How can landscape architecture be used to reclaim and re-purpose former iron mining sites in order to preserve cultural identities?
about:

> Reclamation-Based
> Exemplification of History and Culture
> Enrichment
> Tourist Attraction
> Strengthened Bond Between Past and Present
> Growing Cultural Pride
Minnesota Iron Range

Ironton Sintering Complex

Fargo/Moorhead

Minneapolis

Duluth

Site Context

Photo: Google Earth

Ironton Sintering Complex

> 35 Acre Site

> National Register of Historic Places

> No Longer In Use

> Town Population: ~3,000

> Climate similar to Fargo

Crosby, MN
why here?

> Industrial History
> Regional Culture
> Natural Beauty
Iron Range History
The first ore to be commercially mined from the region came from the Soudan Mine opened by the Minnesota Iron Company in 1884.

The iron mining drew immigrants from all over the world including Finland, Sweden, Italy, Norway and Croatia and by 1900 nearly 70% of mine workers were foreign-born.

By the early 1900s the Iron Range contained the largest variety of immigrants outside the Twin Cities.

As mining operations increased, new towns were founded and existing ones grew exponentially spurring the development of the Iron Range.

Currently, mining operations have slowed and the economy of the region is in a state of transition.
History

The modern history of “Da’ Range,” as the locals call it, can fit into roughly five generations. With such a young history it is no wonder the population is so well connected to its past. Practices started out of necessity, such as back-yard gardening and community meetings, have been passed down from generation to generation. People from The Range have a strong sense of pride and identity.

Outdoors

The Iron Range holds some of Minnesota’s most beautiful natural landscapes. Rolling hills, rocky shores, bountiful forests and numerous lakes have instilled within the people a strong connection to the outdoors. Activities ranging from biking to hunting/fishing and boating are all practiced in abundance throughout the region.

Patriotism

For Iron Rangers, as they call themselves, dedication to the country that has provided for them is a thing of pride and is celebrated heavily throughout the region.
Community

Nearly all of the small towns throughout the Iron Range organize community events ranging from the Mardi Gras-like 4th of July celebrations to the cultural Land of the Loon Festival. Parades, crafts and traditional food are always a large draw for locals as well as tourists.

January
Night Sky of the Northwoods

February
Laskianen Finnish Sliding Fest
Full Moon Snowshoe Hike

March
Eveleth Puck Days
Pepsi Challenge Cross Country Ski Race

April
Iron Range Earth Fest

May
Bob Dylan Days

June
Land of the Loon Fest

July
Northern Lights Music Fest
Aurora Patriotic Days
Fourth of July Celebrations

August
Great River Energy Mesabi Trail Tour

September
Wirtanen Pioneer Farm Fest
Housekeeping Olympics

October
Night Sky of Northwoods Halloween Carnival

November
Iron Stories

December
Weihnachtsfest
Balkan holiday Bazaar
Holiday Heritage Fest
Winter Solstice Celebration
Site Information Analysis
Current Entry
- uninviting
- nondescript

Former Sintering Furnace
- overgrown
- in need of minor repair
- a lot of character

Former Sintering Elevator
- in disrepair
- overgrown
- a lot of character

Current Landscape
- undefined
- unkempt

Former Sintering Warehouse
- in disrepair
- full of debris/garbage
- a lot of character
Slope
The slope within the site ranges from gentle slopes ranging from 0%-5% (shown as white) and more notable slopes upwards of 10% to 30% (shown in red).

Toxins
The process of iron ore sintering produces three prominent toxins that enter the soil and air; lead, zinc and mercury. These toxins cause negative effects ranging from kidney damage and headaches to blindness and DNA alteration.

Topography + Toxin Movement = Location

Phytoremediation will be used to uptake the toxins and clean the soil.
What’s the Plan?

Gateway to the Range:
> A place that exemplifies history and culture
> Creates a source of pride for locals
> Jump off point for tourists
> Community Involvement

A Living Museum:
> Trail system
> Interactive exhibits that change through the year
> A Changing cultural focus
> Community Involvement

Clean-Up:
> Uptake and neutralization of toxins
> Minimal impact on existing ecology
> Aesthetically pleasing
Initial Concepts

- Process Sketches
- Bench Concept
- Light Pole
- Tree/Shaft
- Mini Tank Fire
- Park Design at Midterm
- "Full Immersion" Concept
- Entry Concept

Community Involvement

Trail system

Interactive exhibits that change through the year

A Changing cultural focus

Uptake and neutralization of toxins

Minimal impact on existing ecology

Aesthetically pleasing
Design Proposal
Cohesive Design
master plan

Portsmouth Mine Pit Lake

Discovery Park

Discovery Trail (Primary)

Discovery Trail (Secondary)

> Connection to community
> Embraces three core concepts
> Takes advantage of natural landscape
> Minimal impact on natural environment
A defined entrance greets visitors as they enter Portsmouth Mine Discovery Park. The theme of the entrance, like that of the park as a whole, reflects the industrial heritage of the region in both material and form. The added vegetation symbolizes the regrowth of damaged ecologies while adding further aesthetic appeal and definition.
Portsmouth Mine Discovery Park

- Sculpted Landscape
  - provides definition, reminiscent of pit mines

- Public gathering space
  - farmers markets, craft fairs, festivals and events

- Tourism information
  - maps, trip planning, itineraries, events calendars

- Adapted Structures
  - climbing wall, cultural mural, immersion museum

- Toxin Remediation
  - holistic cleaning of sintering toxins and parking runoff
Gateway to **the Range**

sculpted landscape

> Terraces built to 4’-6’ in height

> Sheet-piling wall construction with concrete faux-dirt, concrete facade

> Former sintering furnace re-imagined as a climbing wall with new routes added monthly.
> Terraces allow for sledding, skiing and snowboarding (particularly for children)

> Climbing wall adapts for ice climbing

> Ice wall is carefully built using a system of removable nozzles
Gateway to the Range
defining place: Material

> Reclaimed and Donated Materials

> Industrial materials and form reflect sites history

> The words for “iron”, “shovel”, “ore” and others are imprinted within the concrete in the native languages of the regional immigrant groups.

> Red maples, sparsely planted throughout the central gathering space, will bear vibrant red fall color representing the redness of iron ore.
Gateway to the Range

defining place: detail

Bench
- Steel Girder
- Reclaimed Wood Plank

Light Pole
- Steel Girder
- Mining Lamp

Bike Rack
- Steel Gear

Concrete Footing
Gateway to **the Range**

*event space*

- Central gathering space hosts markets, concerts and other events
- Local music, crafts and food are promoted improving the local economy and attracting future visitors
- Terraces act as natural backdrops for vendor stalls while spatially defining the event
Living Museum immersion gallery

- Starting point of the Living Museum
- Visitors don coveralls and miners hats before entering the gallery space
- Gallery space features traditional company-provided housing, art, historic elements and large-scale exhibits rotating on a cultural calendar
- Visitors experience a “full immersion” experience in a mock-mine

- elevator
- historic miner’s housing
- ADA lift
- stairs
- local mining art
- exhibits
- mine immersion
- “locker room”
- exit
- entry
Toxin Cleanup concept

Iron Ore Sintering produces Lead Mercury Zinc causes Anemia Deafness Kidney Damage Rashes DNA Alteration ...and more

Phytoremediation Solution Effect

Clean Water Clean Soil Healthy Environment Healthy People Education

Gardens are aesthetically pleasing while functional
> Designed to slow the flow of water, remediate toxins and stabilize the soil
> Planted with native plants well suited for the local soil typology
> Anual testing of water, soil and plant material
> Plants burnt at end of life cycle with toxins separated from ashes
Toxin Cleanup
parking remediation

- Placed at a natural low point with drainage from the primary parking lot
- Garden focuses on the uptake of petroleum by-products from automobiles

**Green Ash**
*Fraxinus pennsylvanica*
Tolerant to Petroleum

**English Ivy**
*Hedera helix*
Toxin Uptake: Carbon Monoxide, Petroleum
Hyperaccumulator, Phytoextraction

**Golden Weeping Willow**
*Salix abla “Tristis”*
Toxin Uptake: Mercury, Lead, Zinc
Phytostabilization, Phytoextraction,
Phytodegradation, Rhizodegradation,
Phytovolatilization

**Tall Fescue**
*Festuca arundinacea*
Toxin Uptake: Lead, Zinc, Diesel Fuel
Accumulator, Phytoextraction,
Rhizodegradation

**American Winterberry**
*Ilex verticillata*

**Savin Juniper**
*Juniperus sabina*

**Diablo Ninebark**
*Physocarpus opulifolius “Diabolo”*

**Garden focuses on the uptake of petroleum by-products from automobiles**

placed at a natural low point with drainage from the primary parking lot
Garden focuses on the uptake of zinc, mercury, and lead.

Stops the movement of toxins and their entry into Portsmouth Mine Pit Lake.
Living Museum
discovery trail

Portsmouth Mine
Discovery Park

Discovery Trail
(Primary)

Discovery Trail
(Tertiary)

“Discoverable”

> 2.5 mile trail
> Connects to existing trail systems
> Trail takes advantage of natural landscape for views of Portsmouth Mine Pit Lake and surrounding forests
> 24 “discoverables” located within 5 minutes of each other by foot
“discoverables” range in theme from current and historic mining to cultural elements such as Norwegian wood sculptures.

Some change in theme based on the seasons and a rotating cultural calendar.

Signage provides further information on exhibits and how they relate to the Iron Range.
<table>
<thead>
<tr>
<th>Italian</th>
<th>Finnish</th>
<th>Norwegian</th>
<th>Croatian</th>
<th>Swedish</th>
<th>Other</th>
</tr>
</thead>
</table>

> Each major cultural group is given a two-month period of focus

> Smaller cultural groups are given the same two-month period rotating year to year

> Organized events and activities will reflect the culture of the time
Living Museum cultural calendar

DECEMBER/JANUARY
- Dog Sledding
- Cross Country Skiing
- Ice Hockey
- SnowShoeing
- Swedish
- Finnish

FEBRUARY/MARCH
- Chinese Celebration
- German Festival
- Other
- Croatian

APRIL/MAY
- Traditional Dance
- Food Festival

JUNE/JULY
- Trail Riding
- Food Festival
- Spaghetti Cookoff
- Italian

AUGUST/SEPTEMBER
- Viking Festival
- Climbing Competition
- Norwegian

OCTOBER/NOVEMBER
- Chinese Celebration
- German Festival
Tourist Information

Itineraries and culture camps

Itineraries change with seasons as well as culture calendar to reflect the numerous attractions within Ironton/Crosby and The Range as a whole.

Tourists can engage in overnight stays or “culture camps” at the Portsmouth Mine Pit Lake Campground and learn traditional immigrant dances, languages and cooking techniques.
Through the creation of a “Gateway to the Range”, the interactive “Living Museum” and the remediation of past ecological damage, Mining the Past not only recognizes the history and culture of the Iron Range, it celebrates it.

A New Gateway to The Range
...and there was more...
Climate
The climate in the Iron Range region is typical of northern Minnesota and similar to that of Fargo. The winters are cold and produce bountiful snow while the summers can get quite hot.

Design Implications:
As the seasons in the Iron Range change the weather conditions in such extreme ways so to do the activities. This means that a successful design within the Iron Range must not just accommodate the seasonal weather changes but celebrate them.
Water
The average depth of the water table within Crow Wing County is 25 feet below ground. The implications for this are that potential on-site contaminants such as mercury, zinc and lead will likely have penetrated deep enough into the soil to contaminate the groundwater. Mercury has been found present in the surrounding bodies of water, which are more than clean enough for recreational use, but not at levels above those found in the majority of Minnesota’s lakes.

Toxins
The process of iron ore sintering produces three prominent toxins that enter the soil and air; lead, zinc and mercury.

Zinc: occurs naturally all over the world. Is necessary for normal bodily function in humans an most other animals. High concentration can cause rashes, stomach aches, anemia and damage to the pancreas.

Lead: Can cause numerous health effects in humans including brain damage, reduced fertility, kidney damage, miscarriages and high blood pressure. Can cause similar damage in other organisms as it builds up in their bodies. Lead is transported easily from prey to predator and can also damage organisms essential to soils including worms and bacteria.

Mercury: Highly abundant in freshwater lakes. Mercury causes brain damage, kidney failure, deafness, amnesia, nervous system damage and DNA alteration in humans. Similar effects are seen in other organisms as well and is rapidly spread through food chains.

Design Considerations
While the current effect of the perceived toxins on-site remain to be determined (no thorough tests have been conducted), the assumption can be made that the soils on-site carry some level of contamination. This contamination will need to be addressed in some way even if that intervention is minor. The ideal method for dealing with this issue is some sort of phytoremediation. Whatever the method, the process will be conducted with the least amount of environmental disturbance possible.
Connections

Location
The site is located just over one half mile from Ironton proper and just a bit further from Crosby. Being well connected to the towns via roads and trails further strengthen the site's potential.

Right: One of the many biking trails found in the Iron Range.


Portsmouth Mine Pit Lake

Connections

1/2 Mile

CR 30

The site is located just over one half mile from Ironton proper and just a bit further from Crosby. Being well connected to the towns via roads and trails further strengthen the site's potential.

Right: One of the many biking trails found in the Iron Range.
