

## **COULEE MINE OPERATION PLAN**

The Coulee Frac Sand (Coulee) mine site consists of approximately 173.5 acres. Mining and contemporaneous reclamation is proposed for approximately 122 acres. The remaining acreage on the site includes property line setbacks, delineated wetlands, stormwater ponds, driveway, and an 11-acre processing area constructed on the west side of the site as shown in [Figure 1, Mine Layout](#). Access to the mine and processing area will be by a blacktop driveway onto County Trunk V. The property owner, Carbo Ceramics, Inc. (Carbo), will be the titled landowner, and will lease the property to Coulee which will operate the mine.

Mining operations will be screened from County Road V, MacArthur Dr, and nearby residents using a combination of earth berms, forest stands, trees, grasslands, and wetlands as shown in [Figure 2, Screening](#). The effectiveness of the screening is shown in [Figure 3, Line of View](#) from County Road V, MacArthur Road, and 6 nearby residents. The west pine trees, 20' tall southwest berm, and 20' tall northeast processing-area berm will visually and audibly isolate the processing area. A three-dimensional view of the southwest berm, northeast processing area berm, and excavation berm are shown in [Figure 4, Coulee Mine 3-D Views of Berms](#). The active mine boundary will be setback from the legal property boundary as shown in [Figure 5, Setbacks](#).

Mining will be done in fourteen phases ranging from approximately 1.8 to 11.4 acres per phase as shown in [Figure 1, Mine Layout](#). The numbering order of the phases identify their estimated operational sequence. The phases represent smaller, manageable parcels that will isolate and limit site disturbance at any one time. This approach will accelerate the reclamation in a measured and managed manner for the life of the mine. The estimated total production is 10 million tons of raw sandstone. The mine lifetime is expected to be approximately 12 to 20 years, but could be longer depending on marketplace demand.

Prior to site disturbance, erosion control and stormwater Best Management Practices (BMPs) will be installed, which will be monitored and maintained during mining and processing. An access driveway, sand storage areas, and a wet plant processing facility will be constructed on the west part of the site. Sandstone material will be excavated and transported to the on-site wet plant facility via a slurry pipe line or haul trucks. After processing through the wet plant facility, moist sand will be loaded in trucks and transported off-site to the Carbo dry-processing facility located in Marshfield, Wisconsin, another dry-processing plant, or to dairy farms in the local area. Non-marketable material will be returned to the proposed mine site and utilized as reclamation material. It is estimated that 300,000 to 600,000 tons of moist sand resource will be produced annually depending on marketplace demand.

Processing of the sandstone will be done in four stages: 1) Topsoil and Overburden Removal Stage, 2) Sandstone Extraction Stage, 3) Washing Stage, and 4) Transport Stage. The Sandstone Extraction Stage, and Washing Stage will operate during the spring, summer, and fall seasons (April through November), while the Topsoil and Overburden Removal Stage, and Transport Stage will operate the entire year. None of the stages will operate on Sundays or legal holidays.

**Topsoil and Overburden Removal Stage** The topsoil and overburden will be removed prior to sandstone extraction using an excavator, dozer, and off-road haul trucks. The topsoil and overburden from the processing plant area (11 acres) and first phase (Phase 1, 7.6 acres) will be moved and stored in the southwest, northeast processing area, and excavation screening berms. Topsoil and overburden in subsequent phases will be used in the reclamation of the previous phase. The topsoil will be kept separate from the overburden and used again as topsoil in the reclamation. The material from the southwest and northeast processing area screening berms will be used in the final reclamation. The operation hours will be as provided in the Developer's Agreement with the Town.

**Sandstone Extraction Stage** After the topsoil and overburden have been removed, the sandstone will be extracted using an excavator and transported to the wet plant using either a slurry pipeline or off-road haul trucks.

Slurry Pipeline An excavator will feed a portable slurry station which will mix the sand with water and pump the sand-water slurry to the wet plant. Haul trucks will not be used in this process. The excavator and portable slurry station will operate while the wet plant is operating, up to 24 hours a day.

Off-Road Haul Trucks If haul-trucks are used to transport the raw sandstone to the wet plant, the sandstone will be stockpiled near the wet plant and loaded into the wet plant using a wheel loader. The stockpile near the plant will be large enough to feed the wet plant through the night while the haul trucks are idle. The operation hours will be as provided in the Developer's Agreement with the Town.

Crushing of Sandstone Testing of the sandstone to-date has shown that crushing of the sandstone is not required. If at some point it is found that some crushing of the sandstone is necessary, it will be done within the wet plant after the initial wet scalping screen.

## **Washing Stage**

The Washing Stage is the processing of sand through the wet-plant. The wash plant will wash the sand and separate the sand into coarse sand, finished sand, and ultra-fine sand. The coarse and ultra-fine sand will be returned to the mine excavation and used in reclamation. Approximately 20% to 30% of the ultra-fine sand may be distributed to dairy farmers for bedding sand. The ultra-fine sand not going to reclamation will be stockpiled onto the ultra-fine stockpile capable of holding up to 50,000 tons of sand, while the finished sand will be stockpiled onto the finish stockpile capable of holding up to 190,000 tons of sand.

In the wet-plant, sand enters at a steady rate of 160 to 175 tons/hour. This sand will be processed through a wet scalping screen which will remove coarse material. The sand-water slurry will then pass through attrition cells (tanks with rotating paddles) which will wash the sand. The sand-water slurry will then go to cyclones which will remove ultra-fine material. The slurry will then be dewatered and conveyed to the finish stockpile. The ultra-fine material will also be dewatered and returned to reclamation or stockpiled onto the ultra-fine stockpile and will be distributed as dairy bedding sand.

Wastewater from the wet-plant goes to a thickener tank and clean water is then recirculated back to the wet-plant. Food-grade flocculants will be used to coagulate and settle out the ultra-fine material in the water. Products from Hydrite Chemical Company (Hydrite CAT and Hydrite Floc) will be used. These are the same flocculants used by many city water utilities, like Wisconsin Rapids Water Works to clarify city drinking water.

Underflow mud-like material from the thickener tank will go to a filter plate press where water will be removed and a solid cake-like material will be returned to the mine excavation and used in reclamation.

The wet plant is a closed loop water processing plant. The only water leaving the plant will be from evaporation and the wet sand. The wet plant will draw approximately 130 gpm of makeup water from a high capacity well. The wet-plant is a quiet-operating, self-contained plant. The Washing Stage hours of operation will be up to 24 hours a day.

### **Transport Stage**

The finished sand will be transported to the Carbo Ceramics dry-plant in Marshfield, Wisconsin using over the road trucks. The capacity of the finish stockpile will allow removal of sand throughout the winter months when the Sandstone Extraction Stage, and Washing Stage are idle. Trucks will enter and exit the mine through the northwest driveway as shown in [Figure 1, Mine Layout](#). Under normal circumstances, the trucks will travel north 1.1 miles on County Road V and then turn right (east) onto U.S. Hwy 10 and proceed on to Marshfield, Wisconsin.

It is estimated that three to four trucks will be used to transport finished sand. The operation hours will be as provided in the Developer's Agreement with the Town. Trucking will shut down while school buses are picking up and dropping off students along County Road V during the school year or approximately September through May. Trucks will be run at night only during periods of peak marketplace demand.