Laurentian Vision Partnership
Transforming pits and piles into lakes and landscapes

Charrette Draws a Future for Biwabik

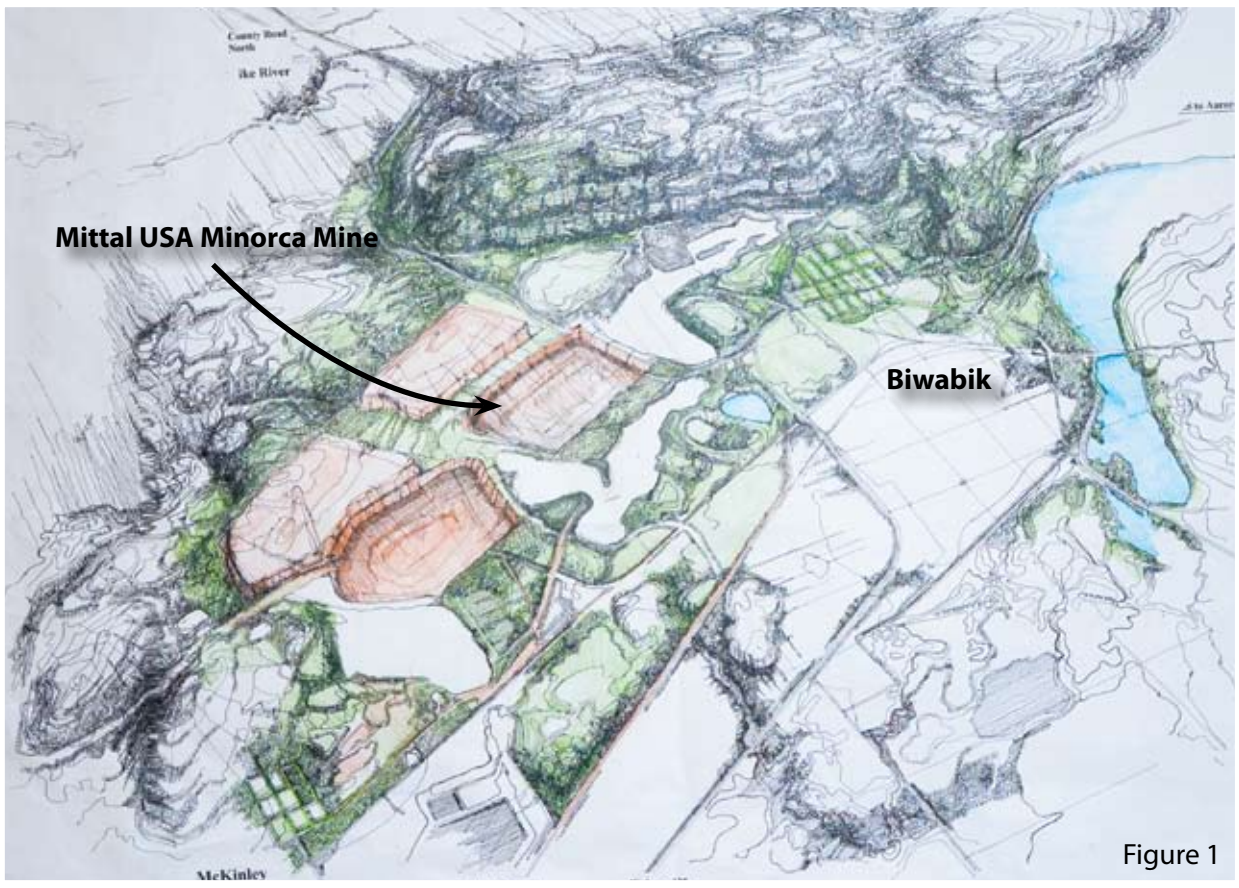


Figure 1

By Christine Carlson
Project Manager

The third Laurentian Vision Partnership (LVP) Design Charrette was held at Giants Ridge from April 22 — 26, 2007. Entitled **Mittal USA: Minorca East Reserve Design Charrette**, the workshop explored how to shape two open pits, stockpiles and a haul road for reuse once the new Minorca mine is complete in, approximately, twenty years. The charrette also laid out important actions that Biwabik, Mittal USA and others could take in the next live years to implement these or any other proposals, if they are desired.

This is the third design charrette the LVP has executed since 2000 when it began promoting active cooperation between mining and community interests on the Iron Range. It uses the charrette format to initiate these relationships because it is an effective and affordable tool for visualizing how mining can help shape land for the future. It is also a positive way to begin serious discussion about future land uses on former mine lands (see sidebar "What is a charrette").

This handout describes the April charrette and the two land designs that were produced — **Recreation Network and Sustainable Community.** Both designs demonstrate that mining can create development opportunities. They illustrate ideas for the reuse of pits, stockpiles and haul road areas. They also include new locations for County Hwy. 715 and broader ideas for development in Biwabik. Both scenarios stress concepts that are realistic and buildable. Both scenarios also retain access to future reserves.

Charrette Mission

In late winter, 2007, key stakeholders (i.e. City of Biwabik, Mittal USA, fee owners, MN DNR, St. Louis County, Iron Range Resources, Minnesota Power) established specified goals for the charrette and directed the team to:

1. Illustrate attractive land designs that
   a. Maintain access to future reserves.
   b. Emulate north woods character in image, scale and landscape form.
   c. Provide access to water, natural resources, and circulation and recreation systems nearby.
   d. Lay out a variety of usable (i.e. build able and manageable) development ideas and locations.
2. Screen mine views from major roads and viewpoints.
3. Lay out alternative locations for County Hwy. 715.
4. Explore land formations that enhance the appearance of the mine and improve the restoration potential for vegetation establishment and habitat creation.

Study Area

Mittal USA currently operates the Laurentian mine near Gilbert and processes raw ore into taconite pellets at its production facility in Virginia. Ore reserves in the Laurentian pit have been mined since 1992 but may be exhausted by 2011. Therefore, Mittal will need a new source of iron ore to maintain production of taconite in the Virginia facility. Two open pit mines with stockpile areas and haul roads will be opened and operated north of Hwy 135 between Biwabik and McKinley. Pits 1 and 2 will cover a combined area of 476 acres east of the McKinley pit lake, north of the Welton-Mary Ellen and west of the Canton-Higgins. The pits will be located on each side of the Belgrade sink, a water drainage way and site of collapsed underground mine conduits.

For purposes of the charrette, the study area included the new mine site and land north to the Laurentian Divide, south to Hwy. 135 and east to Giants Ridge (see Figure 1 above).

Mine Operation

To reach the ore reserve, Mittal USA will strip topsoil and vegeta¬tion (overburden), waste rock and lean taconite, and stockpile it north of the new

What is a charrette?

A charrette is a very structured, multi-day workshop organized to generate feasible ideas for a particular physical site. In the case of the Laurentian Vision, the site is an existing or proposed open pit taconite mine under operation for an extended period of time (i.e. 20 — 50 years). Professional planners, designers and mine engineers make up a charrette team that explores how to use the mine site once the ore has been depleted. The team generates maps, drawings and other graphic materials to help visualize, illustrate and discuss future scenarios and implementation strategies. A charrette is used to begin planning and development processes, and to bring together the key people needed to realize shared outcomes.

The word charrette is French for cart. Charrettes were used in 19th century French art schools to collect students drawings while they were frantically finishing them. Iron Range charrettes have been dubbed share-its, a term which best reflects their intent.

The Mittal USA Minorca charrette took place round-the-clock, over a four-day period. It involved a team of nine professional designers, planners and mine engineers, and a host of local, regional and state resource specialists. In addition to focused design work and peer reviews, the team participated in a range of activities. They had dinner discussions with sponsors, stakeholders, and local representatives. They toured the existing mine, new mine site, County Road 715, town, Giants Ridge and general vicinity. Some team members also toured the area by plane. The team also held an evening open house, public design reviews, and a final formal presentation. All activities were taped and photographed. Many were well attended. A group of Virginia high school art students visited the design team one afternoon. Several citizens and resource specialists visited or worked with the team through-out the week. Over thirty residents and other interested parties attended the open house. Over sixty were present at the final presentation on Thursday, April 26.

Laurentian Vision Partnership

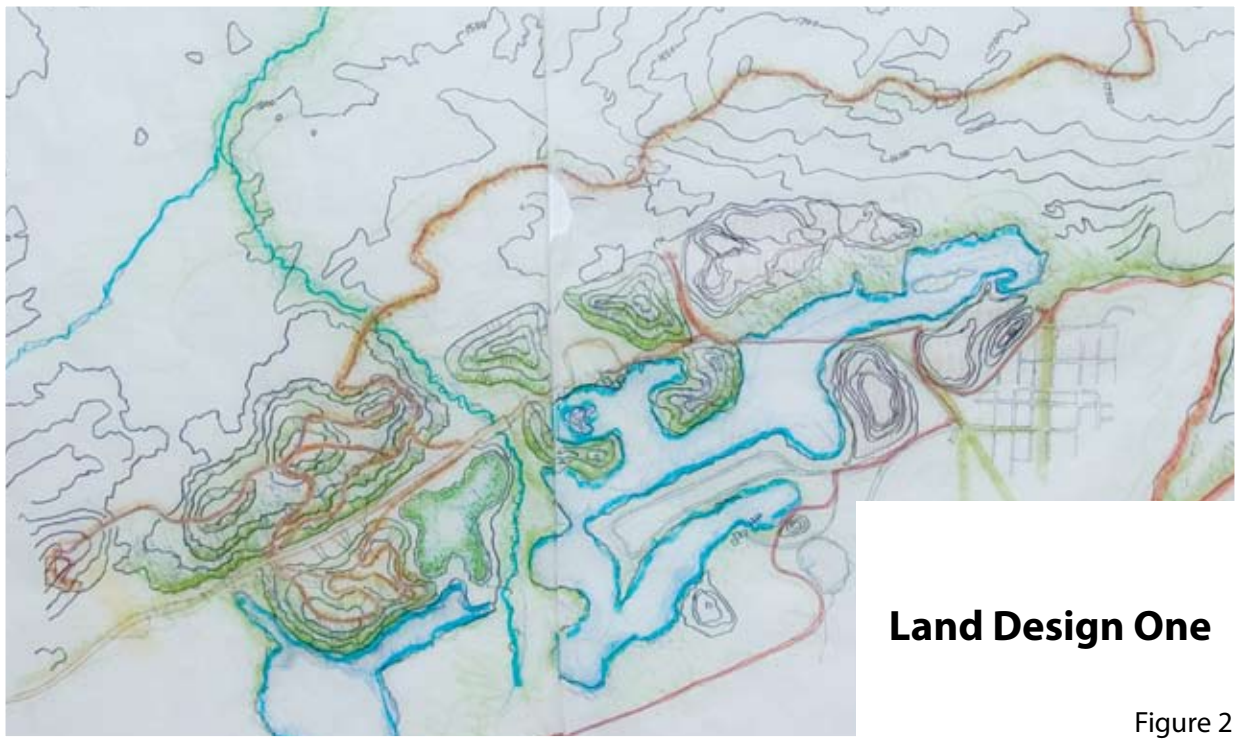
The Laurentian Vision Partnership is a regional coalition that promotes the development of productive post mining landscapes by facilitating

- Preservation of lands necessary to sustain current and future magnetic taconite mining
- Promotion of buildable landscape options for post mining uses
- Identification of new development opportunities
- Application of tools to achieve these goals:
  - Community Visioning
  - Land Design Workshops
  - GIS Mapping
  - Innovation Grants
  - Regional Cooperation

pits. The company will use two separate, existing stockpiles to maintain drainage through the Belgrade sink. The total stockpile area will cover 431 acres, approximately.

Mining will begin in Pit 1 near McKinley and continue until ore is needed from Pit 2 near Biwabik (in ten years time, approximately). Waste from Pit 1 will be deposited on the stockpiles. Waste from Pit 2 will be stockpiled and backfilled into Pit 1, leaving some access to future reserves. Once Pit 2 is exhausted, Mittal will build landforms around it and cap Pit 1 with overburden. Thus, Pit 1 will be filled mostly with waste rock so Pit 2 nearest Biwabik can fill with water.

The geology of the site indicates that the ore reserve slopes 12% from north to south. That means the north side of both pits will be shallow (60 ft.) and the south sides will be deep (280 ft.). The operation must also leave room for access to future reserves. Given the shape of the future pits, the difficulty of creating usable land in deep water, and the cost of handling waste material, the team focused most of its work on reshaping the stockpiles and the north sides of Pits 1 and 2.



Land Design One

Figure 2

Design Charge

In addition to meeting the stakeholder mission, the design team had to achieve a more fundamental goal — to demonstrate the mechanics of land shaping during mining. In other words, how to tie land shaping in sequence to Mittal's mining operation without wasting effort, distance, money or other resources. Several assumptions were given to the team. Design and operational issues embedded in the problem also needed to be resolved, namely:

1. Use 52,000,000 cubic yards, approximately, of mine waste and overburden in the development of end uses (35,000,000 c.y. waste rock; 17,000,000 c.y. overburden).
2. Reach a final pit depth of 280 ft., approximately, and a final water elevation of 1419 ft., approximately.
3. Stockpile waste rock in Pit 1 and potentially in Pit 2, if necessary.
4. Maximize extraction of the taconite reserve, including enlargement of the delineated mine pits, if necessary.
5. Retain access to future reserves and/or to non-taconite materials, with as few encumbrances as possible.
6. Use the geologic structure of the site (character of pit walls, existing earth forms, location of future reserves, particularly in relation to final water elevation, etc.) to shape development concepts.
7. Relocate County Hwy 715 away from the mine areas.
8. Consider the general context within which the mine pits are situated — their relationship to Biwabik, McKinley, the Pike River, Hwy. 135, the existing mine operation and other existing and proposed land uses.
9. Retain or redesign large mammal wildlife corridors through the project area.
10. Strengthen physical and visual links to existing natural and cultural systems (e.g. wetlands, rivers, lakes, Laurentian Divide, Biwabik).
11. Relocate the Mesabi Trail or other important pedestrian or vehicular circulation routes, if necessary.

Land Design

Based on existing information about the mine site, city and general vicinity, and on observations made during the site tour, the team quickly developed two general directions for the reuse of future pits and stockpiles — a recreation framework and a community development framework. Both scenarios focus on using land closest to and within Biwabik, including new locations for County Hwy. 715. The team also recommended that several sequential planning steps be taken by the City, Mittal USA and others. Both the land designs and the action steps respond to interests and needs expressed by the mining company, fee owners, county and community stakeholders in discussions held prior to and during the workshop.

Land Design One: Quiet Sports Recreation Network

Land Design One takes advantage of existing regional opportunities and reshapes mine features to build a nature-based, low impact recreation area. It develops three major ideas to illustrate how what is left from mining can be reused with minimal investment and/or infrastructure:

1. A land and water trail network that offers hiking, mountain biking, skiing, birding, canoeing and other quiet sports within close proximity to downtown Biwabik. The network capitalizes on the topography of the stockpiles and natural land- forms to provide challenging biking and hiking courses, scenic views and access to water.

2. Creative reshaping of stockpiles and pit lakes to provide attractive scenery and new upland wildlife habitat north of Highway 135.

3. Re-creation of new naturalized areas and retention of existing corridors for healthy water flow and habitat.

Recreation Network. Land Design One uses the area's rich natural resources to provide new nature-based, low-impact recreation opportunities that complement existing' activities. A long distance trail takes off from stockpiles north of Pit 1 and ascends the Laurentian Divide, serving as the spine of this enlarged system (see Figure 2 above). This Voyageur Trail follows historic Native American and voyageur routes in the area by traversing the Divide and linking existing trails (e.g. Mesabi Trail) with the Superior Hiking Trail to the north and east. The trail provides birding stops and expansive views north over the Pike River valley. It is designed to primitive standards established by the National Park Service and US Forest Service. Hikers move from primitive campsite to primitive campsite, or at best, from hut-to-hut.

In addition to providing long distance hiking, the trail serves as one arm of an extreme cycle-cross course. The course consists of a series of challenging hills and trail routes built on the stockpiles north of Pits 1 and 2. The new course also connects into existing mountain biking trails in the area.

Both the Voyageur Trail and the cycle course become extensions of Giant Ridge's Cross Country ski system. Or, they could begin to define a larger course designed to host national and world-class Cross Country events.

Finally, informal recreation uses - especially those that would not require large investments in infrastructure, or those that could be relocated easily if access to future reserves was required — exist on the south side of Pit 2 (formerly the Mary Ellen). Figure 2 identifies a new marina for motorized (less than 15 mph) and non-motorized boats (e.g. canoes and kayaks) on the site of Austin Powder. Another idea proposes prefabricated summer cottages for hikers, cyclists or birders on land south of the lake. The cottages are organized in clusters named for the historic mine locations around Biwabik, close enough to town for walking or cycling into the central business district.

Land Formation. Creative reshaping of mine stockpiles can meet state reclamation requirements and other goals at the same time. Figure 2 identifies the silhouette of a sleeping giant, which means Mesabi in the Ojibwe language. White pines and other native vegetation highlight its head, stomach and feet. The idea illustrates how thoughtful regrading of the stockpiles from Pits 1 and 2, and careful use of vegetation can create an attractive landform and pleasant views from Highway 135, and even reflect local history — all at little or no cost to Mittal or the community.

Biological Functions. Land Design One keeps as much land open as possible for visual quality, water flow and habitat, and to maintain access to future reserves. It uses the Belgrade sink as a natural drainage way and an important corridor for animals moving from large land reserves north of the Divide to those south of the mine. It also proposes the development of a shallow water habitat. Figure 2 identifies the location of a 29-acre perched wetland between Pits 1 and 2. Placed above lowest grade reserves to offset mitigation in the future, the wetland is fed from an upland water source that will not be impacted by mining. Clay waste is placed in the bottom as a lens to hold water above final ground water elevation(s). If constructed as designed, this wetland concept could meet requirements for wetland mitigation at a substantial financial and wetland credit savings to Mittal and the state.

Land Design Two: The "Sustainable" Community

Land Design Two creates a distinct landscape from the mine area, but also explores a broader design framework. In addition to proposals for landforms and pit lake, this scenario suggests development ideas in Biwabik that could enhance its role as the economic and residential center of this part of the region. Land Design Two also presents two alternative alignments for County Hwy. 715, the local road to be displaced by the mine. Either or both alignments could be built to facilitate development and circulation in and through the community.

Land Design Two assumes that Biwabik will make choices on how to diversify opportunities for people relocating or wanting to stay in the region. The main idea behind Land Design Two is to take advantage of the recreation opportunities in the region to make the community sustainable. Land Design Two also strengthens Biwabik's existing town form by linking it to the pit lake where recreation and new neighborhoods will attract new populations.

Mine Development. To create a sense of community, Land Design Two proposes development close to town to take advantage of existing services, and a sense of place. Figure 3 illustrates a beautiful recreation area surrounding the north side of Pit 2 which, after mining, has become a large, continuous water body from Canton to Mary Ellen. The lake has a very exciting, shaped shoreline including a shallow water lagoon that serves as a swimming area and important water habitat, a public beach, and an adventure playground themed around mining. All surface land and the rake bed have been shaped to be safe, and easily accessible to Biwabik without building expensive infrastructure (roads, parking, etc.). Docking points exist around the lake so people can easily boat and walk into downtown.

A community house sits at the center of the north shoreline People can meet, watch the water and their children, and use the building for meetings, organized

Land Design Two

Figure 3

events, etc. An amphitheater carved into the stockpile on the western shore is designed as both a performance stage and an educational venue. Stockpiles along the north side of the lake are reshaped either as entry mounds to the lagoon or as overlooks. Their hilltops serve as displays for artistic sculptures or interpretation, or invite people to picnic, think, experience and enjoy the locale s physical and cultural heritage.

Figure 3 illustrates choices for visiting or living in Biwabik. Clusters of year round homes or seasonal cottages with water views are located on reshaped south-facing benches overlooking the lake. They surround a common open space elevated above and behind the community house. The commons provides a great place and opportu-nity for people to meet and gather right outside their front door.

The same concept for a tightly knit summer cottage community applies to the more transitory south edge of the lake. Seasonal homes, designed to look like classic mining cottages, are sited along the lake and interspersed with trails and open land. A limited access road leads from Hwy. 135 to the cottages and to a small public marina for non- motorized boats located on the former Austin Powder site.

In another example, Figure 4 illustrates a typical pit edge. The section shows how structures could be built along the south-facing shoreline. A 100 — 200 ft. bench graded against a planted stockpile could accommodate roads, small houses and the 30+ ft. ledge between the land and the lake. Waste rock and topsoil are shaped along the shore to soften the edge, and placed in the lake to create shallow water habitat, beaches, and riparian areas.

Land Design Two results in 530 acres of continuous water body and 7-8 miles of shoreline - 1.5 — 2.0 miles usable for development.

County Hwy 715. Figure 3 outlines two alternative alignments for County Hwy. 715. Both alignments could have major implications for the future form of Biwabik and its role as a regional service and business center. One alignment passes through town on former railroad grades just west of Main Street. The road passes through an historic mine landscape, crosses the Higgins - Canton Pit on a causeway and rejoins the Pike Road north of the Higgins. This alignment not only provides wonderful views over water. It also creates infrastructure for redevelopment of the blocks west of City Hall as the retail-commercial core of downtown.

The second alternative extends north from the Hwy 4/Hwy 135 intersection east of downtown, loops around the northern border of Biwabik and the Canton, and meets the Pike Road north of Higgins. This Voyageur s Parkway provides scenic upland and lake views, and could open areas for residential development north and east of existing neighborhoods. Small, houses, carefully designed and clustered to reflect historic locations (e.g. Cincinnati or Duluth), could develop along the parkway. The houses, with south facing lake views and water frontage, and within walking distance of downtown, could provide an economic counterpoint to those at Giants Ridge (see Figure 4).

Town Development. Land Design Two capitalizes on current zoning. The alignment proposed through town could bolster redevelopment of the blocks just west of City Hall as the core retail - commercial district. The Voyageur Parkway alignment could reinforce residential zones east and north of downtown and the town s strong grid pattern. Current zoning also indicates good locations for business and employment centers south of Hwy 135, within easy walking distance of the central business district. Biwabik has, therefore, great opportunities to strengthen its core retail, business and residential areas within the town's current boundaries, leaving the future landscape west of town open for new, diverse activities attractive to visitor or permanent populations.

Land Design Two proposes other ideas that could bolster town development, including:

- A gateway on Hwy. 135 to reinforce the entry into town and the central business district. The gateway idea builds on Biwabik's rich mining heritage and takes advantage of the sports (hockey) field and mine stockpiles. Existing dumps are reshaped artistically to create a sense of anticipation and welcome. A visitor center and trailhead, designed to match the city s vernacular architecture, is built near the hockey rink to serve as the hub for recreation and other services, including the Mesabi Trail. The gateway area is within walking and biking distance of downtown.
- Relocation of the Mesabi Trail from Highway 135 to a trailhead near the hockey field west of town. The new trail alignment crosses the proposal for County Hwy 715, continues on to an overlook of the Canton pit, then heads north and east through town — off road all the way to Giants Ridge.
- Planting of rows of trees (e.g. white pines) along former railroad tracks from the old depot to and around the Canton Pit. The tree rows, or allees, trace the historic railroad alignments, reinforce Biwabik's legacy as a mining town, and provide another pedestrian access point to the Canton pit. The trees also provide dramatic visual interest from Hwy. 135, and set the stage for development of County Hwy. 715, should it be located on this alignment through town. In other words, this tree-lined right-of-way could start out as a hiking/biking trail, then become the actual road right-of-way. Preparation for such a transition could begin immediately as a community project.

Summary

Land Designs One and Two illustrate how to create usable land and lakeshore from mining, and how to reuse such an area without foreclosing access to future reserves. The designs concentrate development close to town, and maximize the shape of topography, shoreline, shallow water areas and south facing benches. Land Design Two also lays out alternative locations
for County Hwy. 715. Either or both routes would facilitate future development in and around Biwabik. Both land scenarios

- Use the area's rich history and beauty, and its strong connections to regional resources to frame ideas (i.e. Laurentian Divide, the Mesabi Trail, Giants Ridge, Pike River lands to the north).
- Focus on Biwabik as a regional draw for recreation and quality of life choices.

All of the features depicted in the land designs complement each other. Either scenario can be considered as an individual development project or as one phase in a larger-scale plan for Biwabik and its vicinity.

Next Steps

The design team quickly laid out planning action areas should key stakeholders want to pursue either or both proposals. The actions are important for the City and others to complete within the next five years to ensure that the Minorca mine site becomes an asset for the area. The team stressed that such actions will help:

- Clarify and solidify direction for stakeholders and the community
- Identify and align financial and human resources
- Build civic support and grow civic champions
- Identify and designate roles and responsibilities

The charrette produced some important results. First, it quickly generated two feasible land designs that demonstrate how
the mine sit can be reused productively. Certainly, many other concepts can reshape landforms and other features left by mining. For example, future lakeshore could be several small lakes connected by narrow channels, rather than one large lake like that depicted in the drawings. Mittal can build the backbone or infrastructure for a variety of land designs. It can relocate and shape stockpiles, construct benches suitable for roads or structures, reshape lakeshore for specified uses, create wetlands or other shallow water areas, and plant vegetation. These activities can be integrated into its mine plan and reviewed over time, as the mine evolves. The point is to understand that Mittal will contour a landscape based on the requirements of its operation. However, if joint planning and design decisions are made early enough, it can also create a landscape that is attractive, productive and valuable for everyone. What's important is to know that moving dirt can meet many goals, if they are clearly stated.

Second, the charrette demonstrated that collaborative thinking and decision making can solve complicated technical problems, produce good solutions and build the kinds of working relation-ships needed to make big ideas happen. Real people generated these ideas and drawings. The charrette introduced the people who are the contacts for help and information, and it documented them in action (see photos). The sidebar lists names and contact information.

The mine has a twenty-year life span - a very short timeline for big ideas, but one that poses an exciting future for Biwabik. Why not begin working together now to make sure that the beautiful places you want, those that are full of rich outdoor and community experiences, are part of it?

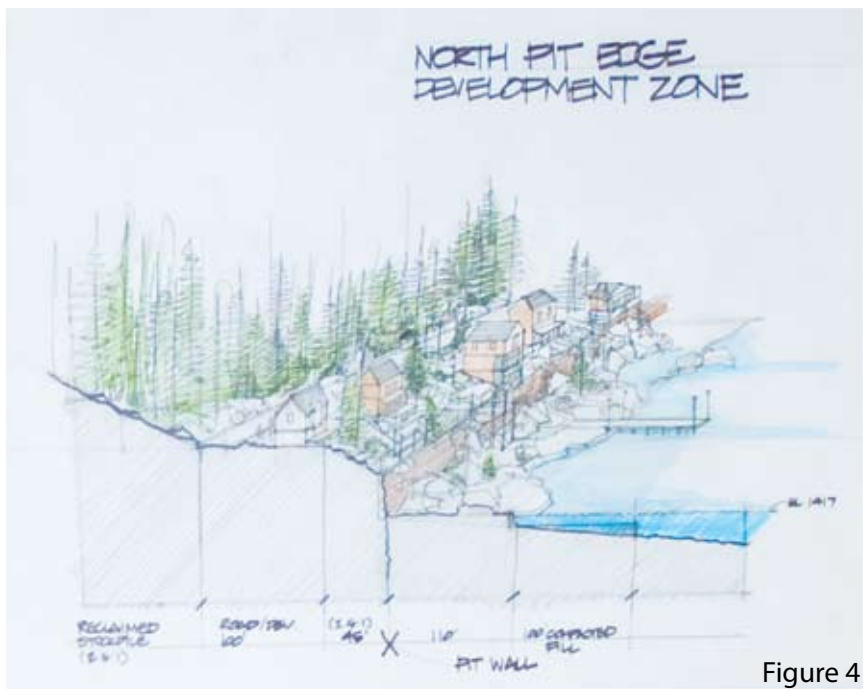


Figure 4

Design team members review concepts with stakeholders.

Charrette Design Team

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Resource Assistance

The following people contributed valuable time, information and ideas to the charrette. We sincerely thank them, and look forward to working with them in the future!

City of Biwabik

Pam Berts, City Accountant
Eric Forsman, City Engineer, Benchmark Engineering, Inc.
Jeff Jacobson, New City Manager
Terry Lowell, Former City Manager

Mittal USA

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Minnesota Department of Natural Resources

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Rendrag, Inc.

Rachel Gardner
Tom Gardner
Mary Holliday

Regional Rail Authority

Gary Cerkvenik
Bob Manzoline

Key Actions

2007 Resolve and finalize water source for City.

Finalize future alignment for County Hwy. 715.

Establish a community liaison with Mittal USA and fee owners to meet quarterly for mine updates. Meet at least once per year to discuss and review post-mine planning.

Identify funding sources and potential leverage opportunities.

Develop reporting system to provide regular updates to citizens.

Initiate a local land design planning process to develop a final town/pit master plan.

Initiate a community education program to build support and buy-in from community and other key stakeholders.

Identify and nurture civic champions to pursue the project and keep it alive.

Plan an early, simple project for success. Lay out yearly projects to meet same goal.

2009 City of Biwabik to adopt master plan as official city plan.

Mittal USA to adopt master plan as official company land development plan.

2010 Identify and prioritize master plan projects. Initiate detailed design development.

Sponsors Make Charrette A Success. Thank you!

The following cooperators contributed generous financial and human resources to the charrette. The workshop would not have been possible without them. A sincere thanks to:

City of Biwabik
Mittal USA
Iron Range Resources
Minnesota DNR
Rendrag, Inc.
Minnesota Power
University of Minnesota

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Design team on site visit at Mittal USA active mine.