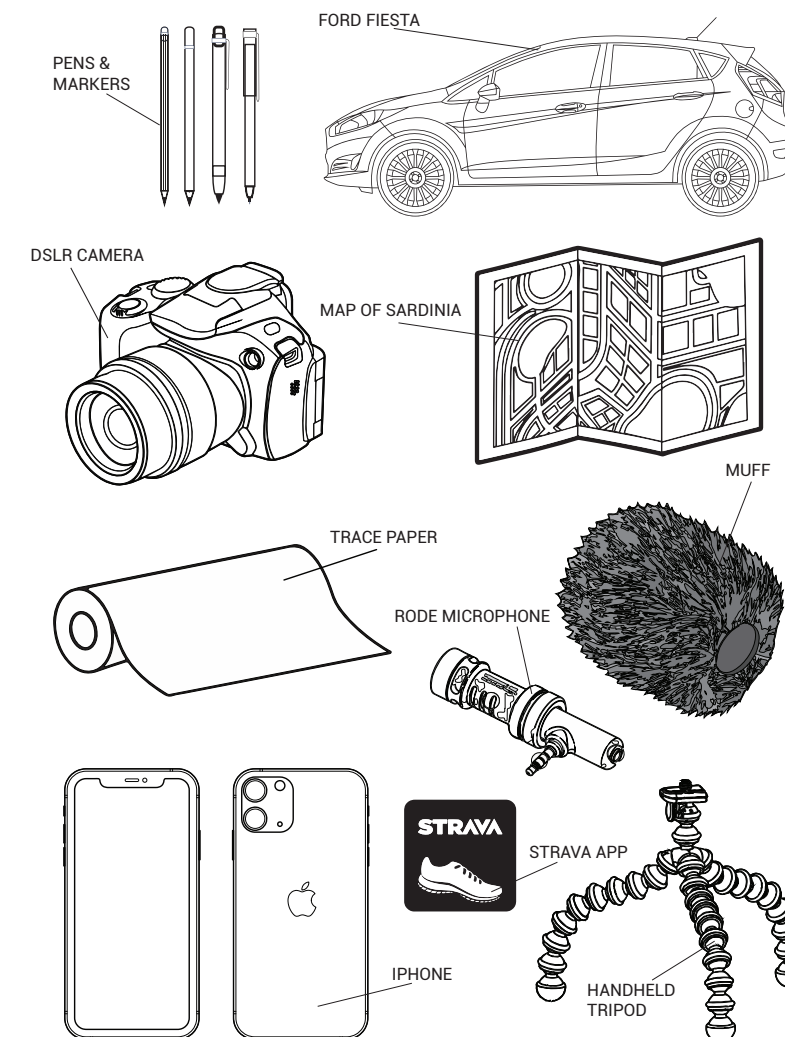
**Tools Needed:** Maps, Tracing Paper, Pens, Camera, Microphone, Tripod, Strava App

**People:** Team + Workshop Participants

On this day we held a workshop attended by residents and mine employees from the towns surrounding the Santu Miali Gold Mine. Data from the 2018 workshop was validated and new primary data was collected.

Participants were asked to add points of personal significance onto the base map. Those who attended last year's workshop validated their previously added points and added any new ones they chose to include. Participants were also asked to add frequent or infrequently used paths they take around the mine site. Each participant was provided tracing paper in order to draw their pathways over the basemap. The pathways and accompanying stories were discussed with the cohort.

After sharing their individual pathways and stories, the cohort chose three participants who volunteered to lead a walking tour. This guided tour was documented through photo, audio and video, while GIS data was also collected.



Day 1: Cagliari



Day 2: Towns in and around Santu Miali Gold Mine



Day 4: Montevecchio Mine & Historic Planned Community





Day 5: Santu Miali Mine



## Bridging the Gap

“It is a megalithic country – not in the sense of being prehistoric – like every poor land in the world it has its own history ignored or dismissed as ‘savage’ by the metropol – but in the sense that its soul is rock and its mother stone” (Berger 2001/2003, p. 236).

Sardinia is a landscape shaped by stones (Berger 2001/2003, p. 235). In Sardinia, humans shaped the landscape using stones for six millennia. Early in Sardinia’s history, Domus de Janas, small rooms carved into rock-pediments, were made as burial chambers; Nuraghe, neo-lithic stone towers that were used for living and defensive purposes, still dot the landscape (Berger 2001/2003, p. 237-240); the soil in Sardinia is poor and rocky and every tanca (pasture) has stones piled up to allow the soil to be worked (Berger 2001/2003, p. 234); stone walls demarcate tancas, roads, and create sheep pens; the use of stones marks the Sardinian landscape as occupied and full of meaning (Berger 2001/2003, p. 235).

The stones of Sardinia tell another story that has shaped the history and landscape of the island. Sardinian rocks are rich in mineral deposits and this, along with its strategic Mediterranean location, has attracted invaders and colonizers over the past four millennia (Berger 2001/2003, p. 235-236). This story about the potential riches of Sardinian stones is of concern to geologists and mining interests; recently, international mining interests have extracted gold from the Furtei mine in central Sardinia and have forever changed the landscape.

“The good lord did not put gold deposits in the middle of Manhattan or Paris. The good lord picked for some unique or obscure reason to put gold into areas like the middle of the Tanzanian jungle, on top of the Andes mountains, in remote communities where the options to escape poverty are nil and ... the responsible mining community ... provides tens of thousands of jobs and that means a hundred thousand opportunities for people who would not otherwise have those” (Peter Munk in Frigon 2009, 1:08:30).

The international mining sector works at several mutually reinforcing scales: global, national, and regional (Tsing 2000). These scales are not neutral or objective – they are created, reified, and become taken for granted as a ‘natural’ reality (Tsing 2000, p. 120). These scales are seen in the creation of the Furtei mine and the transformation of the landscape from rural and pastoral to industrial and extractive. Finance capital, which enables the mining sector, attempts to create a global and universal scale in which it is a hegemonic actor – it has global reach and can make the dreams of those at the national and regional scales come true (Tsing 2000, pp. 119-121). Mining, supported by international finance, is important to the Canadian economy and identity; once a colonial outpost that was a source of resources for Europe, mining became a means of Canada asserting itself on the world stage (Deneault and Sacher 2012). Some in Canada, feeling

anxious about the closing of the Canadian frontier and the rise of environmental regulations, saw opportunity in foreign frontiers for mining riches (Tsing 2000, p. 139); this Canadian national dream of mining riches is imagined as universal, transcendent, and beyond local cultures (Tsing 2000, p. 140). The regional scale at which international mining operates is the frontier (Tsing 2000, p. 122); the frontier is ostensibly a landscape full of riches, open for development, empty, but paradoxically, have residents who possess the same dream as Canadian miners. The creation of the frontier is a necessary part of the mining process; the frontier is a place of mystery and undiscovered potential. A place where risk takers can make a fortune if they are brave enough to invest in a mining company. The frontier, with its imagined profitability (Tsing 2000, p. 118) is a precondition for speculative investment in mining firms and resource extraction (Tsing 2000, p. 131).

Publicly traded companies in Canada must file public securities documents and information with the Canadian Securities Administrators in order to enhance investor awareness. The documents filed by the Canadian mining companies involved with the Furtei mine filed between 2002 and 2009 discuss geology, exploration programs, estimated gold reserves, stock deals, mergers, acquisitions, contracts, and promotions and new hirings; they never mention the people of Sardinia or any description of the land other than that of a source of gold.

As the above quote from Peter Munk reveals, gold is in places that are distant and amenable to being transformed into an extraction frontier. These places are presented as having nothing except the potential for resource extraction; it is only through allowing foreign companies extract these resources that the frontier has any hope of progressing. The frontier, and its associated plans and projects, are premised upon a narrative that justifies extraction, exclusion, and a paternal, neo-colonial relationship whereby the frontier is governed by the financial ‘centre.’

“Pay attention! Something is evil in the macroeconomic plans, something is not functioning in the complicated mathematical calculations that sing the successes of neoliberalism’ ... ‘Look! This is what the numbers and the speeches hide. Blood cadavers, bones, lives and hopes, crushed, squeezed dry, eliminated in order to be incorporated into the indices of profit and economic growth.” (Berger 2001/2003 p. 229).

In creating the frontier, residents’ landscapes are subsumed to the landscape needed for accumulation. The spread of the frontier represents the destruction of local places, land, rights, and knowledge (Tsing 132). The neoliberalism project wants us to imagine the world remade according to its values and doctrines; a global world with free flows of capital, labour, and money across scales (Tsing 120). This project, with its purported global universalism, wants people to believe that there is little space between what is known and unknown. For example, the ostensibly universal mining ambition that Canada exports draws together the known and unknown – the universal is what is known and, since it is universal, it

also represents the unknown. When this space contracts and is small, there is little room for imagination and the possibility of other ways of knowing, hoping, acting, and dreaming (Berger 226).

However, what is believed to be known in these instances is a fiction. An artifact of a global narrative that presupposes the complete hegemony of the neoliberal project that erroneously believes that the world has been remade according to its values and doctrines; a global world in which capital, labour, money, and ideas flow freely. A world in which global finance and universal dreams can be used in a Canadian nation building project in a far-flung frontier. However, there are peoples who do not fit into the logic, plans, and projects of resource extraction. This studio project seeks to irritate the logic of extraction, to provide a reminder of the people who are commonly excluded from plans and projects (Berger 225-226), and to explore how communities and planners can collaborate to collapse the distance between the scales at which the mining industry operates.

The reading of a text may work to approximate an experience that is represented in the text; it may also result in the distancing of the reader from the experience. Thus, an image of an indigenous man in Mexico, killed while fighting for his way of life, can tell a reader something approximating “the indigenous situation in modern Mexico, NAFTA, the international forums, the economic bonanza, the first world” (Berger 2001/2003, p. 229). This same image could also be interpreted as something distant: “This did not happen here ... this is Chiapas, Mexico, a historical accident, remedial, forgettable and ... faraway” (Berger 2001/2003, p. 230). In the creation and reading of a text an exchange occurs between the writer and the reader; this exchange provokes the collapsing of distance between the experience and the reader (Berger 2001/2003, p. 230). This recognition is important to our project as we attempt to collapse the distance between financial and colonial centres and the resource frontiers that they create. The project aims to consider how images, videos, and maps can be created and used by planning practitioners to communicate the experiences of people impacted by mining. The methods used and products created seek to make explicit the connections between these seemingly distant geographies and how decisions and policies made in Canada have tangible impacts on the lives of the people who live around the Santu Miali mine. This project implicates Canada in the institution of global mining and the Santu Miali mine in an attempt to make it difficult for a reader, or viewer, to dismiss what is happening in Sardinia as something far away and unconnected with their life. Through interventions, such as our occupation of POPS in which a story of Canadian mining was told through images, words, and postcards for participants to take home, commonly believed relationships between Canada, mining, and foreign landscapes and people are challenged; by changing participants’ knowledge of this institution, a new way of understanding reality is created which could become the basis for political change and a reconfiguration of the geography of resource extraction.



Day 6: Workshop in collaboration with UNISS



Day 7: Workshop with residents and employees from town surrounding Santu Miali Gold Mine





“Psychogeography sets for itself the study of the precise laws and specific effects of the geographical environment, whether consciously organized or not, on the emotions and behavior of individuals” (Debord 1955/2008, p. 23).

Debord recognized the emotional and behaviour impacts that a landscape can have on individuals. Kevin Lynch, while recognizing the powerful linkages between a city and meaning and memories, attempts to move beyond the individual and identify public images of a landscape: “the common mental pictures carried by large numbers of a city’s inhabitants: areas of agreement which might be expected to appear in the interaction of a single physical reality, a common culture, and a basic psychological nature” (1960/1990, p. 7). Identifying a common image of the landscape surrounding the Santu Miali mine is critical to establish a meaningful remediation plan for the mine’s afterlife. This plan needs to address the landscape as it is known and seen by the inhabitants of the region and not as a frontier that once had gold and now is a toxic site that needs to be cleaned. Through this project, and earlier work, data collection on creating an image of a commonly viewed landscape has begun. The primary method that was used during this studio project was the walking tour. Three individuals led guests through parts of the landscape around the minesite and explained what was being seen and memories and feelings associated with this. This method is similar to the walking tours that Lynch (1960/1990: p. 143) utilized to gather data to create an abstracted map of the impressions that the physical form makes on people who have connections to a particular landscape.

## What’s Next?

Our goal in producing this document and its associated digital resources has been to create a living work; just as we inherited this project, it can be picked up and expanded upon by others. Some ways that it could grow include:

### **Build a website to house the project**

The information gathered throughout the project is diverse in type. The products created include interactive mapping tiles associated with individual experience, videos used to animate stories from mine workers, facilitated workshop results from the town of Furtei, video and printed materials from a walking tour installation in Toronto, background research on the policy, regulatory, and societal structures supporting extractive industries, and a visual essay summarizing the above information. These items all reinforce and inform one another and are currently dispersed across media types and locations. While we have embedded links to the digital content in the visual essay by using QR codes, the project would

be better served through creating a single home for everything produced. This website would allow for increased continuity between the various facets of the project and would serve as a living document to expand upon the work.

### **Animate the visual essay**

The front side of the document you are currently holding is a visual essay summarizing the information gathered over the course of this project. It walks the reader through the history of Canada’s investment in extractive industries, current domestic and international systems supporting the mining industry, the Santu Miali mine’s history, and the current work being done in the surrounding community with regard to post-closure planning. Time constraints to this project resulted in a printed final project; however, the visual essay could be more compelling if digitally animated. We imagine more interactive product, where a reader could click to move forward through the topics, and the animated and video elements currently housed separately from the visual essay could be incorporated.

### **Further interventions in Toronto**

The work produced for the walking tour of the financial district in Toronto can be continued. The links between Toronto and international mining projects remain intentionally obscured, and work that brings those connections to light is valuable. Further work in Toronto could work to ground international mining associations in the space of the financial district, or in Toronto at a greater scale. This could take the form of further art interventions, or walking tours, or other forms we have not considered. Another potential path for extending the work in Toronto would be to seek to publish this work or to participate in conferences here in Toronto. One potential venue for this distribution would be the planned Antipode Beyond Extraction counter-conference, running concurrently and in opposition to the Prospectors and Developers Association of Canada convention in March 2020.

### **Further collaborative work in Sardinia**

Work on the post-closure planning of the Santu Miali mine will continue regardless of the continuation of our particular project; however, continued participation in facilitation, research, and documentation could be beneficial. The workshops conducted in Sardinia provide a basis for further facilitation, and the results of this round of community involvement could be used in future facilitation efforts aimed toward refining the desired future of the mine. Tools like Strava, GIS, and video could be used to document the mine’s stories. Unconventional methods of facilitation grounded in psychogeography could be used to further engage populations not generally consulted in post-closure planning. For example, emoji mapping could be used to engage with children in the community.

## Production

We chose these method of storytelling as a means of speaking between qualitative and quantitative data, a variety of methodologies and nuances that would be difficult to express through traditional storytelling formats. This visual essay communicates our role in collapsing the distance between two distinct places involved in resource extraction. We engaged in a variety of methods to tell the story of place, and we decided to use this format to showcase these lived experiences in a method that is universally understood and applicable.

Our aim was to create a final product that would summarize our findings and live as a resource for the people we engaged with in Sardinia once translated into Italian. Our intention in doing so is to better communicate Canada’s ties to places and people in distant locations whom we are connected to through extraction. It also dismantles the trope of resource extraction frontiers by representing the Santu Miali site as a place that is a home with its history and valued memories and connections . For our format we sought inspiration from a few sources, namely, Ariel Aberg-Riger, a visual storyteller for Citylab. However, as production continued and our work evolved the final product took a shape of its own due to technical and time constraints, team member proficiencies, and the volume of material that needed to be included.

Part of the process of creating products to communicate the story of the Santu Miali mine was using software to enliven and animate the data. This was done using the following process:

### **Walking Paths**

1. Download Strava data as a gpx file.
2. Add the gpx file to QGIS and add layer with the points collected by Strava.
3. Convert the points into a line.
4. Add a basemap.
5. Export map as pdf for further processing.
6. Animate path in After Effects & compile video in Premier Pro

### **Elevations**

1. Install Profile Tool plugin in QGIS
2. Create Digital Elevation Model of area
3. Use Profile Tool plugin to create elevation profile along walking path
4. Export graph as an svg file for further processing.
5. Animate path in After Effects & compile video in Premier

### **Tiles**

1. Save coordinates of points as a csv file, import the csv file into QGIS.
2. Create a buffer around each point for the area to be shown in the tile.
3. Add a basemap, export each buffered area as an image.
4. Crop each image in Photoshop.
5. Add caption describing the story associated with each point.

# RECOMMENDATIONS FOR SARDINIA

North American literature on mine closure planning and remediation focus heavily on the technical aspects of mine remediation. For instance, Betancourt-Buitrago (2019) presents a photocatalytic reduction option for the treatment of cyanide wastewater, while Kossoff et al. (2014) investigates processes of isolating tailings to deter them from entering groundwaters, rivers, lakes, and the wind. Lima et al. (2016) examine techniques for post-closure planning, including remediation, restoration, and rehabilitation, where they find reclamation and rehabilitation to be the best approaches to recovering landscapes post-closure. Within these technical approaches, little attention has been given to the public participatory process of remediation and the elements of perpetual care to help a community heal post-closure (Beckett, 2018). The process of remediation is typically perceived as an act of reversing environmental damage caused by mining. However, as Nixon (2011) argues, pollution can be recognized as a form of “slow violence” as its aggregate impacts affect communities for generations to come. Environmental and social damages of mining therefore cannot simply be reversed once the mine has closed (Beckett, 2018). Scholars have also begun to recognize the anthropocentric nature of remediation, as the general intent of cleaning up environments are for the benefit of humans (Katz, 1997; Elliot, 1997). Further remediation and restoration techniques must therefore consider its potential benefits and harms on humans and other life forms collectively.

Beckett (2018) notes the process of remediation in itself can be harmful to surrounding communities as they reshape local landscapes and economies. Some scholars have begun to broaden their definition of remediation to consider its social implications, including Chukwuma (2011) who argues communities need leadership, partnerships, sharing of stories, and support from all levels of government to protect groundwater resources. Other authors investigate the social barriers to remediation, such as Jardine et al. (2013) who consider the five main obstacles to trust in the process of remediation. They reference histories of mistrust between communities and the government as a significant barrier to remediation (Jardine et al., 2013).

With growing understanding of its multifaceted considerations, mine closure and remediation are now encouraging guidance from a range of disciplines including engineers, environmental scientists, socioeconomic



practitioners, and communities (Van Niekerk, 2014). Other scholars assess remediation as a process of perpetual care and living with the histories of mining, rather than maintaining this fantasy that waste can be removed and controlled forever (Ureta, 2016; Beckett, 2018). There needs to be a greater appreciation of the continuous nature of the environmental and social suffering that occurs as a result of mining and remediation (Langhorst and Bolton, 2017).

There are clear gaps in mine remediation literature surrounding environmental justice for Indigenous communities, as they lose their ability to care and be cared for by their land (Tuck & Yang, 2012; Beckett, 2018). Processes of mine remediation must therefore occur hand in hand with processes of reconciliation with communities and Indigenous peoples.

To take on a more comprehensive approach to mine closure planning, Beckett (2018) argues for a broadened definition of remediation that includes social justice, repair, mediation, reconciliation, and care. This holistic definition of remediation will help push mine closure plans beyond the act of cleaning up polluted landscapes, towards practices of trust building, reconciliation, and ongoing care for humans, animals, and environments alike (Beckett, 2018).

## Case Study: Giant Mine, Yellowknife

The Giant Mine near Yellowknife, Northwest Territories was decommissioned in 2004 after producing over 7 million ounces of gold over 56 years. The processing of the gold ore at this mine produced arsenic trioxide dust. In the early years, an estimated 16,500 pounds of arsenic was emitted by the Giant Mine each day. As technologies for collecting air and water emissions improved, arsenic emissions from the mine declined: by 1973 850 pounds of arsenic each day was released and by 1979 only 29 pounds per day were released. However, there arsenic pollution had severe impacts on the indigenous peoples, non-human species, and the physical environment around the mine (Sandlos and Keeling 2012).

After the mine closed in 2004, the Canadian government became responsible for the environmental contamination left by the mine. Since the 1990s, the government had been studying the best way to deal with the 237,000 tonnes of arsenic stored underground at the mine. In 2003 it recommended a ‘frozen block’ technique to freeze the arsenic in situ in perpetuity. This method would require that the site be maintained over thousands of years. This remediation plan was rejected by the Yellowknife Dene First Nation (YKDFN) and Alternatives North (an environmental and social justice NGO) (Toxic Legacies nda.).

These groups successfully lobbied the City of Yellowknife to request an environmental assessment be conducted to study the government’s proposed remediation plan. In 2013 the environmental assessment was completed and in 2015 the Giant Mine Remediation Project Environmental Agreement was signed. This agreement binds the Canadian government, the territorial government, and the Giant Mine Remediation Project to engage in community involvement and gain their consent in future remediation planning (Beckett 2018).

In response to the unsatisfactory remediation plan proposed, a community-university research partnership named ‘Toxic Legacies’ was created between Memorial University, Lakehead University, the Goyatiko Language Society, and Alternatives North. This project seeks to articulate the history and legacy of arsenic contamination at the Giant Mine through five sub-projects: collecting the memories of the Yellowknives Dene and arsenic, conducting community land-use mapping, understanding the process of mine remediation and its limitations, developing methods to communicate to future generations about any remaining dangers at the mine site, and the production of the Guardians of Eternity documentary that examines the arsenic problem at the mine (Toxic Legacies ndb.).

During a workshop held to gather community perspectives on the remediation of the landscape, some surprising themes emerged. Participants viewed the process as a way of shaping how the site will be used and remembered into the future. Some people thought that the site should be re-greened and made welcoming while others believed that the site, while being decontaminated, should be left as a scar on the landscape as a reminder of what happened. Workshop participants forced the remediation process to address the impacts that mining had on their communities, historical injustices, and colonial relationships as well as environmental degradation (Becket 2018).

The Giant Mine remediation process provides a case study for how a remediation plans to address the Santu Miali mine after life should be developed. Remediation plans are commonly developed as technical exercises. Experts use their specialized knowledge to determine what the problem is and the potential solutions. Only after the problem is defined and solutions identified, the affected communities may have an opportunity to be brought into the process (Beckett and Keeling 2019: 217). This reflects to the earlier discussion about the limits of possibilities when the space between the known and unknown is small. When remediation is defined as a technical process, the knowns and unknowns of remediation lie within the realms of biology and chemistry. However, mining is built on legacies of colonialism, expropriation, human rights violations, as well as environmental degradation. The idea of remediation must be reconstituted to include the remediation of historical injustices and colonial history as well as environmental cleanup (Sandlos and Keeling 2016; Beckett 2019). The expansion of the field of remediation introduces a host of unknown elements which must be accounted for. This involves bringing in ‘experts’ other than technical specialists; the people who live(d) on and are or have been impacted by the mining operation

must be consulted as experts on the landscape, of their history, of any injustices, and of the future of the landscape. By doing this, the range of possibilities for the successful remediation of the mine site in its afterlife will include environmental cleanup and address the needs of current, and future, residents of the site.

## Case Study: Argentiera

Argentiera is a small town in Sardinia, Italy. It is located 43 km from Sassari, on the coast of the Sardinian Sea. Argentiera is a former mining town based on the extraction of minerals, such as silver, blende, galena and their mixed derivatives (De Monis, 2008). Argentieria belongs to a 600 ha wide unique estate, which is bounded by the seacoast on the west and extends east wide to the interior part of the area (De Monis, 2008). With mining beginning in 1867, It is one of the more historic mines of the island. Today it is celebrated for its synergy of the landscape, seascape and the mine.

Human settlements connected to productive activities were constructed along the coastline: firstly, they were concentrated around the old buildings, known as cuiles, and secondly, with the development of the extraction process over time, they formed a mature residential pole provided with infrastructures and social services. The surrounding village was built for several hundred families of the miners and technicians. In 1951, a population of 1347 inhabitants lived at L’Argentiera, but it is possible to estimate a higher figure, around 1700, for settled persons, since many workers maintained their residency outside (De Monis, 2008).

After the mine closed in 1963, Argentiera was left completely deserted with many abandoned buildings. The natural resources and economic activity that supported its existence have failed to endure the rest of the population. In order to create or recover economic, cultural and social value through in Argentiera the following processes of healing the environmental damage was deemed necessary.

It order to make what was left of Argentiera commercially viable health and safety was of major concern. Land erosion over the years lead to concentration of metals in the soil and water. The material coming from the mine was generally mixed up with extraction waste materials of the rocks containing lode.Mine remediation projects tend to focus on the technical, scientific or risk management aspects of clean-up, such projects risk perpetuating or re-inscribing these environmental injustices and responsibility for environmental degradation (Dillon 2014). Specific analysis and monitoring for traces of iron, copper, cadmium, arsenic, and mercury ia a necessary precaution (Landworks, 2015). Secondly, the character of the site offered an opportunity to formulate it as a cultural heritage site at a broad scale, involving sustainable building restoration, energy production, tourism and landscape. Mining heritage on the island of Sardinia has the opportunity to become a contemporary tourism destination

offering many programs. Geomining Park, leads programmes and policies for the rehabilitation of these sites, which constitute relevant economic opportunities for local communities. Intergenerational programs such as Landworks connect together the identity of the site communicated in an attractive way. In this pathway, tourists, such as culture consumers, ecologists, architects and simple citizens, may wander the ancient mining facility now constructed to be a museum through the shafts, the deposits of the residuals, the ancient processing buildings and the house of the director of the mine, tasting, living and understanding the reasons that determined the actual landscape patterns (De Monis, 2008). These activities celebrate the historical past of Argentiera and provide residents a viable opportunity to re-establish a community there.

## Best Practices for Post-Closure Planning

In addition to the potential continuation of this project, this document aims to provide a brief overview of best practices of social post-closure planning. The remediation plan in effect at Santu Miali, as with many extractive post-closure plans, deals exclusively with technical remediation. While this remediation of the site is vital, it is also critical for the health of the community that steps are taken to mitigate the effects of the mine’s closure on a social level. The case studies reviewed above indicate that planning with and for community groups can have enormous effect on the ongoing success of post-closure mines.

### Community Directed Remediation

The remediation efforts thus far put in place at the Santu Miali mine are technical and are generally established in absence of consultation with the community. As shown by the Giant Mine case study, remediation plans that are exclusively technical can lead to a lack of trust in the process, with the community’s exclusion serving to reinforce barriers. However, further study and consultation with the community, where stronger relationships are consciously cultivated, can lead to a remediation plan that incorporates community concerns and is both more successful and more embraced by the community. Armour’s work on co-operative processes outlines the necessity of providing the resources and materials needed for the community to articulate their needs and positions; a community that is respected is more likely to have trust in both the process and the outcomes of a remediation plan.

For Santu Miali in particular, we suggest a continued course of community-based land use mapping. The work previously done to engage residents

puts the focus on the past and current condition of the mine, and has not yet addressed its future. Further efforts to discuss the site’s future could include initiatives such as developing a psychogeographic mapping of the landscape through continued walking tours, or a facilitation exercise indicating preferred site uses into the future, using symbology or other visual participatory methods. Further work on the post-closure remediations plans should ensure the participation of people of all ages, as the mine’s operation and closure has created a substantial issue of intergenerational equity; those who benefited from the mine through employment and those who have only known it as closed are likely to have diverging perspectives that deserve to be considered. Additionally, the work to date has largely engaged with those who used to work at the mine—there is value in reaching out to the wider community, who may not have a past connection to the mine but could still care about its future.

### **Economic Potential**

The Santu Miali mine should be considered as a potential asset, even in its post-production years. The remediation of the mine should, through the community directed remediation outlined above, consider the economic opportunities available now that the mine has left. This is critical for the ongoing success of the community. The Santu Miali mine was one of few opportunities in the areas; when it closed, the whole area lost its economic engine. Although it is beyond the scope of this project to solve this issue, it must be considered moving forward.

The Argentiera case study is an example of how a Sardinian mine has successfully created an economic and social hub through tourism. Santu Miali differs from Argentiera in that it is not located on the coast, where much of Sardinia’s tourist infrastructure is. However, its centrality—in the middle of 4 towns, a 40-minute drive to Cagliari—positions it well to draw investment into the interior of Sardinia. Partnerships with the larger organizations including UNISS, like the Argentiera mine landworks program which provides training programs for local residents, could incentivize local economic progress or development of employment, a cultural or tourist node—a site that draws people in.

### **Perpetual Care**

The key principle in moving forward with the social planning for Santu Miali’s post-closure is that of perpetual care. The mine should be considered not within a binary broken/fixed framework, but as an ongoing process. The Giant Mine case study shows that there is no end to remediation; if it is built, it must be cared for forever. This is also an issue of intergenerational equity, as for the most part those who must go on caring for the mine will have no experience of it in operation, with this divide increasing as time passes. A multigenerational approach to consultation is

therefore critical going forward.

Santu Miali is more contaminated than Argentiera, the closest comparable Sardinian site. It will likely require an organization to ensure that the site is cared for in perpetuity, as the potential harm of the site will continue beyond the immediate memory of the current community. Whoever next has ownership of the mine should acknowledge the need for ongoing work; this will likely also require financial assistance from higher levels of government, as the mine’s continued state of remediation is a public good. There is also a critical place here for bottom-up work, in addition to top-down governmental interventions. Both case studies have demonstrated that a reciprocal relationship of care between the landscape and the community is necessary for an optimal post-closure future.



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