Installing an In-Road Antenna

Introduction

The following document details the procedure for a typical on-site installation of Optimum's In Road Antenna.

Figure 1: In Road Antenna

Tools and Equipment Required

- Heavy weight combination rotary hammer, with both a rotary hammer and straight hammer function
- Flat chisel tip for rotary hammer
- SDS Max thru-hole drill bit for rotary hammer (1 3/8" or greater X 24")
- Extension kit for thru-hole drill bit (as long as possible, preferably 33")
- Light weight rotary hammer with ¼" drill bit
- ¼" X 2 ¼" concrete wedge anchors
- 7/16" deep socket and ratchet wrench
- Cold-patch compound for asphalt repair

Procedure

Use the following steps to correctly install the manhole lid antenna:

1. For full site access, remove the manhole lid adjacent to where the antenna will be installed.
2. Choose a location for the in-road antenna. It should be located approximately 1 ½' - 2' from the manhole, as close as possible to the radio device inside the manhole and as far as possible from curbs, buried pavement sensors, cables, etc.

3. Before installing the antenna, test its operation and the cell coverage at the intended installation location. Call Optimum Instruments Inc. to perform a RSSI (Radio Signal Strength Indicator) test with an Optimum technician. The Optimum technician will have you connect the antenna to the radio device, place the antenna on top of the pavement at the intended installation location, and power the radio device. The technician will then provide you a dBm value (see Table 1 below) which corresponds to the quality of the reception at the antenna's location. When complete, power off the radio device, and disconnect the antenna.

RSSI Value	Expected Quality of Communications
>=-70 dBm	Very Good
-71 dBm to -80 dBm	Good
-81 dBm to -90 dBm	Fair
-91 dBm to -100 dBm	Weak
-101 dBm to -110 dBm	Infrequent
<-110 dBm	Unusable

Table 1: RSSI value and expected quality of communications

4. Install the SDS thru-hole drill bit and extension onto the heavy weight rotary hammer. With the hammer in rotary mode, drill a hole for the radio frequency (RF) cable into the side of the manhole. Use an angle of about 40°.

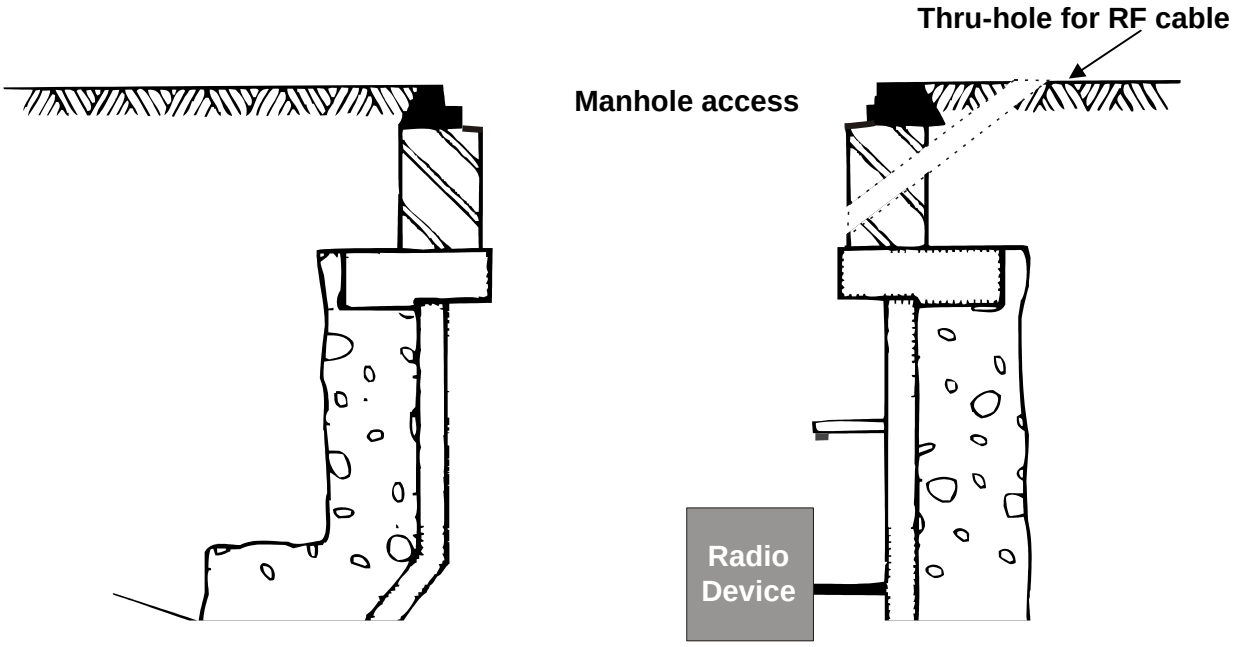

Figure 2: Hole for RF cable, side view

5. With the rotary hammer in hammer only mode and the chisel tip installed, chip out a recess 9” X 7” X 2”deep immediately behind and starting at the antenna cable hole. Chip out the recess on the side of the RF cable hole farthest away from the manhole access (Figure 3).

Figure 3: Chipping out the antenna recess

6. Next, chip out a slot into the bottom of the newly made recess to receive the antenna cable housing on the base of the antenna. Starting at the RF cable hole, chip out a slot at least 1” wide by 1” deep through the center of the recess.
7. Test fit the antenna in the recess. Remove material as necessary until the top of the antenna is flush with the top of the pavement.
8. Route the TNC connector and RF cable through the hole that was previously drilled into the side of the manhole.
9. Place the antenna into its recess at its intended location. Mark the anchor placement with the light rotary hammer and ¼” drill bit by drilling a clear mark into the pavement through the antenna’s two anchor holes.

Figure 4: Concrete wedge anchor

10. Remove the antenna from the recess and drill two ¼” blind holes 1¼” deep at the anchor marks. Tap the two wedge anchors, wedge end first, completely into the blind holes.

Figure 5: Drilling holes for wedge anchors

11. Fit the antenna over the anchor bolts and into its recess. Install the ¼" flat washers and 7/16" nuts on to the wedge anchors and tighten the nuts down with the 7/16" deep socket and ratchet wrench.

Figure 6: In-Road Antenna mounted with wedge anchor bolts

12. To complete the antenna installation, fill in the remaining space around the antenna with the cold patch material, leaving only the top plastic face of the antenna exposed. As a precaution, perform a RSSI test once more to verify the antenna's operation.