RAYCAP CASE STUDY

Raycap To 5g Carrier: "Houston, We Have A Solution"

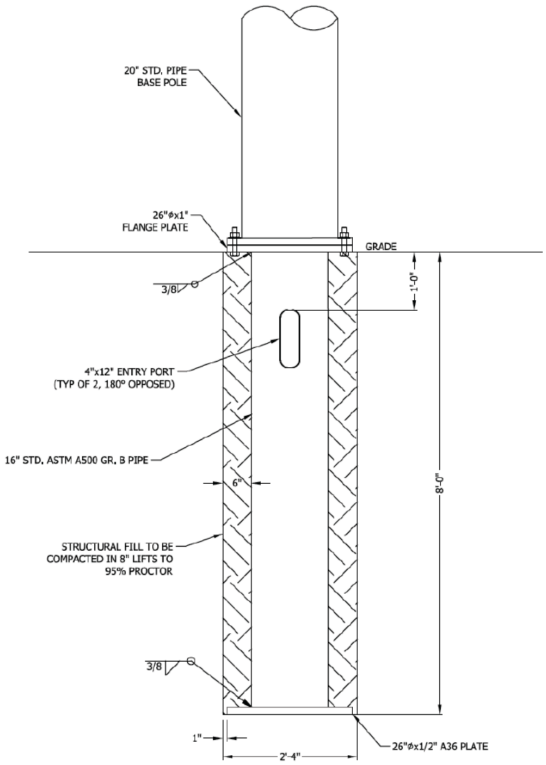
Our North American tier-one carrier customer challenged us to design an integrated small-cell pole with very strict foundation and pole diameter requirements. For Raycap, it wasn't rocket science, it's what we do every day for 5G deployments.

We designed this integrated small cell pole to provide 5G mmWave service around the Houston, Texas area.

Depth Of Foundation Less Than Eight Feet

The primary challenge in receiving this bid was the requirement that the pole's foundation be no more than eight feet deep, to avoid disturbing existing utilities buried below that depth. This is not an unusual request in dense urban areas. But in Houston, we also had to consider very high wind load requirements, and pole heights up to 44 feet tall.

Raycap engineers responded immediately and did the analysis. We also worked with a third-party structural engineering partner, to validate our calculations as an independent party. Since the poles were going to be installed in many sites across the Houston, Texas area, we streamlined the process by using the Unified Soil Classification System (ASTM D2487), in conjunction with the International Building Code and available USDA soil data, to determine average soil conditions for the poles. This is a common practice that we use in order to facilitate other projects around the country. In Houston, it enabled us to produce a design using an 8' foundation depth, which cleared the way for project approval from the customer and jurisdiction.



The key engineering requirement of this project was a foundation no more than eight feet deep.

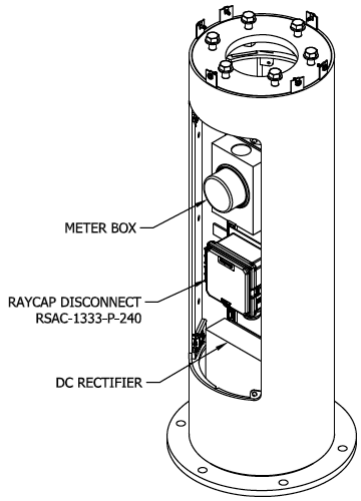
Fit Into The Right Of Way

The next challenge was to design a base section that could enclose much of the electronics and meet strict right-of-way requirements. Some of the sites would be on street corners and curbs, so they could not impede traffic or lines of sight. The customer asked for the overall diameter of the base section to not exceed 20 inches.

Starting with an existing design, Raycap engineers reduced and reorganized the mechanicals and equipment to fit this requirement. The base of the pole holds two high-power multi-band DC radios for 4G communications, along with a rectifier to convert AC to DC power to supply the radios. The base also includes the power meter for the utility, stationed behind a

window so it is easy for a technician to read.

A Raycap AC disconnect with our StrikeSorb® technology protects all the electronics in the pole. This density of electronics can generate a lot of heat, so the base is actively cooled using three fans to move air from an intake to an exhaust vent. We did a full thermal simulation to validate that the pole has effective cooling during Houston's hot summers.

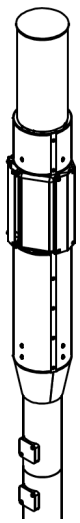


The base of the pole is only 20 inches in diameter, yet contains two high-power radios and support electronics for the whole site.

4g And 5g Radios In The Top

The other two high-frequency 4G and 5G radios (LAA and CBRS frequencies), as well as three 5G radios, reside at the top of the pole. Cabling extending through the center of the pole, out of site, connects them with the base.

The 5G radios are oriented to provide 360-degree coverage around the pole. The design partially conceals the 5G radios by using "bump-outs" between the radios, creating the illusion of a circular section that blends in together with the rest of the pole.



The top of the integrated small cell pole houses two 4G and three 5G radios.

Meeting City Requirements

The city's jurisdictional requirements allow pole heights up to 34 feet in some areas, and 44 feet in others. Raycap's designs keep the base and top sections largely consistent between these heights, extending the mid-section as needed. This is important because the customer did not know how many of each height it would need at the time of the order.

Raycap's designs were consistent with all the other municipal requirements for color and finish, and for accommodating the different light arms specified for the various neighborhoods. In fact, while Raycap was fulfilling the order, the customer received an opportunity to place eleven poles of a different color at a golf course to provide service for an important tournament. Raycap was able to quickly manufacture and powder-coat the poles to deliver them for installation at the course.

Raycap integrated small cell poles are manufactured domestically in one of its three manufacturing facilities.

Flexible Manufacturing And Delivery

The initial set of poles for Houston were delivered in a short timeframe, to allow the customer to begin installation. The rest of the poles have been manufactured and are warehoused either at Raycap or customer sites in Houston until they're ready to deploy. This flexible delivery and warehousing process helps the customer match materials with the speed of construction.

Now that we've delivered this carrier a solution for Houston, we're even more ready to help other carriers to launch theirs.

Learn more about Raycap's solutions for small cell concealment at www.raycap.com or sales@raycap.com

About Raycap

Raycap is an international manufacturer and technology leader with decades of experience providing innovative infrastructure solutions for customers in the telecom, energy, defense, transportation, and other industrial markets. Its solutions protect mission-critical applications and ensure the best possible system availability. The company's product portfolio includes lightning and surge protection technologies, structured cabling and connectivity solutions, power management systems, custom enclosures, cabinets, and wireless network concealments. Since its founding in 1987, the company has experienced continuous growth. Its engineering expertise, test laboratories, and multiple manufacturing facilities guarantee quality, reliability, and innovation. Product design, testing, and approval processes comply with all international safety standards. Raycap operates in the United States, Germany, Greece, Cyprus, Slovenia, and Romania.

Talk to Raycap about integrated small cell concealment options.

Contact us today at info@raycap.com

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