

Ash River Trail Site for NOvA

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After several site visits over the last year we have selected a primary site off the Ash River Trail and a secondary site off the Orr/Buyck Trail 30 km to the South, which will be described in a future document. We used the following criteria to select these sites:

- ~12 km off-axis
- Furthest distance from Fermilab and still in the US
- Accessible by road
- Relatively flat
- High ground well above water table with no wet lands
- Without features likely to provoke controversy or litigation such as large numbers of people living nearby, visible from a national park, burial mounds, historical site, etc.

The Ash River site (See Figure 1) is a 23.5 acre plot currently owned by the DNR and is located 810.5 km from Fermilab and 11.8 km off the beam axis. It is a high, well drained area with exposed ledge rock very close to the surface in many areas. The shallow soil is primarily sand and clay mixed with large rocks and has been logged over in the past 10 years. Ground cover is mainly regenerated poplar and grass. The site is also not visible from the Voyageurs National Park which was another criterion for site selection.

The legal description is T68N, R19W, Section 18. This is a so-called "government section", that is, it does not consist of the usual 640 acres. The part in which we are interested is the SW plat of the North 1/2 of the section. The 4 corners of the site are located:

NW 48.37892 N, 92.83272 W
SW 48.37536 N, 92.83284 W
NE 48.37903 N, 92.82961 W
SE 48.37547 N, 92.82963 W

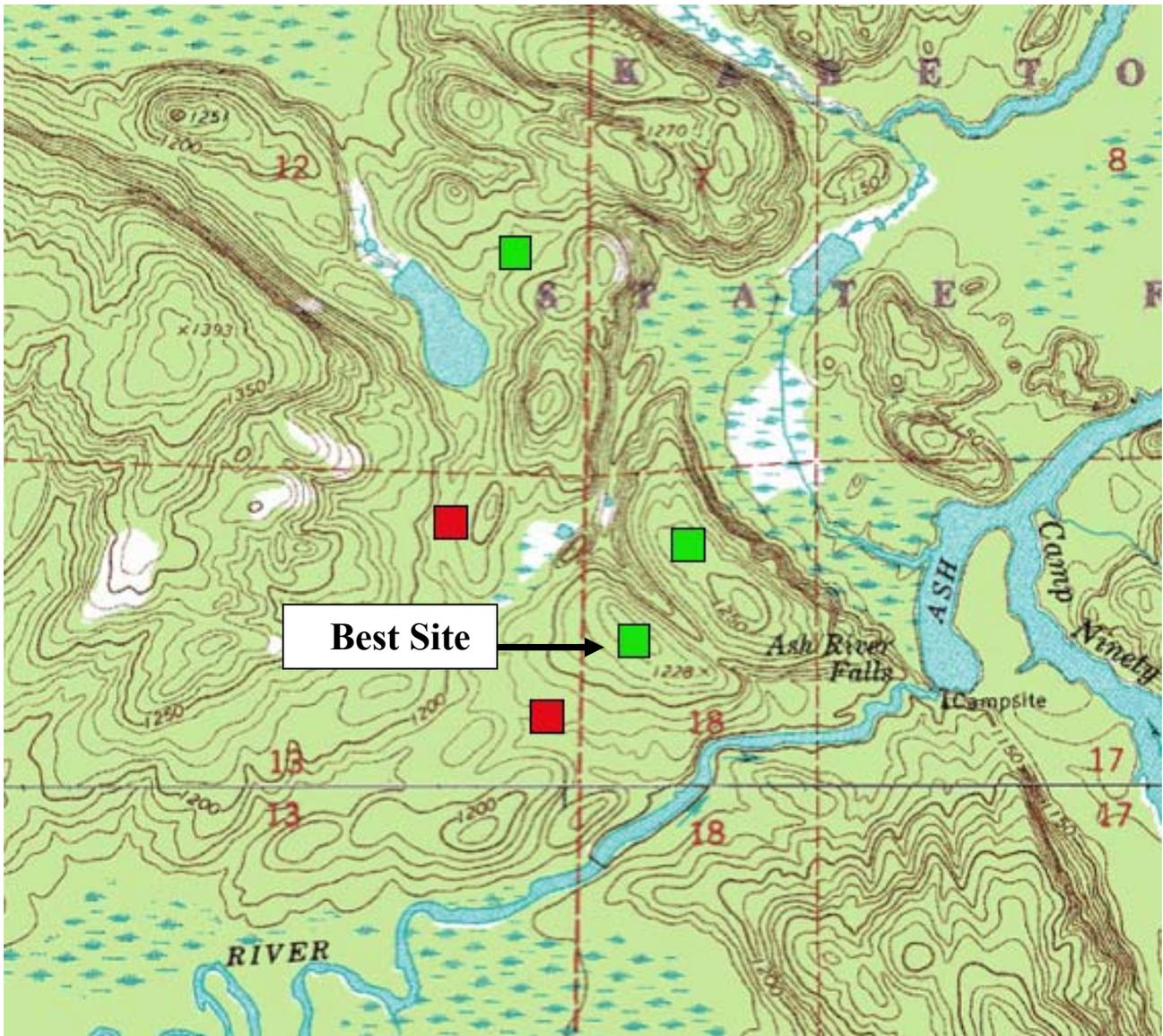


Figure 1-Ash River Falls TOPO

This site is located down the old Ash River Grade (old railroad bed highlighted in blue on [Ash River Trail GPS Base 17x11 adjusted1.pdf](#)) 2.3 miles from the Ash River Trail. The turnoff is just over 5 miles from Highway 53. About ½ the Ash River Grade is owned by the State (see [Ashriverownership.pdf](#)) and the rest is owned by Forest Capital Partners, formerly Boise-Cascade. The Ash River Grade is a clay based logging road primarily used only in the winter. Access is very difficult during any wet periods. Currently this road is not drivable by truck so you must walk into the site. We are also required to give Forest Capital Partners notice when we cross their property, until a written agreement is in place.

We have met with representatives from the DNR, who manages the state land, Forest Capital Partners and Voyageurs National Park and discussed locating the NOvA Detector in this area. We gave presentations showing the scope and schedule of the

project. While it was clear a Scoping EAW and likely a full Environmental Impact Statement would be needed, everyone present agreed that there were no major show stoppers with the site selection. The site is far enough away from Ash River Falls that we do not expect any historical or cultural artifacts. Since it has recently been logged, there are no old-growth forest issues.

The road has a reasonable base but will require considerable topping with additional gravel base and class 5 topping to make the it passable to heavy year-round truck traffic. While Highway 53 does not have road restrictions in the spring, Ash River Trail requires 9-ton-per-axle load limits for roughly 60 days, from March 15 till May 15. This means a 15% reduction in load during this period. Since the Ash River Grade has a clay base, it is possible loads may have to be lowered even further to prevent damage during frost breakout. See [road restrictions.pdf](#) for map.

Both road and power easements will be required from the Ash River Trail. To minimize environmental impact, an underground power line to the site is proposed. The cost is slightly higher than an overhead line but the underground line improves reliability and minimizes damage from storms. The local power is supplied by North Star Electric Cooperative, who have provided a cost estimate \$250K. The work includes resizing of 69 kVA line to the Kabetogema substation (35 miles) to handle the additional 1500 kVA load required for NOVA. The spreadsheet below summarizes the cost estimate. It contains no contingency, so at least 50% should be added to reflect the early design stage. The power feed is the end of an overhead feeder line, which is susceptible to power outages from storms. It is recommended that a backup generator and UPS system be installed, as outages on this line are typically hours long. Estimates are in the \$300K-500K range depending on load requirements. A power line map is shown on [Electrical-NOVA.pdf](#)

North Star Electric Cooperative			
Budget Estimate of the Cost to Upgrade Distribution Facilities to Serve			
Off Axis NOVA Detector Site (1500 kW)			
From the Kabetogema Substation to the Ash River Area			
	Quantity	Unit Cost	Total
Step-Down Transformer	1	\$ 30,000	\$ 30,000
Step-Up Transformer	1	\$ 30,000	\$ 30,000
Substation Recloser: Nova-TS	1	\$ 20,000	\$ 20,000
Reinsulate 1/0 ACSR to 25kV	8.25	\$ 15,000	\$ 123,750
7.2kV to 14.4kV Transformer Changeouts	19	\$ 1,000	\$ 19,000
Half mile of URD for Nova Test Plant	2.5	\$ 26,400	\$ 66,000
Nova Test Plant Service	1	\$ 25,000	\$ 25,000
Total			\$ 313,750
Customer Share of Cost			80%
Total to Customer			\$ 251,000