

**CITY OF MURFREESBORO
BOARD OF ZONING APPEALS**

Regular Meeting, August 25, 2021, at 1:00 p.m.
City Hall, 111 West Vine Street, Council Chambers, 1st Floor

A G E N D A

1. Call to order
2. Determination of a quorum
3. Consideration of minutes
 - a. Minutes for the regular meeting on July 28, 2021
4. New Business

Special Use Permit Amendment Request

- a. **Application Z-21-023 by Jennifer Dokos, for Dish Wireless,** is requesting an amendment to a special use permit that was approved on October 24, 2018 allowing the establishment of a wireless telecommunication facility in a Commercial Highway (CH) zone for property located at 1631-1633 Northwest Broad Street. A condition was placed on the special use permit that applicants shall use conceal wrap material around the antennas to help the aesthetics of the facility. The applicant seeks an amendment of the original special use permit in order to eliminate the condition of approval requiring the conceal wrap material. (Project Planner: Amelia Kerr)
5. Staff Reports and Other Business
6. Adjourn

**MINUTES
OF THE CITY OF MURFREESBORO
BOARD OF ZONING APPEALS**

City Hall, 111 W. Vine Street, Council Chambers

JULY 28, 2021, 1:00 PM

Members Present:

Davis Young, Chair
Julie King
Tim Tipps
Ken Halliburton, Vice-Chair

Staff Present:

Marina Rush, *Principal Planner*
Matthew Blomeley, *Assistant Planning Director*
Joel Aguilera, *Planner*
Amelia Kerr, *Planner*
Roman Hankins, *Assistant City Attorney*
Serena Harris, *Recording Assistant*

1. Call to order:

Chair Young called the meeting to order at 1:03 pm.

2. Determination of a quorum:

Chair Young determined that a quorum was present.

3. Consideration of Minutes:

With there being no objection by any of the Board members, the minutes of the March 24, April 28, and June 23 BZA meetings were approved as submitted.

4. New Business:

- a. Zoning application [2021-022] for Tax Map 093M, Group B, portion of Parcel 02600, requesting a variance from the required 42-foot front yard setback along Malachite Drive to allow a 20-foot setback. Property is zoned Commercial Highway (CH), located along southwest corner of Franklin Road and Covenant Road. (Project Planner: Marina Rush):**

Marina Rush presented the Staff Comments regarding this item, a copy of which is maintained in the permanent files of the Planning Department and is incorporated into these minutes by reference.

Tim Tipps inquired about other comparable properties with three road frontages and also how this property was impacted by the existing stormwater pond.

Marina Rush addressed Mr. Tipps' questions.

Vice-Chair Halliburton asked what the rear setback would be if there were no road along the rear of the lot.

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Marina Rush answered that the rear setback would be twenty feet.

Julie King questioned why this commercial variance should be considered differently than similar residential variance requests, when homeowners have been historically denied for similar requests.

Marina Rush contrasted that most residential homes are of comparable size within an individual neighborhood; whereas commercial properties have varied uses, lot sizes, and building sizes making it difficult to make a comparison. Ms. Rush added that typically the ones that are denied are requests for larger homes that aren't comparable to neighborhood homes.

Chair Young inquired about the placement of Malachite Drive and why a smaller store footprint would not be acceptable.

Marina Rush reviewed road access and confirmed that the plan would work with the smaller building footprint.

Kelly Hiett with CESO, Inc. 2126 Centerview Road, Suite 150, Brentwood, TN 37024 came forward to present why she thinks there is a hardship and how without this variance the growth of the store will be hindered.

Vice-Chair Halliburton inquired about whether this site is overparked.

Ms. Hiett said that there are 90 parking spaces proposed, though Aldi's standard for a store this size is 95.

Chair Young opened the public hearing.

Bruce Kirk of Swanson Developments (1188 Park Avenue) came forward to support the request of the applicant.

There being no one else to speak for or against the request, Chair Young closed the public hearing.

The Board discussed the merits of this variance request.

Roman Hankins commented that either for the granting or denial of a variance, the BZA has to provide written findings of fact, stating which elements are or are not proven by preponderance of the evidence.

There being no further discussion, Julie King moved to deny the variance application based on the fact that the applicant failed to meet the standards required by the Zoning Ordinance; The motion was seconded by Chair Young, and the motion was denied by the following vote:

Aye: Julie King

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Ken Halliburton
Davis Young

Nay: Tim Tipps

A copy of the Board Action on Application for Variance is appended hereto.

Tim Tipps inquired if the Chair can second a motion.

Roman Hankins clarified that the BZA Rules and Procedures allow the Chair to second motions.

- b. Zoning application [2021-021] for Tax Map 092, Parcel 46.01, requesting a special use permit in accordance with the City of Murfreesboro Zoning Ordinance, Chart 1, to construct a public building for State of Tennessee DMV and Rutherford County Register's satellite offices. Property is zoned Residential Single Family (RS-15), located at the northwest corner of Blaze Drive and Fortress Boulevard. (Project Planner: Amelia Kerr)**

Marina Rush, on behalf of Amelia Kerr, presented the Staff Comments regarding this item, a copy of which is maintained in the permanent files of the Planning Department and is incorporated into these minutes by reference.

Vice-Chair Halliburton inquired about the services of this location, including the drive-thru window.

Ms. Rush and Mike Hughes with Rutherford County Engineering Department came forward to offer clarification on the project.

Chair Young opened the public hearing.

There being no one else to speak for or against the request, Chair Young closed the public hearing.

There being no further discussion, Ken Halliburton moved to approve the special use permit application subject to all staff recommendations; The motion was seconded by Tim Tipps and carried by the following vote:

Aye: Tim Tipps
Julie King
Ken Halliburton
Chair Davis Young

Nay: None

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5. Staff Reports and Other Business:

- a. Marina Rush proposed a training session to review the BZA standards, processes & procedures within the next two months.

6. Adjourn.

There being no further business, Chair Young adjourned the meeting at 1:46 p.m.

CHAIRMAN

SECRETARY

**MURFREESBORO BOARD OF ZONING APPEALS
STAFF COMMENTS
AUGUST 25, 2021
PROJECT PLANNER: AMELIA KERR**

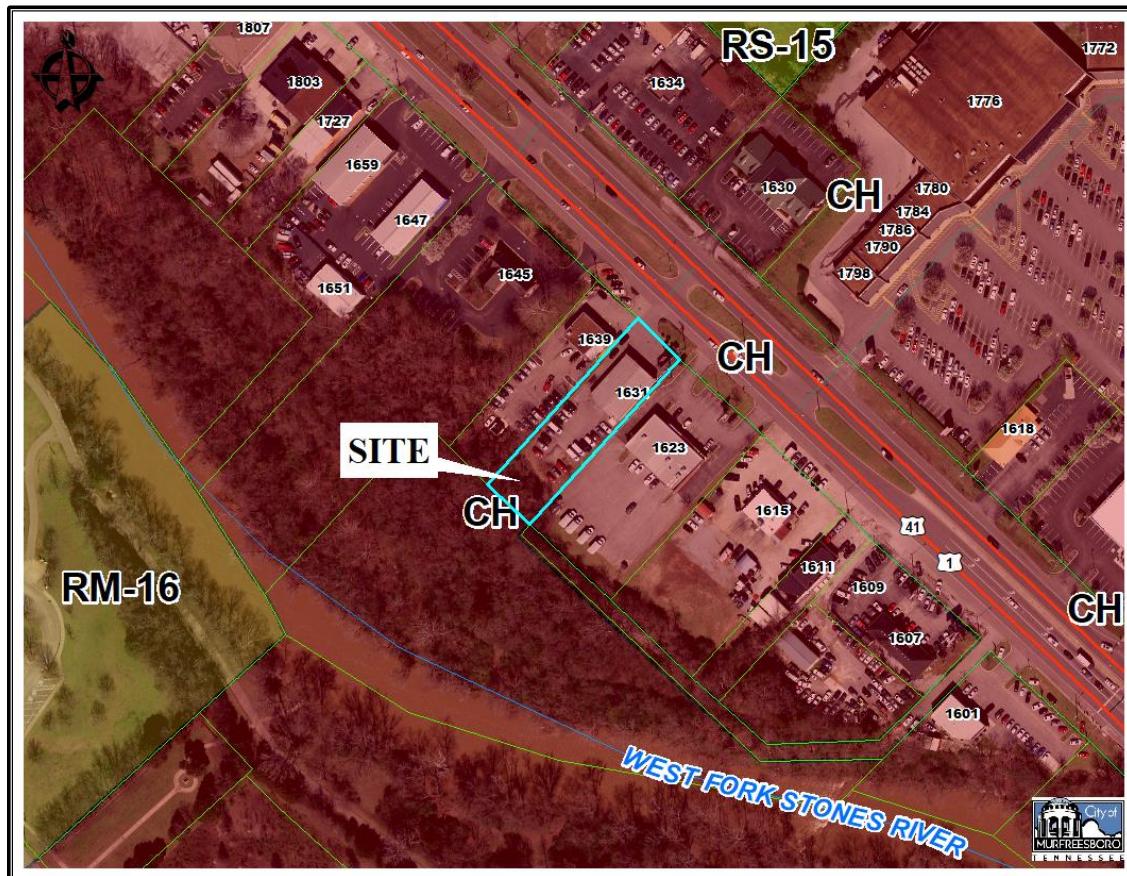
Application: Z-21-023

Address: 1631-1633 Northwest Broad Street

Applicant: Ms. Jennifer Dokos, for Dish Wireless

Zoning: Commercial Highway (CH)

Request: An amendment to a special use permit that was approved on October 24, 2018 allowing the establishment of a wireless telecommunication facility in a Commercial Highway (CH) zone for property located at 1631-1633 Northwest Broad Street. A condition was placed on the special use permit that applicants shall use conceal wrap material around the antennas to help the aesthetics of the facility. The applicant seeks an amendment of the original special use permit in order to eliminate the condition of approval requiring the conceal wrap material.



Special Use Permit Request Overview

The subject property is identified as 1631-1633 Northwest Broad Street and is located north of West Northfield Boulevard. The property is a rectangular shaped lot, and the current tenant in the commercial building is Avis/Budget Car and Truck Rental. The telecommunication facility is in the rear of the lot towards the west property line.

Pursuant to Chart 1 of the Zoning Ordinance, telephone or telegraph facilities in the Commercial Highway (CH) zoning district require approval of a special use permit. In October 2018, the BZA approved a special use permit (Z-18-050) for this property to allow the installation of the monopole and colocation of cellular equipment. The 2018 special use permit included a condition of approval for cellular providers installing new antenna to use “conceal wrap material” that would be installed on the antenna and this reflective material would simulate the sky. This was intended to minimize visual impacts of the antenna and was a recommendation from the applicant’s (SCI Towers) consultant, Mr. Larry Perry. If new equipment is not able to be installed with this condition of approval, it requires an amendment to the Special Use Permit approved by the Board of Zoning Appeals.

The current applicant, Ms. Jennifer Dokos representing Dish Wireless, has researched and confirmed that the wrap material is no longer available, and no replacement material is being manufactured due to the quick deterioration of the material due to weather conditions. Ms. Dokos has submitted a letter (Attachment A) stating that the “concealment wraps previously approved and utilized by the Wireless Industry are now obsolete with inventory no longer available for use”. In the letter she provided a link to a site “Inside Towers” (June 12, 2020) which is written for wireless infrastructure professionals and which states that “3M Concealment Film is being discontinued” (Attachment B). Further, the letter states that Mr. Scott Duncan of Obscure Tech LLC, a Telecommunications equipment supplier “is currently working with others to provide an alternative to the 3M concealment wrap, however, at this time, there is not an acceptable product which provides a minimal loss in dB in laboratory tests”.

The applicant is requesting antennas be installed as they are manufactured in their off-white finish with mounting equipment being galvanized steel to match the tower shaft. This is the same as other cellular antenna installed on poles in the City of Murfreesboro and throughout the country.

Because of the limited scope of the request, Staff has not required the applicant to address all of the specific standards for telecommunications tower in her application, and this report does not address those standards one-by-one as is usually done. However, staff believes that it would be appropriate for the required landscaping buffer to be re-inspected to determine its health and whether or not any of the existing vegetation needs to be replaced.

Recommended Conditions of Approval:

1. Prior to the installation of the ground equipment and antennas, the applicant shall apply for and obtain approval of a Site Plan from the Murfreesboro Planning Department. The

Site Plan approval will include staff comments to ensure the antenna is consistent with any conditions of approval placed upon the special use permit by the BZA.

2. Prior to installation of the ground equipment and antennas, the applicant shall comply with all codes and permitting requirements of the Building and Codes Department.
3. All other conditions of the original special use permit approval shall stand.
4. The required landscape buffer around the tower compound shall be inspected by the Planning Department staff. If any of the original materials have died or are dying, then they shall be replaced.

Ms. Jennifer Dokos will attend the meeting in to answer any questions that the Board may have.

Attached Exhibits

- A. Letter of explanation from applicant
- B. Inside Towers link information
- C. Exhibit photos
- D. Site photos
- E. 2018 BZA meeting minutes
- F. 2018 Confirmation letter
- G. Tower Plans

EXHIBIT A



Matthew T. Blomeley, AICP
Assistant Planning Director
City of Murfreesboro Planning Department
Office Phone: (615)-893-6441 Ext. 1605
mblomeley@murfreesborotn.gov

August 04, 2021

RE: BZA Appeal Z-18-050 - 1631 NW Broad Street for Dish Wireless 3M Antenna Wrap (NABNA00141A)

Mr. Blomeley,

We / Dish Wireless are submitting an application to the Board of Zoning Appeals requesting that condition 5. "*The applicant shall use the new 3M conceal wrap material around the antennas themselves to help the aesthetics of the facility*" be removed as a condition of approval per Application Z-18-050, Cell Tower located at 1631 NW Broad Street.

As discussed, the 3M concealment wrap previously approved and utilized by the Wireless Industry is now obsolete with inventory no longer available for use. The wrap material was ultimately found to be inadequate and often cracked and peeled causing greater aesthetic issues. As support, Margaret Ann provided the below link related to the issue:

<https://insidetowers.com/3m-concealment-film-is-being-discontinued/>

Scott Duncan of Obscure Tech is currently working with others to provide an alternative to the 3M Concealment Wrap, however, at this time, there is not an acceptable product which provides a minimal loss in dB in laboratory tests.



Scott Duncan | COO
Scott.duncan@obscuretechllc.com
www.obscuretechllc.com | 513.884.9013 Mobile

Dish Wireless is requesting that the antenna be installed as they are manufactured in their off-white finish with mounting equipment being galvanized steel to match the tower shaft. This configuration will match the currently installed Verizon Wireless antennas which we believe to be the most aesthetically pleasing array.

We request that the City understand the issue at hand and allow Dish Wireless to install our antennas and move forward with this overall installation which is critical to our local and nationwide buildout.

Thank you for your time and consideration,

Sincerely,

Signature: Jennifer Dokos

Name: Jennifer Dokos

Title: Site Acquisition Manager – Dish Wireless

Date: 8/3/2021

EXHIBIT B

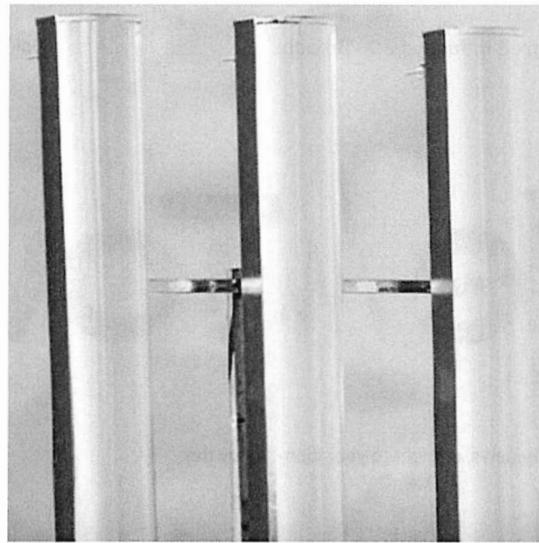
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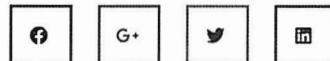


3M™ Concealment Film is Being Discontinued



June 14, 2020 7:10 pm

SHARE THIS ARTICLE



3M™ placed its reflective concealment film on its discontinued list, confirms Scott Duncan, COO of ObscureTech. The film can be used on telecommunications RF infrastructure to reflect its surroundings and aims to eliminate the need for expensive structures or faux facades.

According to 3M's website, Conceal Film uses high performance non-metallic reflective film technology. "Reflective over the full visible spectrum and RF-transmissive into the microwave range, 3M Conceal Film is specially formulated with an adhesive backing to provide long-life in outdoor environments and excellent UV irradiance stability. 3M Conceal Film is optimized for glare reduction and contains a protective layer to provide abrasion resistance and permit mild cleaning," it states.

Despite the discontinuation, "There is still plenty to go around," says Duncan. "Stock is going out as fast as it comes in. We are working with other manufacturers to source an alternative solution. This can take some time due to the COVID-19 crisis, as resources are limited during this time," he says.

Orders can be placed for current builds but should not be requested for new sites under development. ObscureTech's products are approved by U.S. wireless carriers across all technologies, according to Duncan. RF transparent products have been tested from 600 MHz to 100 GHz and ObscureTech can provide pre-cut film fit to size based on manufacturer specifications, or by full roll.

"We offer options for installation by our in-house certified technicians or certification training to your installation team. We are here to assist with quick turnaround time and can provide test samples," Duncan said. To learn more or request the product, visit <https://obscuretechllc.com>.

Leave a Reply

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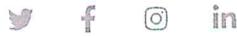
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EXHIBIT C





Current DISH Installation: One antenna per sector - off white antenna to match what is currently installed on Broad Street tower



Current DISH Installation: Small footprint and color will match what is currently installed by Verizon on Broad Street tower.



Cell tower from across the street looking west

Exhibit D



Cell Tower as it exists today.

EXHIBIT E

Regular Meeting Minutes of the Murfreesboro Board of Zoning Appeals

**October 24, 2018 – 1:00 P.M.
Council Chambers**

MEMBERS PRESENT

Davis Young, Chairman
Ken Halliburton, Vice-Chair
Frances Mosby
Julie King
Tim Tipps

MEMBERS ABSENT

STAFF PRESENT

Marina Rush, *Principal Planner*
David Ives, *Assistant City Attorney*
Dianna Tomlin, *Principal Planner*
Austin Cooper, *Planner*
Amelia Kerr, *Planner*
Joe Ornelas, *Planner*
Lexi Stacey, *Recording Assistant*

Chairman Young called the meeting to order at 1:00 P.M.

Application Z-18-050 by Mr. Craig Parker of SCI towers, LLC, is requesting a special use permit to construct a telephone transmission tower in a Commercial Highway (CH) zone for property located at 1631 NW Broad Street (along the west side of NW Broad Street). The applicant is also requesting a 75-foot variance of the 75-foot maximum permitted building height in a Commercial Highway (CH) zone to allow a 150-foot-tall structure.

Ms. Amelia Kerr reviewed the application and the Staff comments contained in the BZA agenda package. If the Board approves the application, Staff recommends the following conditions:

- 1) Applicant shall apply for and obtain approval of a Site Plan Review. It shall include the following:
 - a. Antenna structure shall be setback a minimum of 37'3" from the property line. Prior to the issuance of a Certificate of Completion or Occupancy, a surveyor's certification will be required to confirm the structure has been placed in accordance with this setback.

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- b. Fence height for the enclosure at the base of the antenna structure for associated equipment shall be a minimum of 8 feet in height and controlled by a locked gate
 - c. Landscaping and vegetative buffer shall be installed to reduced visibility from the public right-of-way and surrounding properties.
- 2) Applicant shall submit evidence of FAA approval prior to the issuance of a building permit.
 - 3) Submit a certified letter from the applicant stating that in the event of non-use for a period of 120 days, the applicant, upon notice, will cause the structure to be removed at its own expense.
 - 4) Submit a letter stating that the site construction must be completed within one (1) year from the date of grant of a building permit.
 - 5) This applicant shall use conceal wrap material around their antennas themselves to help the aesthetics of the facility.
 - 6) The applicant should submit a letter of confirmation that the available space on the tower will be made available to other carriers at a rental cost of other similar towers in the county.
 - 7) The applicant should submit a letter from the tower consulting engineer certifying that the structure was constructed as he designed it upon completion of the construction.

Vice-Chair Halliburton asked the applicant if the tower is 150-feet high, why is there only a 30+/- fall zone.

Mr. Larry Perry, the City's 3rd party consultant, came to the podium. His office is located at 11464 Cycle Lane, Suite 400 in Knoxville, Tennessee. He has been in this business for almost 48 years with the towers and was on FCC's Advisory Committee for three Chairmen when they wrote the original rules for cellular communication. Mr. Perry said, staff can ask the carriers to wrap the antennas on the new 3M material. He said it makes the material transparent where you cannot see it. Mr. Perry said he has never seen a monopole antenna fall over like that, as they are made to collapse about 2/3rds of the way up. SEI had a consulting engineer to do the analysis on this monopole tower and Mr. Perry agreed with it. Mr. Perry said if the Board approves the request, he suggested they request a letter from a professional engineer certifying that the tower was built to his recommendations. He said the location is not a real major factor because the river is behind it, woods on the north and south, and a long driveway with a parking lot in front of it. He said our Ordinance requires a fall zone of 150-feet and the applicant has asked for 37-feet, 3-inches. He referred to the 75-foot requirement stating the building is not 75-feet, but the tower is a little over 150-feet. Mr. Perry said this is standard around Tennessee and most Ordinances require the same type thing. He said they meet all the requirements, Federal, State, Local except for these two variances in the City Ordinance.

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Vice-Chair Halliburton asked if this tower will be 5G capable.

Mr. Perry said yes adding that all towers are 5G capable. He said the new 5G towers will be lower, closer to the bottom. The subject tower can handle anything you want to put on it.

Vice-Chair Halliburton said he did not want to approve something that is going to be outdated.

Mr. Perry said no. He said if it were outdated, it would need to be removed within 120 days according to the City Ordinance.

Mr. Tipps asked if there will be a need for 150-foot tall towers in the future.

Mr. Perry said not necessarily, adding when they first started out with this back in the early 1980s there were 400-foot tall structures and they started coming down in height. He said the service area is smaller and smaller because they will lap into others if you do not. The 4G technology right now gives you about $\frac{3}{4}$ of a mile coverage and 5G gives you four football fields which is 400 yards, at the most, depending on the frequency and elevation. He said there would not be many more tall towers submitted, but they will not do away with the ones already in place. Mr. Perry said right now in the Murfreesboro area there are five major carriers compared to twelve major carriers in the United States.

Mr. Craig Parker with SCI Towers came to the podium. He addressed the question on how a 150-foot tower has a 37-foot fall point. He said the tower is made of galvanized steel and each tower is built to specification. Mr. Parker said they have a group of companies they work with as vendors. He said the break-point on a tower is manufactured and 5% weaker than the rest of the structure. He said if there were a structure failure, that is how it is designed to fail at. In this case it would be the 113-foot level, so the top 37-feet would collapse upon itself.

Mr. Tipps asked if the fail is mentioned in the submitted plans.

Mr. Parker said yes.

Chairman Young opened the public hearing. There being no one to speak for or against the application, Chairman Young closed the public hearing.

Chairman Young reminded the Board Members there are two components to this application, a Special Use Permit and height Variance.

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Mr. Tipps asked if similar application have been approved by the Board within the last 12-24 months.

Ms. Rush said the Board has approved two similar applications including the height variance, one in late 2017 and one in early 2018 within the City limits of Murfreesboro.

Vice-Chair Halliburton asked if the applicant has agreed to all the recommendations and conditions.

Ms. Rush said the two mentioned in the presentation from the consultant, these were not included in the staff report, which was the 3M wrap and an engineering letter certifying the tower was built at specifications. She said those two items were additional.

Ms. Kerr said the 3rd party consultant requests have been incorporated into the staff comment. She said they submitted a letter for the non-use of 120 days, which is what was recommended by the 3rd party consultant. She said they wrote their letter for 180, so the City will have them revise that to 120 days. Ms. Kerr said they added #5, which is the use of the concealed. She tried to consolidate his request along with the ones that Staff recommended, as well.

Vice-Chair Halliburton asked if the applicant agreed to doing this.

Ms. Kerr said applicant agree with staff's recommendations.

Mr. Parker came back to the podium and said SCI Towers are not the phone carriers but provides the infrastructure. They are a build-to-suit vendor for Verizon Wireless that will be the anchor tenant. Once the structure is built the providers will apply separately for their own application and building permit to put their equipment on our structure. Mr. Parker said they do not install the antennas. He said, historically they have had conditions where the antennas needed to be either painted or there are socks that go over the antennas. He was familiar with 3M but not familiar with the 3M technology. Mr. Parker said it was not that they would not agree to do it; it is that we are not actually installing the antennas. He said it would be a condition for every carrier that puts their equipment on structure, it would be a requirement of them. He said they build the structure, manage the structure, and rent the space to the wireless provider. Mr. Parkers thinks that would be a condition of every carrier that puts their equipment on the structure.

Chairman Young asked if the 3M structure goes on the antenna or the pole.

Mr. Parker said the 3M will be like what you see on a vehicle wrap, like a vinyl. He said there are not going to be graphics on the antenna but self-adhesive material that is manufactured by 3M. Mr. Parker said having that on the antenna is no issue, but they

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don't own the antennas as they only own the structure. He said if it needs to be a condition of approval, they can inform all their tenants what they need to do. He would also reiterate to the carriers when they apply for a building permit to co-locate on the structure that would be one of the conditions of their building permit.

Chairman Young asked if the co-locaters come to the Board of Zoning Appeals.

Ms. Rush explained yes and explained when the carrier comes thru to install their antenna or co-locate on an existing monopole, the co-locaters must come thru the Planning Department to obtain their building permits and obtain Planning approval. Planning approval is at Staff level and they make sure that what they are proposing is consistent with what the original Special Use Permit was approved for. She said if the Board would decide to add any conditions that would be required of the antenna; those would be carried forward for any providers that would install on it.

Vice-Chair Halliburton asked if that is true even though the co-locater is not the applicant.

Ms. Rush said that is correct.

Mr. Parker said it is his understanding it would be the condition of approval and every subsequent tenant that goes on the structure would be informed of the conditions. He asked if they should reference it as 3M in case there are other manufacturers of the wrap.

It was a suggestion as opposed to a requirement.

Mr. Parker said if the Ordinance states 180 days for vacancy, they will comply with that. The letter they submitted said 120 days but if the requirement is 180 days they will be happy to accommodate that number.

Ms. Mosby made a motion to approve a special use permit to construct a telephone transmission tower in a Commercial Highway (CH) zone for property located at 1631 NW Broad Street with the following conditions:

- 1) Applicant shall apply for and obtain approval of a Site Plan Review. It shall include the following:**
 - a. Antenna structure shall be setback a minimum of 37'3" from the property line. Prior to the issuance of a Certificate of Completion or Occupancy, a surveyor's certification will be required to confirm the structure has been placed in accordance with this setback.**
 - b. Fence height to enclose the base of the antenna structure and associated equipment enclosure shall be a minimum of 8 feet in height and controlled by a locked gate**

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- d. Landscaping and vegetative buffer shall be installed to reduced visibility from the public right-of-way and surrounding properties.
- 2) Applicant shall submit evidence of FAA approval prior to the issuance of a building permit.
- 3) Submit a certified letter from the applicant stating that in the event of non-use for a period of 120 days, the applicant, upon notice, will cause the structure to be removed at its own expense.
- 4) Submit a letter stating that the site construction must be completed within one (1) year from the date of grant of a building permit.

Mr. Ives suggested to modify the conditions to say that condition #5 as stated "*The applicant shall use 3M conceal wrap to change #5 to a suggestion as opposed to a condition and that the applicant use a 3M-type conceal wrap as there may be other manufacturers with a comparable product.*"

Mr. Tipps suggested stating a concealed wrap and strike any reference to a vendor.

Vice-Chair Halliburton said you could then make it a requirement.

Mr. Ives said they could do that, but it is not a requirement of this applicant because this applicant will not be installing the tower. He said the requirements then would be that the future antenna installers provide a conceal wrap on their antennas.

Ms. Mosby said so moved on that condition. The motion was seconded by Mr. Tipps.

Vice-Chair Halliburton asked if they were making it a suggestion or a requirement.

Mr. Ives said the motion is to make it a requirement on the antenna installers.

The motion was unanimously approved.

Vice-Chair Halliburton said if they are to use this template, he was not sure where the practical difficulties are, other than how the thing works.

Mr. Tipps said it appears more that technology has bypassed our regulations. He said the gentleman made some excellent comments as to the whys and the actual impacts of these types of structures and how that fall zone is a limited factor. He said the fact is, it is 150 feet high and to be in compliance, it would not exceed 75 feet.

Vice-Chair Halliburton said they just heard testimony that once it goes to 5G you will see 35-foot towers.

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Mr. Ives said we will see 35-foot towers, but the 150-foot towers will continue to be utilized, and there probably will still be a few more of the micro towers as opposed to small cell towers that will be in the 30-40-foot range. He said a height variance is somewhat different from the bulk regulations pertaining to land usage. The technology requirement for adequate function, the height needs to be at the level requested supported by the engineers and agreed to by our consultant.

Vice-Chair Halliburton verified that because it is a height variance, we would not use this template in granting the motion.

Mr. Ives thinks this template is not particularly appropriate for a height variance.

Mr. Tipps verified the lack of a motion to approve this variance and the fact they voted to approve the Special Use Permit, this applicant could proceed on as long as it was a 25-foot tower.

Mr. Ives said yes, you could. He said it requires the variance for the applicant to build the 150-foot tower at this site.

Mr. Tipps asked if prior towers that have been approved at 150-feet had fall zone requirements in compliance.

Mr. Ives said yes, they would have had fall zone requirements.

Mr. Tipps said they have stated the surrounding area as wooded and parking lot. He asked if that area is owned by the City.

Mr. Ives was not sure if that property was owned by the City.

Vice-Chair Halliburton made a motion to approve a 75-foot variance of the 75-foot maximum permitted building height in a Commercial Highway (CH) zone in order to allow a 150-foot-tall structure. The motion was seconded by Ms. Mosby and carried unanimously in favor.

EXHIBIT F



October 31, 2018

... creating a better quality of life

SCI Towers, LLC
Attn: Craig Parker
P. O. Box 3469
Cary, NC 27519

RE: Z-18-050 – 1631 NW Broad Street

Dear Mr. Parker:

Please be advised that your request for a Special Use Permit for a wireless telecommunication facility and a 75-foot Variance to allow a 150-foot monopole and antenna was approved with the following conditions:

- 1) Applicant shall apply for and obtain approval of a Site Plan Review. It shall include the following:
 - a. Antenna structure shall be setback a minimum of 37'3" from the property line. Prior to the issuance of a Certificate of Completion or Occupancy, a surveyor's certification will be required to confirm the structure has been placed in accordance with this setback.
 - b. Fence height to enclose the base of the antenna structure and associated equipment enclosure shall be a minimum of 8 feet in height and controlled by a locked gate
 - c. Landscaping and vegetative buffer shall be installed to reduced visibility from the public right-of-way and surrounding properties.
- 2) Applicant shall submit evidence of FAA approval prior to the issuance of a building permit.
- 3) Submit a certified letter from the applicant stating that in the event of non-use for a period of 120 days, the applicant, upon notice, will cause the structure to be removed at its own expense.
- 4) Submit a letter stating that the site construction must be completed within one (1) year from the date of grant of a building permit.
- 5) This applicant shall use conceal wrap material around their antennas themselves to help the aesthetics of the facility.
- 6) The applicant should submit a letter of confirmation that the available space on the tower will be made available to other carriers at a rental cost of other similar towers in the county.

Planning Department

111 West Vine Street * P.O. Box 1139 * Murfreesboro, TN 37133-1139 * Phone: 615 893 6441 * Fax: 615 849 2606 * TDD 615 849 2689
www.murfreesborotn.gov

October 31, 2018
SCI Towers, LLC
Page 2

- 7) The applicant should submit a letter from the tower consulting engineer certifying that the structure was constructed as he designed it upon completion of the construction.

Please keep a copy of this letter as evidence of the Board's action. If you have any questions, please contact me at (615)-893-6441.

Sincerely,



Amelia Kerr
Planner

cc: Building and Codes Department

bd



DISH Wireless L.L.C. SITE ID:

NABNA00141A

DISH Wireless L.L.C. SITE ADDRESS:

**1631 NW BROAD STREET
MURFREESBORO TN, 37129**

TENNESSEE - CITY OF MURFREESBORO CODE OF COMPLIANCE

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

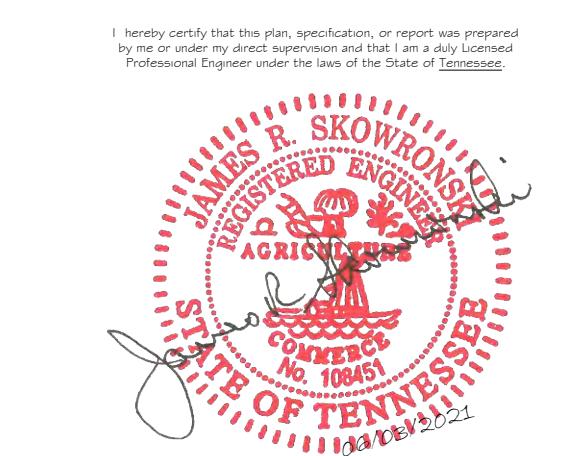
CODE TYPE	CODE
BUILDING	2018 IBC – 2018 IEBC
MECHANICAL	2018 IMC
ELECTRICAL	2017 NEC

SHEET INDEX

SHEET NO.	SHEET TITLE
T-1	TITLE SHEET
1 OF 5	SITE SURVEY
2 OF 5	SITE SURVEY
3 OF 5	SITE SURVEY
4 OF 5	SITE SURVEY
5 OF 5	SITE SURVEY
A-1	OVERALL AND ENLARGED SITE PLAN
A-2	ELEVATION, ANTENNA LAYOUT AND SCHEDULE
A-3	EQUIPMENT PLATFORM AND H-FRAME DETAILS
A-4	EQUIPMENT DETAILS
A-5	EQUIPMENT DETAILS
A-6	EQUIPMENT DETAILS
E-1	ELECTRICAL/FIBER ROUTE PLAN AND NOTES
E-2	ELECTRICAL DETAILS
E-3	ELECTRICAL ONE-LINE & PANEL SCHEDULE
G-1	GROUNDING PLANS AND NOTES
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS
RF-1	RF CABLE COLOR CODE
RF-2	RF PLUMBING DIAGRAM
GN-1	LEGEND AND ABBREVIATIONS
GN-2	GENERAL NOTES
GN-3	GENERAL NOTES
GN-4	GENERAL NOTES

SCOPE OF WORK	
THIS IS NOT AN ALL INCLUSIVE LIST. CONTRACTOR SHALL UTILIZE SPECIFIED EQUIPMENT PART OR ENGINEER APPROVED EQUIVALENT. CONTRACTOR SHALL VERIFY ALL NEEDED EQUIPMENT TO PROVIDE A FUNCTIONAL SITE. THE PROJECT GENERALLY CONSISTS OF THE FOLLOWING:	
TOWER SCOPE OF WORK:	
<ul style="list-style-type: none"> • INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR) • INSTALL (1) PROPOSED TOWER PLATFORM MOUNT • INSTALL PROPOSED JUMPERS • INSTALL (6) PROPOSED RRUs (2 PER SECTOR) • INSTALL (1) PROPOSED OVER VOLTAGE PROTECTION DEVICE (OVP) • INSTALL (1) PROPOSED HYBRID CABLE 	
GROUND SCOPE OF WORK:	
<ul style="list-style-type: none"> • INSTALL (1) PROPOSED METAL PLATFORM • INSTALL (1) PROPOSED ICE BRIDGE • INSTALL (1) PROPOSED PPC CABINET • INSTALL (1) PROPOSED EQUIPMENT CABINET • INSTALL (1) PROPOSED POWER CONDUIT • INSTALL (1) PROPOSED TELCO CONDUIT • INSTALL (1) PROPOSED TELCO-FIBER BOX • INSTALL (1) PROPOSED GPS UNIT • INSTALL (1) PROPOSED SAFETY SWITCH (IF REQUIRED) • INSTALL (1) PROPOSED FIBER NID (IF REQUIRED) • INSTALL (1) PROPOSED METER SOCKET • INSTALL BRASS METER TAG AT METER AS REQUIRED BY MIDDLE TENNESSEE ELECTRIC 	

SITE INFORMATION		PROJECT DIRECTORY	
PROPERTY OWNER:	CTI TOWER INC.	APPLICANT:	DISH Wireless L.L.C.
ADDRESS:	5000 CENTRE GREEN WAY		5701 SOUTH SANTA FE DRIVE
	CARY, NC 27513		LITTLETON, CO 80120
TOWER TYPE:	MONOPOLE	TOWER OWNER:	SCI TOWER INC.
TOWER CO SITE ID:	70095		P.O. BOX 3469
TOWER APP NUMBER:	TBD		CARY, NC 27519
			(772) 631-6575
COUNTY:	RUTHERFORD	SITE DESIGNER:	SURESITE
LATITUDE (NAD 83):	35° 52' 11.82" N 35.869950 N		3659 GREEN RD, SUITE 214
LONGITUDE (NAD 83):	86° 25' 3.35" W 86.417597 W		CLEVELAND, OH 44122
ZONING JURISDICTION:	CITY OF MURFREESBORO	SITE ACQUISITION:	TIFFANY TROCKI (303) 706-4326
ZONING DISTRICT:	CITY OF MURFREESBORO	CONSTRUCTION MANAGER:	AARON FEENSTRA (760) 217-1209
PARCEL NUMBER:	0801-A-011.01-000	RF ENGINEER:	ANUP DHOLAM (214) 395-7856
OCCUPANCY GROUP:	U	POWER COMPANY:	MIDDLE TENNESSEE ELECTRIC
CONSTRUCTION TYPE:	V-B	TELEPHONE COMPANY:	TBD



IT IS A VIOLATION OF LAW FOR ANY PERSON,
UNLESS THEY ARE ACTING UNDER THE DIRECTION
OF A LICENSED PROFESSIONAL ENGINEER,
TO ALTER THIS DOCUMENT.

DRAWN BY: CHECKED BY: APPROVED BY:
GCA CWM JW

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS		
REV	DATE	DESCRIPTION
A	05/12/21	ISSUED FOR REVIEW
0	05/27/21	ISSUED FOR CONSTRUCTION
1	06/02/21	REVISED ANTENNA & MOUNT

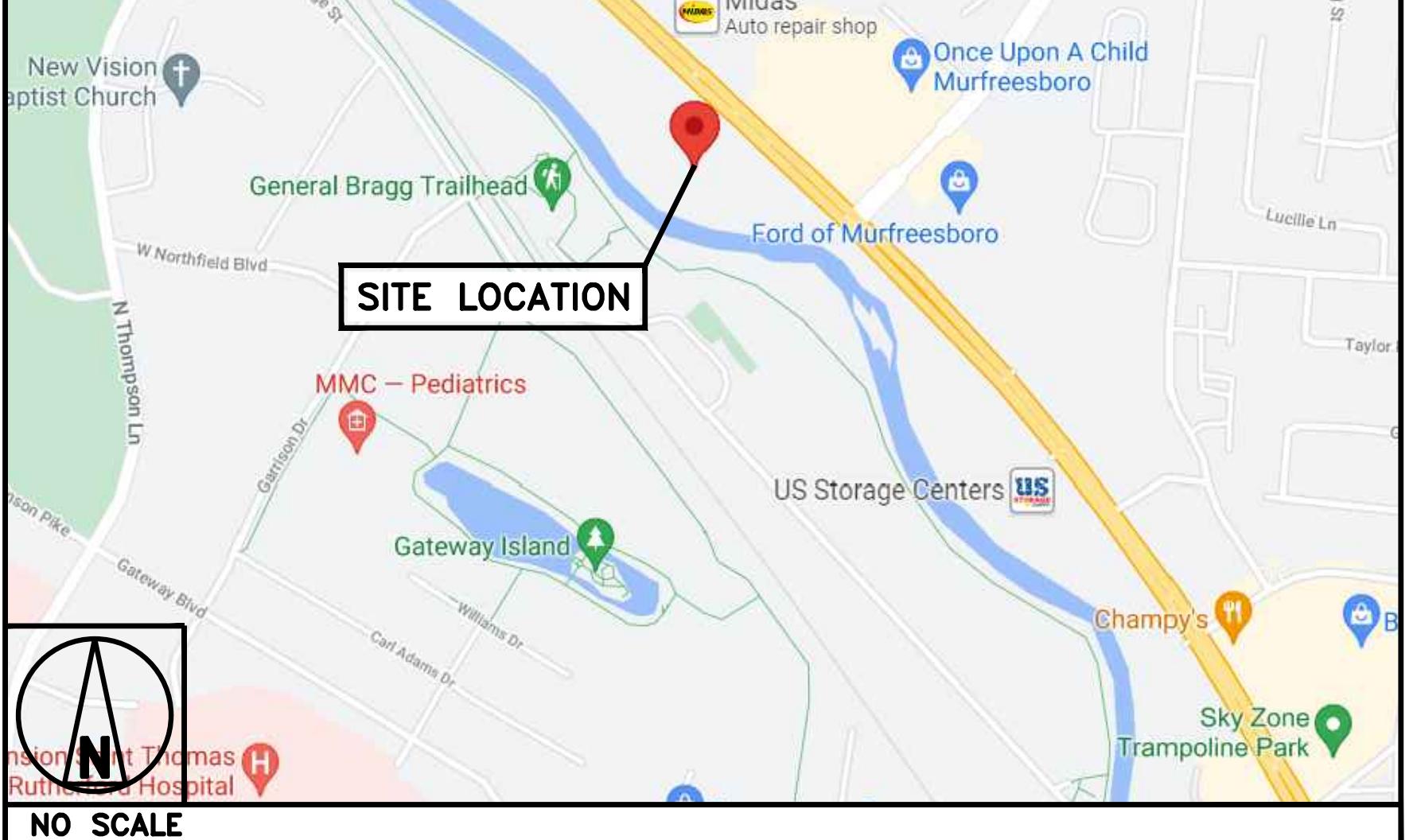
A&E PROJECT NUMBER
NABNA00141A

DISH Wireless L.L.C.
PROJECT INFORMATION
NABNA00141A
1631 NW BROAD STREET
MURFREESBORO TN, 37129

SHEET TITLE
TITLE SHEET
T-1



GENERAL NOTES	
THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE. NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.	
11"x17" PLOT WILL BE HALF SCALE UNLESS OTHERWISE NOTED	



SURVEYOR'S NOTES:

1. NORTH ORIENTATION: Tennessee State Plane Coordinate System, NAD 83 (CORS), determined by GPS Survey
2. ELEVATION DATUM: NAVD88, relative to Continuously Operating Reference Station (CORS) Benchmark as noted hereon. Onsite benchmark is as shown hereon
3. This is a Tower Site Survey, made on the ground under the supervision of a Tennessee Registered Land Surveyor. Date of field survey is 01-28-2020.
4. Instruments Used: Topcon GTS 212 and Prism, Topcon Hiperlite Plus GPS, TDS Nomad and/or Carlson Surveyor Data Collector.
5. Surveyor hereby states the Geodetic Coordinates and the elevation shown for the centerline of the tower are accurate to within \pm 15 feet horizontally and to within \pm 3 feet vertically (FAA Accuracy Code 1A).
6. Survey shown hereon conforms to the Minimum Requirements as set forth by the State Board for a Category "II" Survey as stated in Certification. Field traverse did not require adjustment.
7. Improvements (Utilities, Buildings, Trees, Fences, etc) not located, unless specifically shown hereon in the vicinity of surveyed property.
8. No underground utilities, underground encroachments or building foundations were measured or located as a part of this survey, unless otherwise shown.
9. This survey was conducted for the purpose of a Tower Site Survey only, and is not intended to delineate the regulatory jurisdiction of any federal, state, regional or local agency, board, commission or other similar entity. Survey as published is not intended to be suitable for recording as a Subdivision Plat
10. Attention is directed to the fact that this survey may have been reduced or enlarged in size due to reproduction. This should be taken into consideration when obtaining scaled data.
11. This survey is not valid without the original signature and the original seal of a State-Licensed Land Surveyor, and is not complete without all sheets.
12. This survey does not constitute a complete boundary survey of the Parent Tract, or adjoining Parcels.
13. Title Examination was not available at time of Survey.
14. FLOOD ZONE DATA: By graphic plotting only, a portion of Lessee's Lease Area appears to lie within Zone AE (Special Flood Hazard Areas subject to inundation by the 1% annual chance flood, base flood elevations determined). Base Flood Elevation shown by FEMAZ MAP in vicinity of SITE is 564 feet. Portion of Lessee's Site and Easement appear to lie within "Other Flood Areas, Zone X (0.2% Annual Chance Flood). See F.E.M.A Flood Insurance Rate Map Community Panel No. #47149C0260H, dated Jan 5, 2007, for complete details.

SURVEYOR'S CERTIFICATION:

I hereby certify to SCI Towers, Inc.: that this is a Category II Survey; that the ratio of closure of the unadjusted survey exceeds 1:7,500; that the survey was done in compliance with current Tennessee Minimum Standards of Practice;



Travis L. Shields
Tennessee License No. 2921

AS-BUILT TOWER DATA

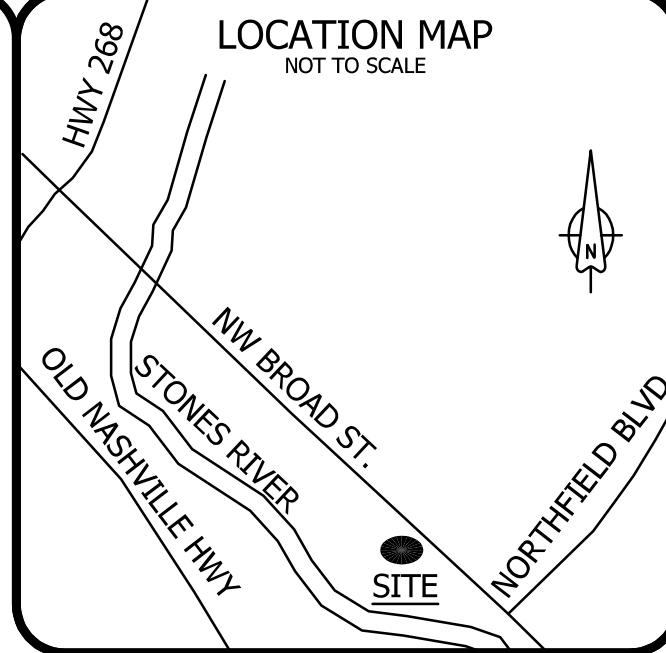
Latitude: 35° 52' 11.83" NORTH
Longitude: 86° 25' 03.33" WEST
Ground Elevation: 567.6 feet AMSL NAVD88
CORS Benchmark: DK7594 TN38

SURVEY RELEASE DATA

#	DETAILS	DATE	DRAWN	APP
0	Original As-Built Survey Issue	02-17-2020	NB	TLS

LOCATION MAP

NOT TO SCALE

**LEGEND**

- CAPPED IRON ROD FOUND
- ◎ SEWER MANHOLE

R/W RIGHT-OF-WAY
 POC POINT OF COMMENCEMENT
 POB POINT OF BEGINNING
 ESMT EASEMENT
 Sq Ft SQUARE FEET

" " PAVEMENT EDGE

△ △ GRAVEL EDGE

— 5' CONTOURS

- - - - 1' CONTOURS

~~~~~ TREE LINE

— RW — PUBLIC R/W

— - - - TAX PARCEL BOUNDARY

— - - - EXISTING EASEMENT

— TIE LINE

— - - - ACCESS/UTILITY ESMT

— — — LEASE AREA

**AS-BUILT TOWER SITE SURVEY**

SITE NAME:  
**BROAD STREET**

Site Number: 70095

Thirteenth Civil District, Rutherford County, Tennessee  
1631 NW Broad Street, Murfreesboro, TN 37129

REVISION #: 0  
ISSUE DATE: 02-17-2020  
SEE SHEET #1

**COVER SHEET**  
SHEET 1 OF 5



**THE LAND CONSULTANTS LLC**  
5449 Highway #41  
Jasper, TN 37347  
(423) 304-6722

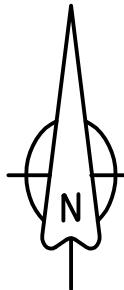


SCI TOWERS, INC  
P.O. Box 3469  
Cary, NC 27519

# PROPERTY INFORMATION

## PARENT PARCEL

A. JOE B. BEASLEY & ASSOCIATES, L.P.  
Tax Parcel: 080I-A-011.01  
Deed Book 606, Page 601  
Lot 23, Block "A",  
Golf Club Heights Subdivision,  
Plat Book 104, Page 295

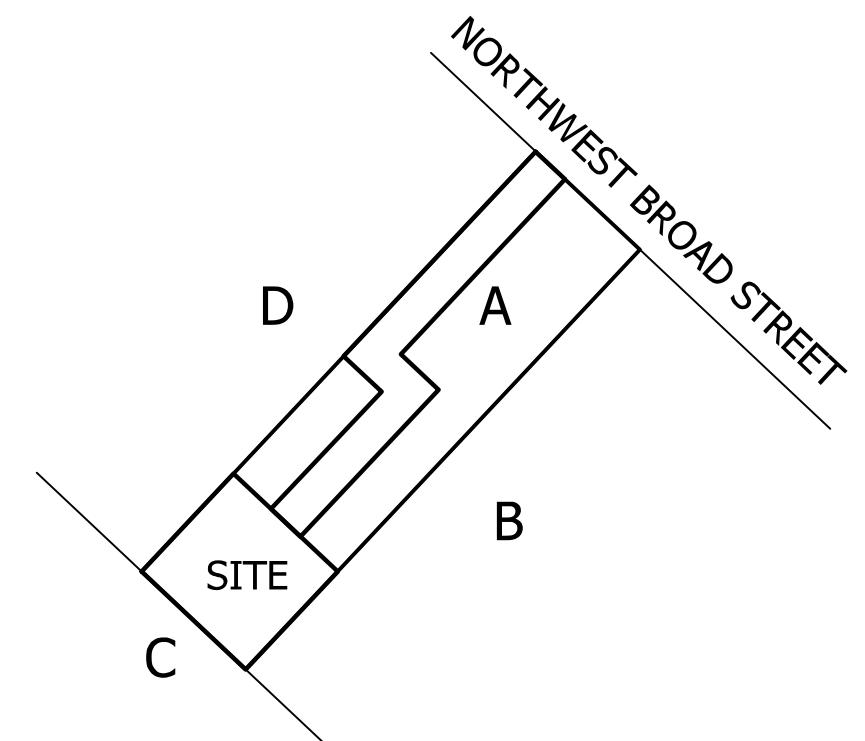


## ADJOINERS

B. PRADEEP AGNIHOTRI  
Tax Parcel: 080I-A-012.01  
Deed Book 148, Page 2363  
Plat Book 104, Page 295

C. FRED H. FARRER  
Tax Parcel: 080I-A-011.00  
Deed Book 592, Page 3111

D. GARY D. ALLEN  
Tax Parcel: 080I-A-010.01  
Deed Book 1353, Page 1411



APPROX SCALE: 1in = 100'



VICINITY/LOCATION MAP CAVEAT:  
ONLY LESSEE'S PREMISES AND EASEMENTS(S) AS SHOWN ON BOUNDARY AND  
TOPOGRAPHY SHEETS IS TO BE CONSIDERED SURVEYED INFORMATION.  
VICINITY/ LOCATION MAP INTENDED ONLY TO SHOW SURVEYED PROPERTY IN  
RELATION TO SURROUNDING AREA



## TITLE EXAMINATION

(Surveyor's treatment of Title Examination Items is limited to the scope described in ALTA/NSPS 2016 requirements, Section 6. C. ii., and is limited to determination of the extent of land, that Title Items may influence, if any. Surveyor may indicate where review by Title Attorney may be warranted.)

Reference: Commitment for Title Insurance, prepared by Fidelity National Title Insurance Company, Commitment No. 27674614 Issue Date: July 31 2018, Schedule B, Section II.

Item 1 – 6: Generalized Items for which no specific documents were listed.

Item 7: Taxes: Not addressed herein.

Item 8: Plat Book 104, Page 295 RORC: Shows no matters influencing Parent Parcel.

Item 9: Terms and Conditions, Deed 104-405 RORC. Imposes Restrictions on portions of Golf Club Heights Subdivision, including Lot 23. Restrictions imposed not subject to analysis by Land Surveyor (Title Attorney review recommended).

Item 10: Easement to City of Murfreesboro, Deed 122-39 RORC: Water Line Easement along the South Line of Highway 41 (Northwest Broad Street). Extent of Easement is defined in Deed by Highway Station Data. Highways Plans not available to determine relationship to Parent Parcel. Assumed to include Parent Parcel per Deed Chain Data. Width of easement may be 15' (7.5' on property) or 30 feet (15 feet on property) in width (extents of each also defined only by Station Data). Assumed to influence Lessee's Easement. (Also conveyed, 40' wide temporary construction easement, assumed expired).

Item 11: Easement to City of Murfreesboro, Deed 128-349 RORC: Deed describes Easement North of Highway 41, assumed no influence on Parent Parcel or Lessee's Site.

Item 12: Consent in favor of M. S. Kennedy, Jr, Trustee, & The Federal Land Bank of Louisville, Deed 128-352 RORC: Refers to a Sewer easement in same name as Item 11. Assumed to refer to same object as Item 11, not further addressed. NOTE: Sewer Manhole shown hereon north of Property, sewer lines were not marked at time of survey and their location relative to Parent Parcel is not known.

Item 13: Easement to City of Murfreesboro, Deed 253-73 RORC: Sewer Easement on Lands Southwest of Parent Parcel.

Item 14: Joint Driveway Easement, Deeds 565-621, 566-65 RORC: Shown hereon, influences Parent Parcel & Lessee's Easement.

Item 15: Deed of Trust and Amendments (listed in Title Report). Not subject to Land Surveyor analysis or mapping. Title Attorney review recommended.

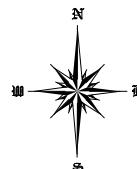
## LEGAL DESCRIPTION OF PARENT PARCEL

LOCATED in the 13th Civil District of Rutherford County, Tennessee, and being more particularly described as follows:

BEING all of Lot No. 23 of BLOCK "A", GOLF CLUB HEIGHTS SUBDIVISION, according to plat and survey of same appearing of record in Deed Book 104, Page 295, of the Register's Office of Rutherford County, Tennessee, to which plat reference is hereby made for more complete details as to location and description of said lot.

AND BEING the same property conveyed to Joe B. Beasley and Evelyn J. Beasley from James Daniel Lewis, Jr. and Vickie Denise Lewis by Deed dated September 27, 1995 and recorded September 28, 1995 in Deed Book 557, Page 850; AND BEING a portion of the same property conveyed to Joe B. Beasley & Associates, L.P., a Tennessee limited partnership from Bobby Joe Beasley a/k/a Joe B. Beasley and Evelyn Jean Beasley a/k/a Evelyn J. Beasley by Deed dated September 23, 1997 and recorded September 24, 1997 in Deed Book 606, Page 601.

Tax Parcel No. 0801 A 011.01



THE  
LAND CONSULTANTS  
LLC  
5449 Highway #41  
Jasper, TN 37347  
(423) 304-6722

PREPARED FOR

**SCI  
TOWERS**

SCI TOWERS, INC  
P.O. Box 3469  
Cary, NC 27519

AS-BUILT TOWER SITE SURVEY

SITE NAME:  
**BROAD STREET**

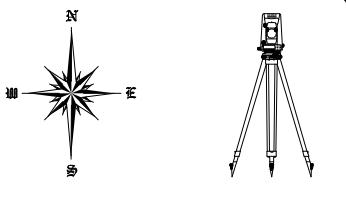
Site Number: 70095

1631 NW Broad Street, Murfreesboro, TN 37129  
Thirteenth Civil District, Rutherford County, Tennessee

REVISION #: 0  
ISSUE DATE: 02-17-2020  
SEE SHEET #1

**OVERVIEW**  
SHEET 2 OF 5





THE  
LAND CONSULTANTS  
LLC  
5449 Highway #41  
Jasper, TN 37347  
(423) 304-6722

PREPARED FOR



SCI TOWERS, INC  
P.O. Box 3469  
Cary, NC 27519

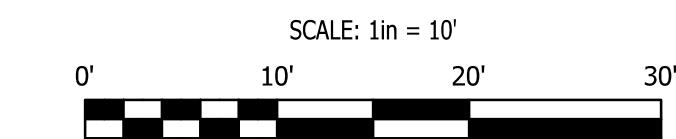
## AS-BUILT TOWER SITE SURVEY

SITE NAME:  
**BROAD STREET**

Site Number: 70095

1631 NW Broad Street, Murfreesboro, TN 37129

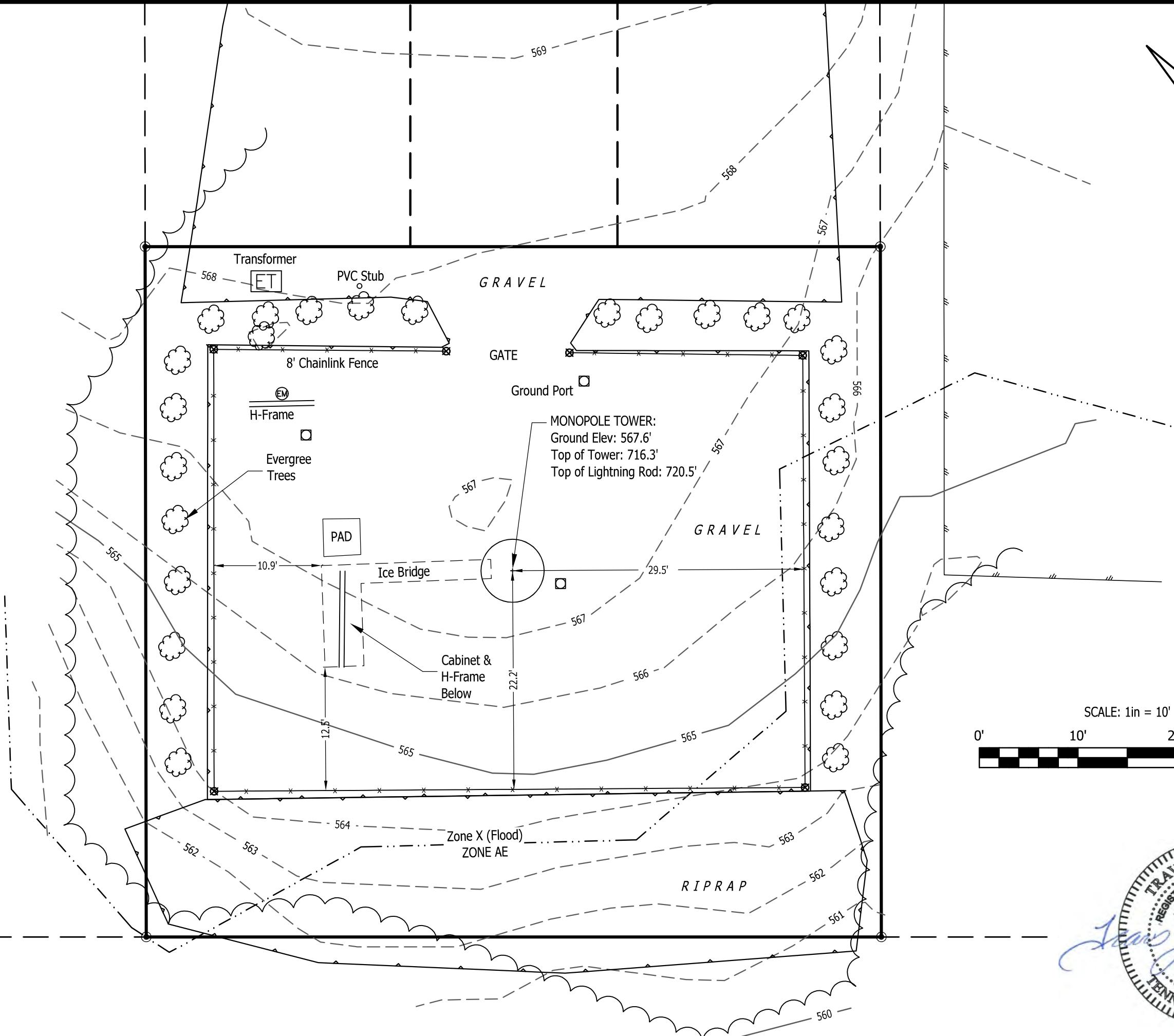
Thirteenth Civil District, Rutherford County, Tennessee



REVISION #: 0  
ISSUE DATE: 02-17-2020  
SEE SHEET #1

DETAIL

SHEET 4 OF 5



## LESSEE'S 21' ACCESS & UTILITY EASEMENT

Being a 21' Access & Utility Easement of 5,398 Square Feet), situated in the Thirteenth Civil District of Rutherford County, Tennessee, and being a portion of the Property of Joe B. Beasley & Associates, L.P., of record in Deed Book 606, Page 601, Register's Office, Rutherford County, Tennessee (RORC), also known Lot 23, Block "A", Golf Club Heights Subdivision, Plat Book 104, Page 295, RORC, and as Tax Parcel 0801-A-011.01, Rutherford County, Tennessee, and being more particularly described as follows:

BEGINNING at a Capped Iron Rod (found) at the Northwest Corner of aforesaid Parcel, located at Tennessee State Plane Coordinates: N: 559,819.02, E: 1,844,928.32;

Thence S 46°43'27" E, along the Southern Right of Way of Northwest Broad Street, a distance of 21.00 feet;

Thence S 43°11'05" W, leaving said Line, a distance of 125.08 feet;

Thence S 46°48'55" E, a distance of 27.04 feet;

Thence S 43°16'33" W, a distance of 104.96 feet;

Thence N 46°43'27" W, a distance of 21.00 feet;

Thence N 43°16'33" E, a distance of 83.93 feet;

Thence N 46°48'55" W, a distance of 27.01 feet;

Thence N 43°11'05" E, along the Northwest Line of aforesaid Parcel, a distance of 146.12 feet to the Point of Beginning and containing 0.12 Acres (5,398 Square Feet) more or less.

## LESSEE'S LEASE AREA

Being a Lease Area of 5,217 square feet, situated in the Thirteenth Civil District of Rutherford County, Tennessee, and being a portion of the Property of Joe B. Beasley & Associates, L.P., of record in Deed Book 606, Page 601, Register's Office, Rutherford County, Tennessee (RORC), also known Lot 23, Block "A", Golf Club Heights Subdivision, Plat Book 104, Page 295, RORC, and as Tax Parcel 0801-A-011.01, Rutherford County, Tennessee, and being more particularly described as follows:

BEGINNING at a Capped Iron Rod (set) at the Southwest Corner of aforesaid Parcel, located at Tennessee State Plane Coordinates: N: 559,600.28, E: 1,844,723.01;

Thence N 43°11'05" E, along the Northwest Line of said Parcel, a distance of 70.00 feet to a Capped Iron Rod (set);

Thence S 46°43'27" E, a distance of 74.52 feet to a Capped Iron Rod (set);

Thence S 43°11'05" W, along the Southeast Line of said Parcel, a distance of 70.00 feet to a Capped Iron Rod (set);

Thence N 46°43'27" W, along the Southwest Line of said Parcel, a distance of 74.52 feet to the Point of Beginning and containing 0.12 Acres (5,217 Square Feet) more or less.



## THE LAND CONSULTANTS

5449 Highway #41  
Jasper, TN 37347  
(423) 304-6722

PREPARED FOR



SCI TOWERS, INC  
P.O. Box 3469  
Cary, NC 27519

## AS-BUILT TOWER SITE SURVEY

SITE NAME:

**BROAD STREET**

Site Number: 70095

1631 NW Broad Street, Murfreesboro, TN 37129

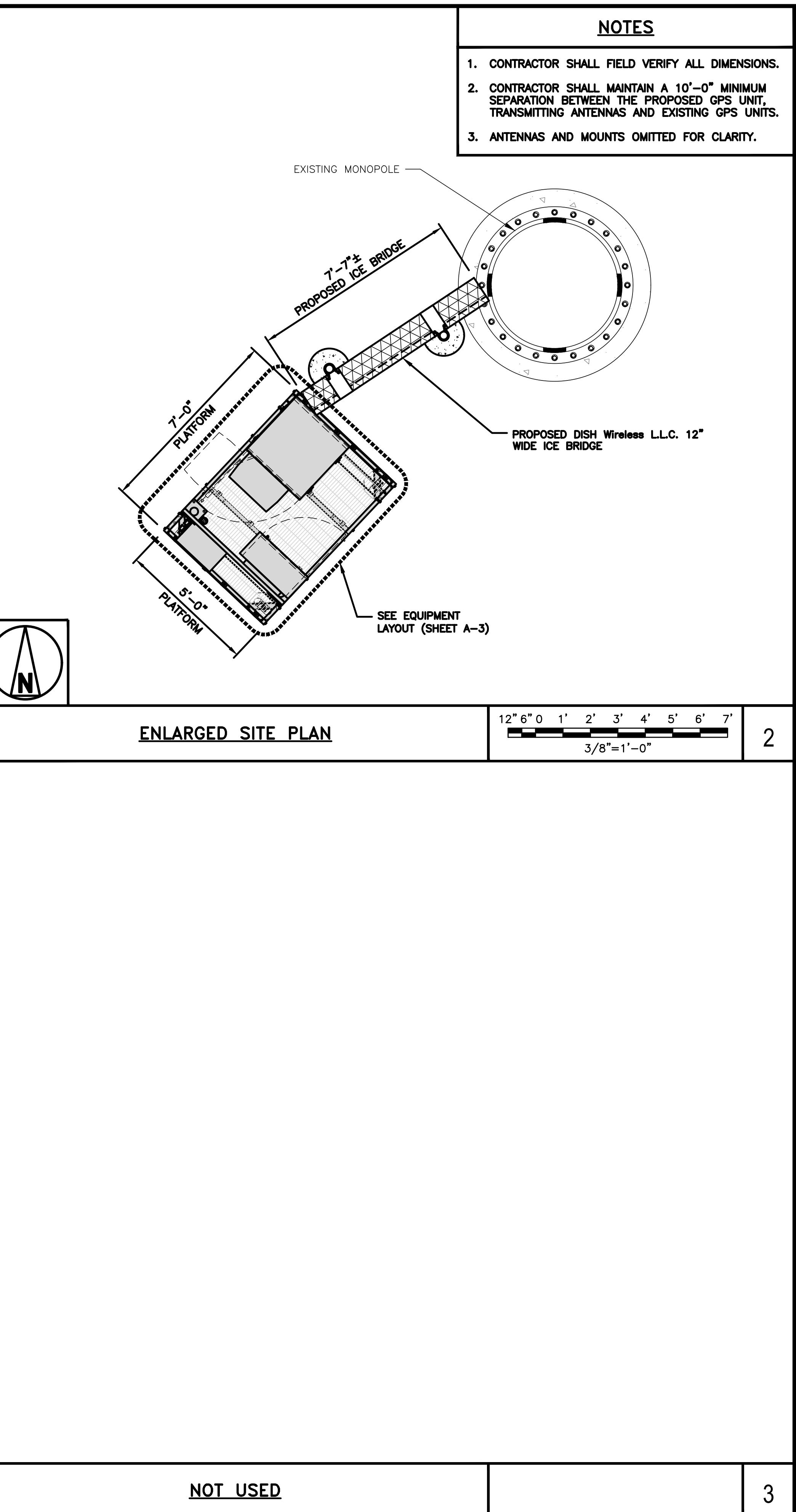
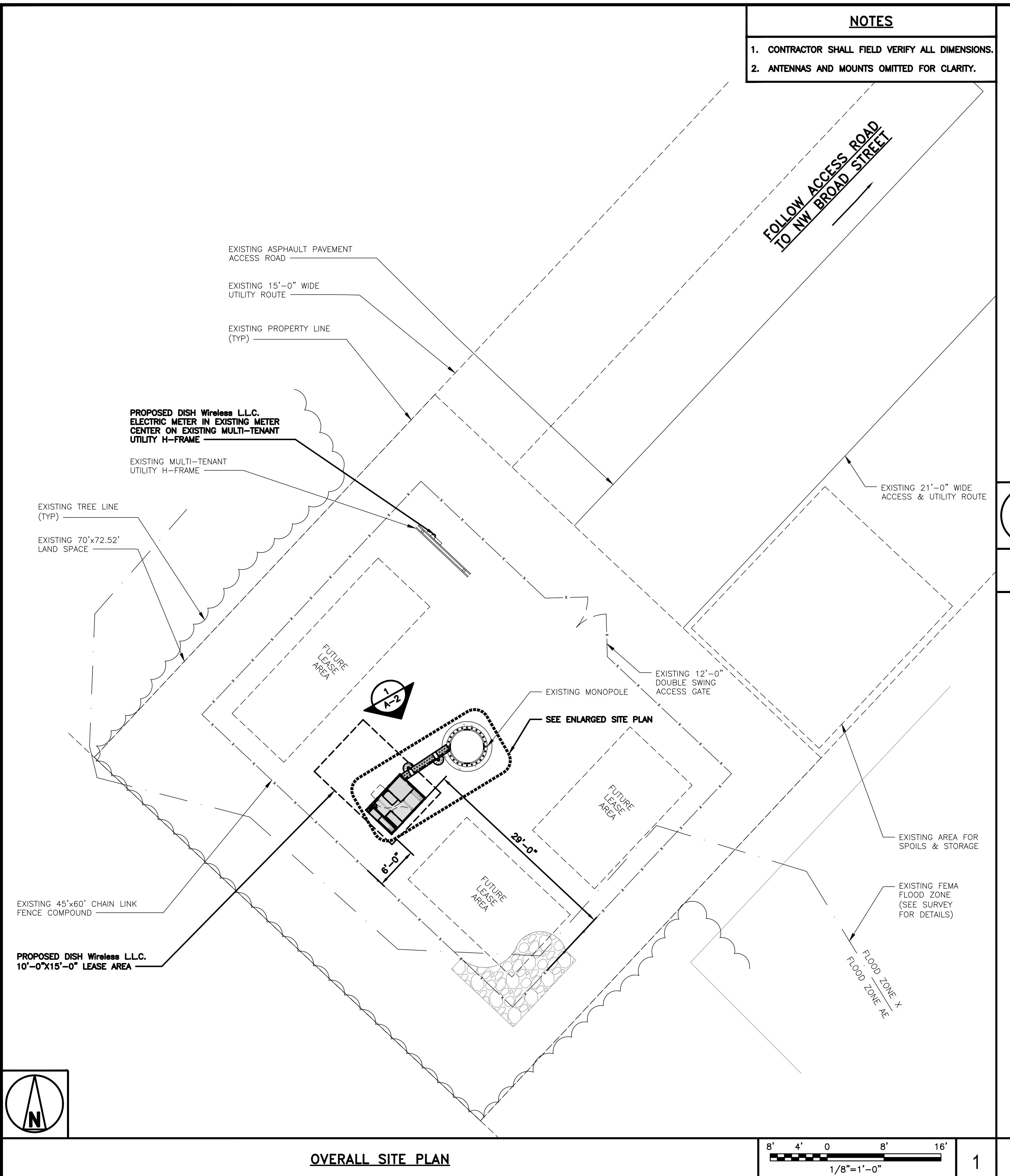
Thirteenth Civil District, Rutherford County, Tennessee



REVISION #: 0  
ISSUE DATE: 02-17-2020  
SEE SHEET #1

## SURVEYOR'S DESCRIPTIONS

SHEET 5 OF 5



**dish wireless.**

5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120

**SURE SITE**

3659 GREEN ROAD, SUITE 214  
CLEVELAND, OH 44122

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and is a duly licensed Professional Engineer registered in the State of Tennessee.

JAMES R. SKOWRONSKI  
REGISTERED ENGINEER  
AGRICULTURAL  
STATE OF TENNESSEE  
NO. 10645  
EXPIRED 03/31/2021

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

DRAWN BY: CCA CHECKED BY: CWM APPROVED BY: JW

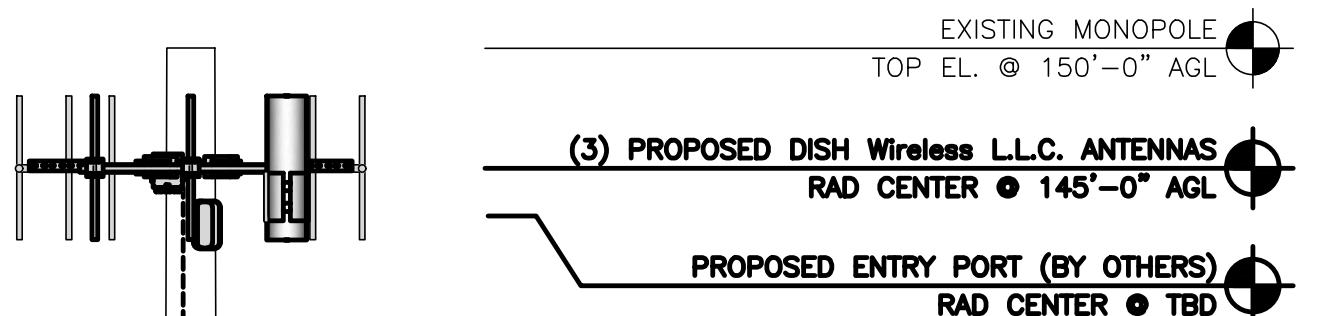
RFDS REV #: ---

**CONSTRUCTION DOCUMENTS**

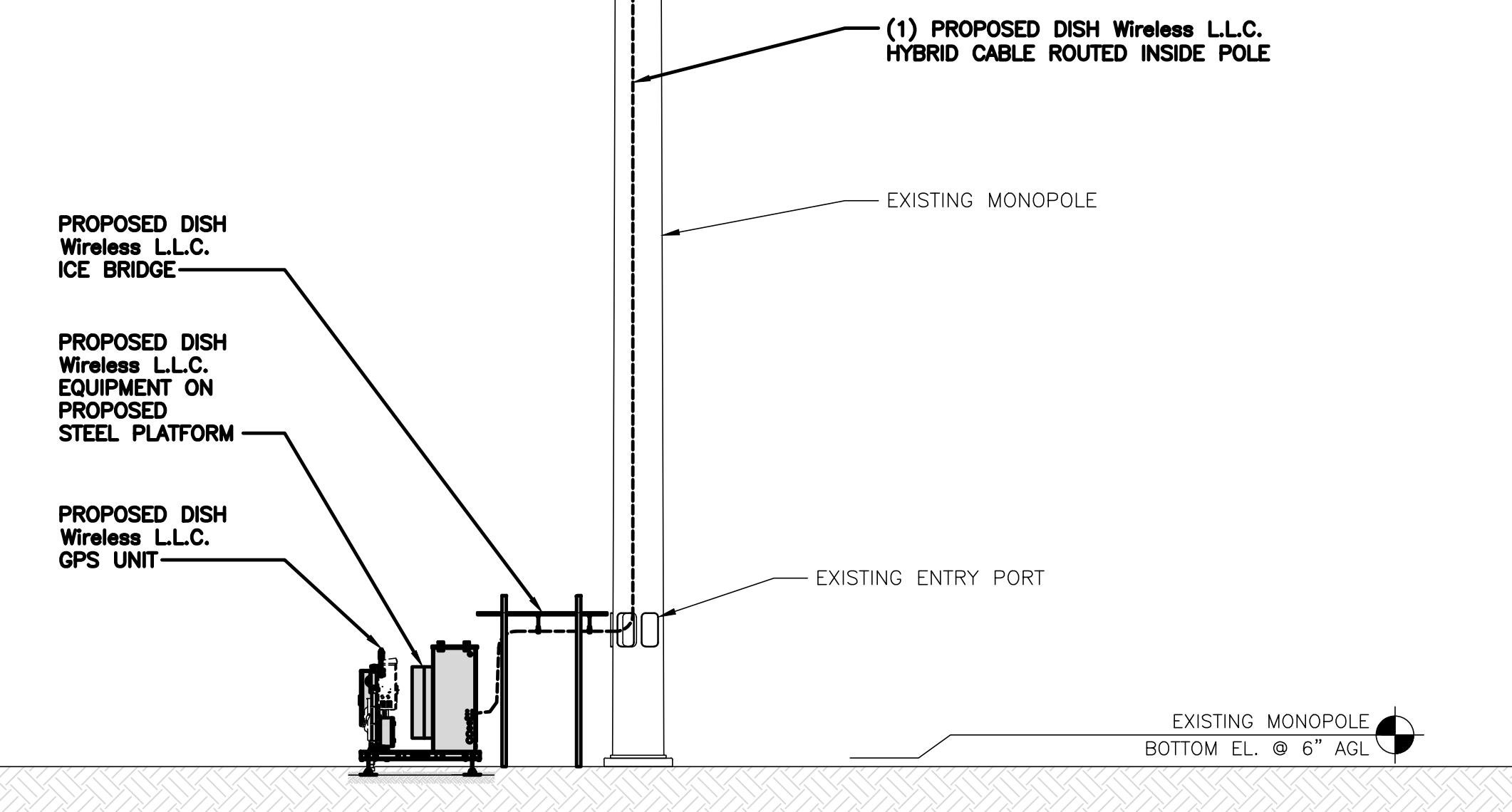
| SUBMITTALS                                                                                                   |          |                         |
|--------------------------------------------------------------------------------------------------------------|----------|-------------------------|
| REV                                                                                                          | DATE     | DESCRIPTION             |
| A                                                                                                            | 05/12/21 | ISSUED FOR REVIEW       |
| 0                                                                                                            | 05/27/21 | ISSUED FOR CONSTRUCTION |
| 1                                                                                                            | 06/02/21 | REVISED ANTENNA & MOUNT |
| A&E PROJECT NUMBER<br>NABNA00141A                                                                            |          |                         |
| DISH Wireless L.L.C.<br>PROJECT INFORMATION<br>NABNA00141A<br>1631 NW BROAD STREET<br>MURFREESBORO TN, 37129 |          |                         |
| SHEET TITLE<br>OVERALL AND ENLARGED SITE PLAN                                                                |          |                         |
| SHEET NUMBER<br><b>A-1</b>                                                                                   |          |                         |

## NOTES

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS

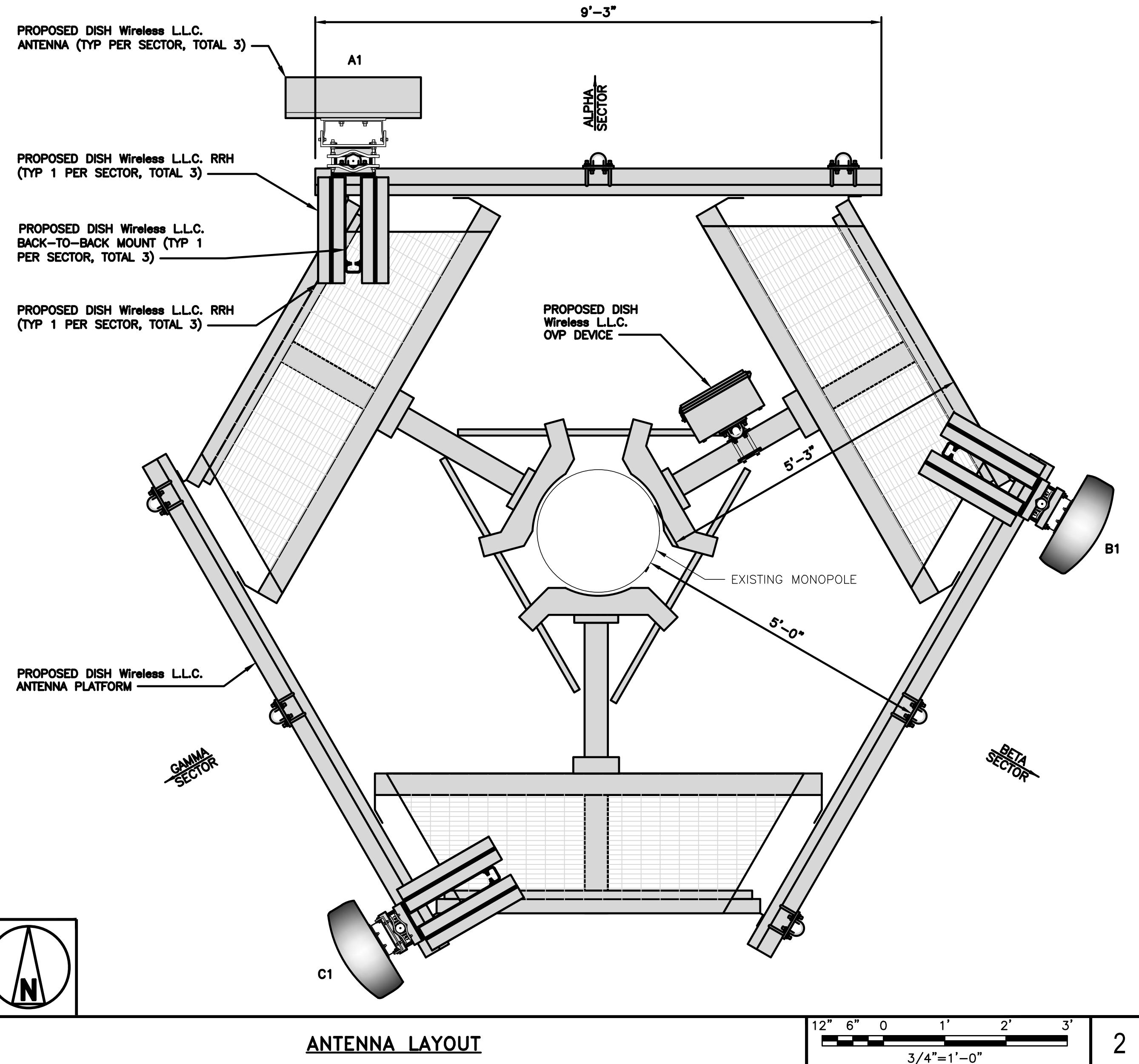


**SITEPRO/VALMOUNT MOUNT**  
MODEL # SNP8-396  
TO BE INSTALLED  
WITHOUT HANDRAIL



PROPOSED NORTH ELEVATION

8' 4' 0 8' 16'  
1/8"=1'-0"



ANTENNA LAYOUT

12' 6" 0 1' 2' 3'  
3/4"=1'-0" 2

| SECTOR | POSITION | ANTENNA                     |                             |            |                                                                                                                                                                                                                                                                |         | TRANSMISSION CABLE |
|--------|----------|-----------------------------|-----------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------|
|        |          | EXISTING OR PROPOSED        | MANUFACTURER - MODEL NUMBER | TECHNOLOGY | SIZE (HxW)                                                                                                                                                                                                                                                     | AZIMUTH |                    |
| ALPHA  | A1       | PROPOSED                    | 12045x CMA-UBTULBULBH       | 5G         | 96.5" x 26.7"                                                                                                                                                                                                                                                  | TBD     | 145'-0"            |
| BETA   | B1       | PROPOSED                    | JMA-MX08FR0665-20           | 5G         | 72" x 20"                                                                                                                                                                                                                                                      | TBD     | 145'-0"            |
| GAMMA  | C1       | PROPOSED                    | JMA-MX08FR0665-20           | 5G         | 72" x 20"                                                                                                                                                                                                                                                      | TBD     | 145'-0"            |
| SECTOR | POSITION | RRH                         |                             |            | NOTES                                                                                                                                                                                                                                                          |         |                    |
|        |          | MANUFACTURER - MODEL NUMBER | TECHNOLOGY                  |            | 1. CONTRACTOR TO REFER TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS.<br>2. ANTENNA AND RRH MODELS MAY CHANGE DUE TO EQUIPMENT AVAILABILITY. ALL EQUIPMENT CHANGES MUST BE APPROVED AND REMAIN IN COMPLIANCE WITH THE PROPOSED DESIGN AND STRUCTURAL ANALYSES. |         |                    |
| ALPHA  | A1       | FUJITSU - TA08025 B605      | 5G                          |            |                                                                                                                                                                                                                                                                |         |                    |
|        | A1       | FUJITSU - TA08025 B604      | 5G                          |            |                                                                                                                                                                                                                                                                |         |                    |
| BETA   | B1       | FUJITSU - TA08025 B605      | 5G                          |            |                                                                                                                                                                                                                                                                |         |                    |
|        | B1       | FUJITSU - TA08025 B604      | 5G                          |            |                                                                                                                                                                                                                                                                |         |                    |
| GAMMA  | C1       | FUJITSU - TA08025 B605      | 5G                          |            |                                                                                                                                                                                                                                                                |         |                    |
|        | C1       | FUJITSU - TA08025 B604      | 5G                          |            |                                                                                                                                                                                                                                                                |         |                    |

ANTENNA SCHEDULE

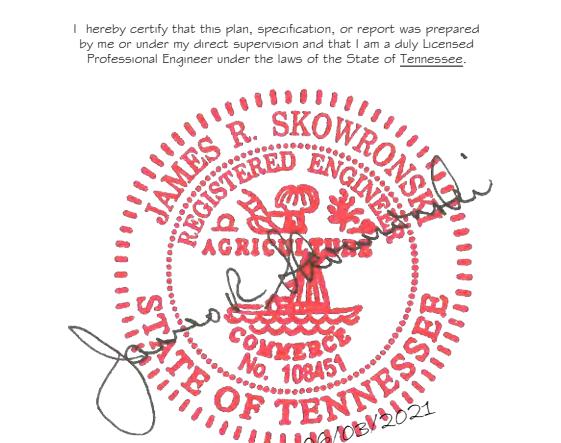
NO SCALE 3

**dish**  
wireless.

5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



3659 GREEN ROAD, SUITE 214  
CLEVELAND, OH 44122



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and was done as a duly licensed Professional Engineer under the laws of the State of Tennessee.

DRAWN BY: CHECKED BY: APPROVED BY:  
GCA CWM JW

RFDS REV #: ---

## CONSTRUCTION DOCUMENTS

### SUBMITTALS

| REV | DATE     | DESCRIPTION             |
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| 0   | 05/27/21 | ISSUED FOR CONSTRUCTION |
| 1   | 06/02/21 | REVISED ANTENNA & MOUNT |
|     |          |                         |
|     |          |                         |
|     |          |                         |
|     |          |                         |
|     |          |                         |

A&E PROJECT NUMBER  
NABNA00141A

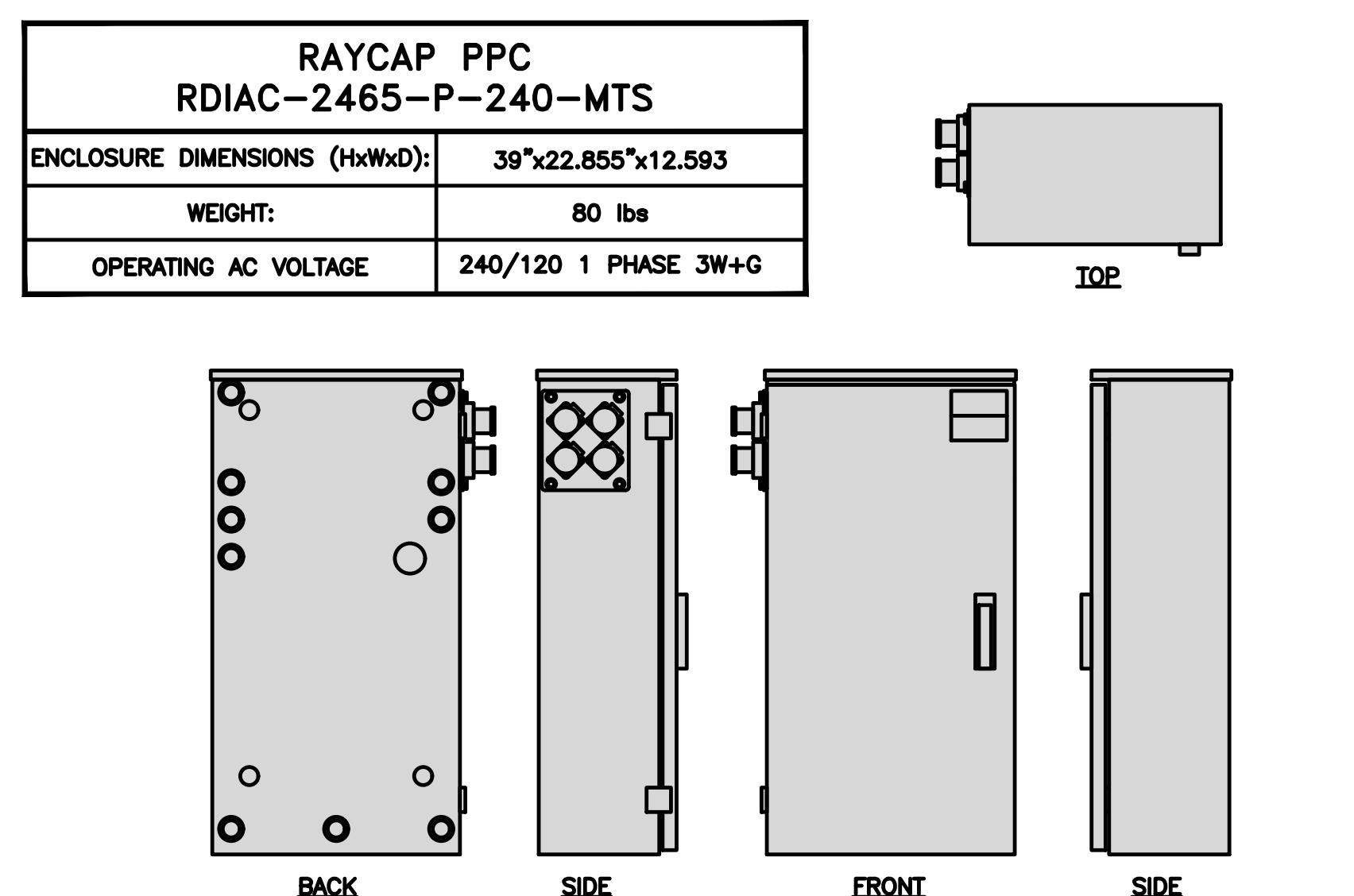
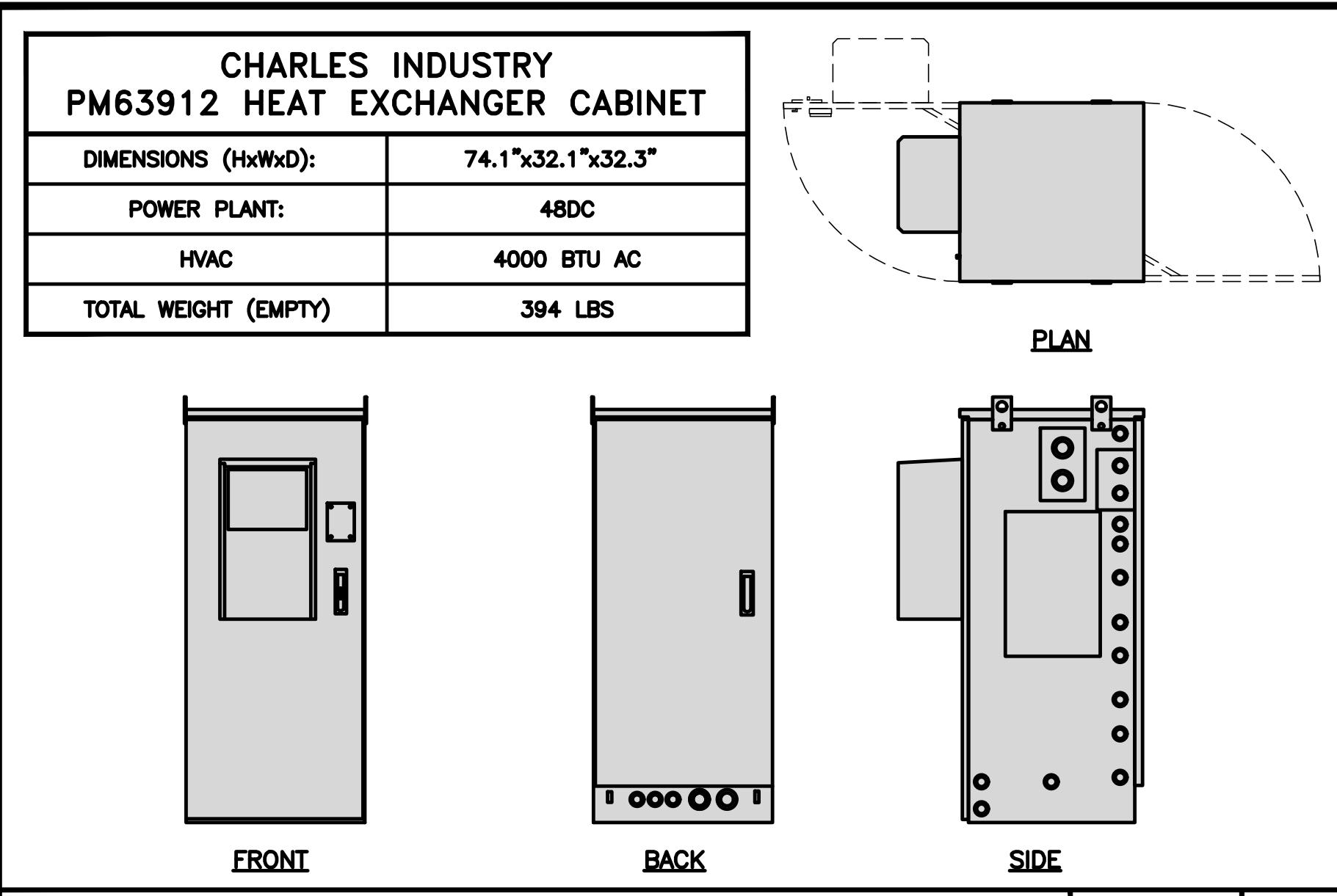
DISH Wireless LLC.  
PROJECT INFORMATION  
NABNA00141A  
1631 NW BROAD STREET  
MURFREESBORO TN, 37129

SHEET TITLE  
ELEVATION, ANTENNA  
LAYOUT AND SCHEDULE

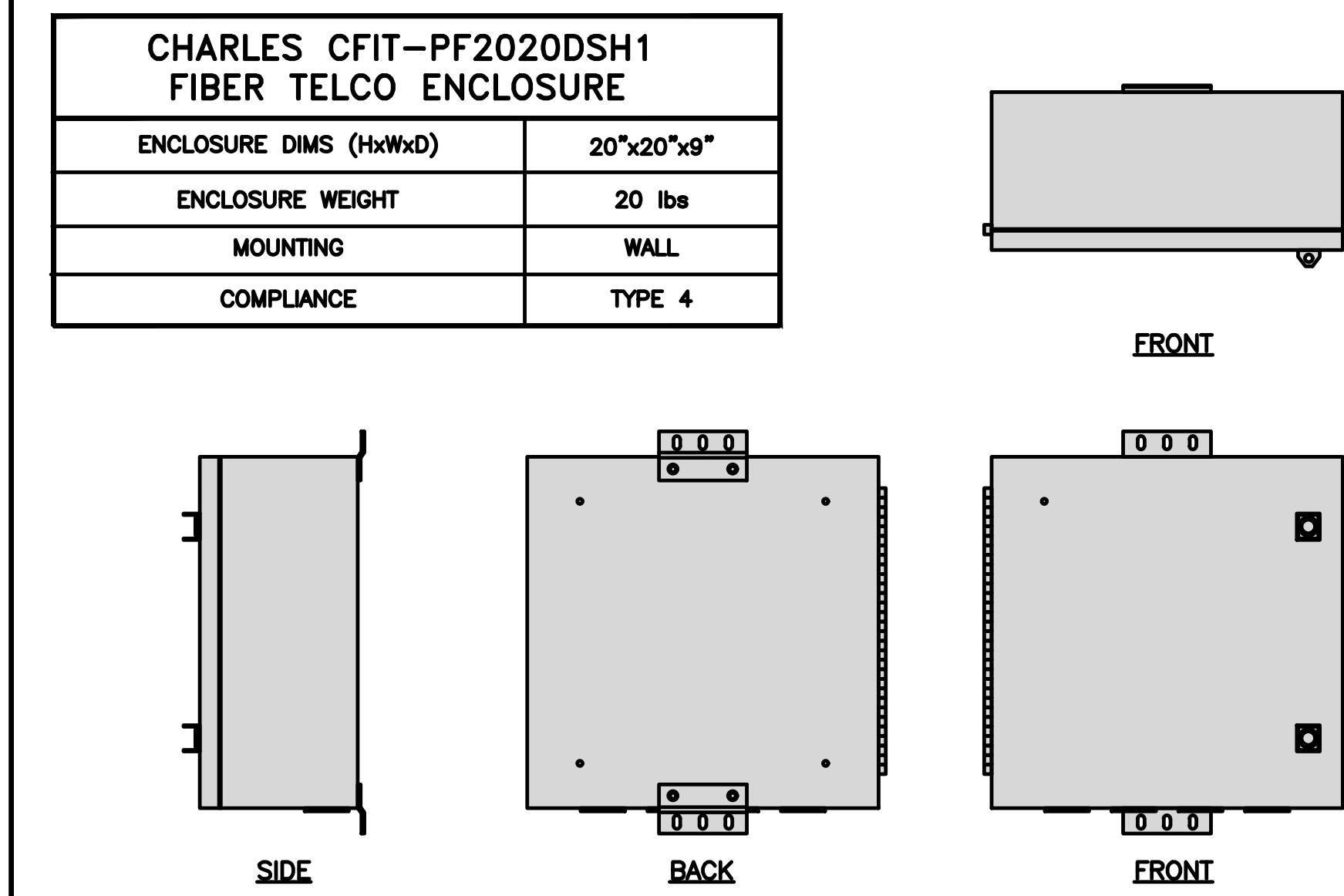
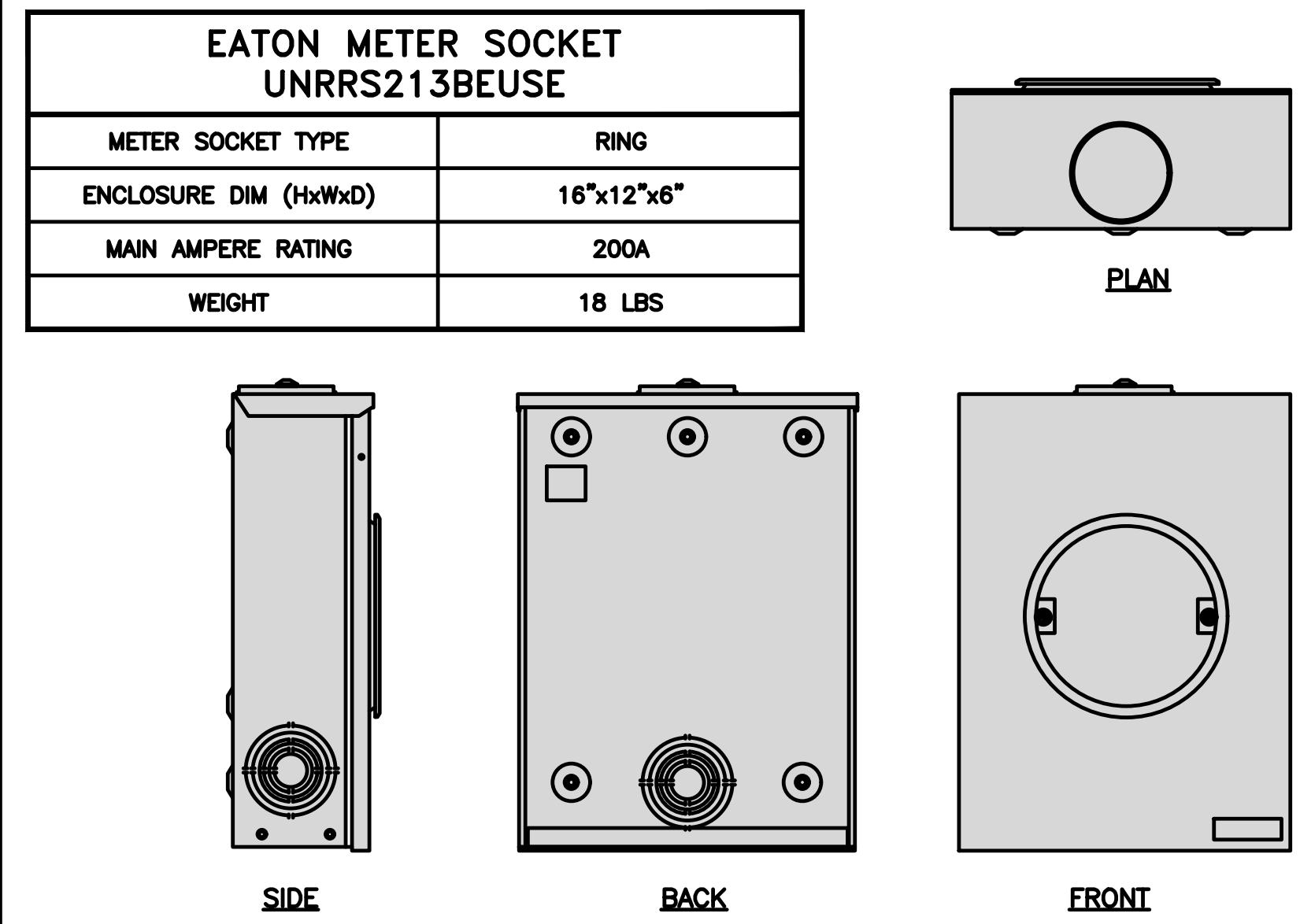
SHEET NUMBER

A-2

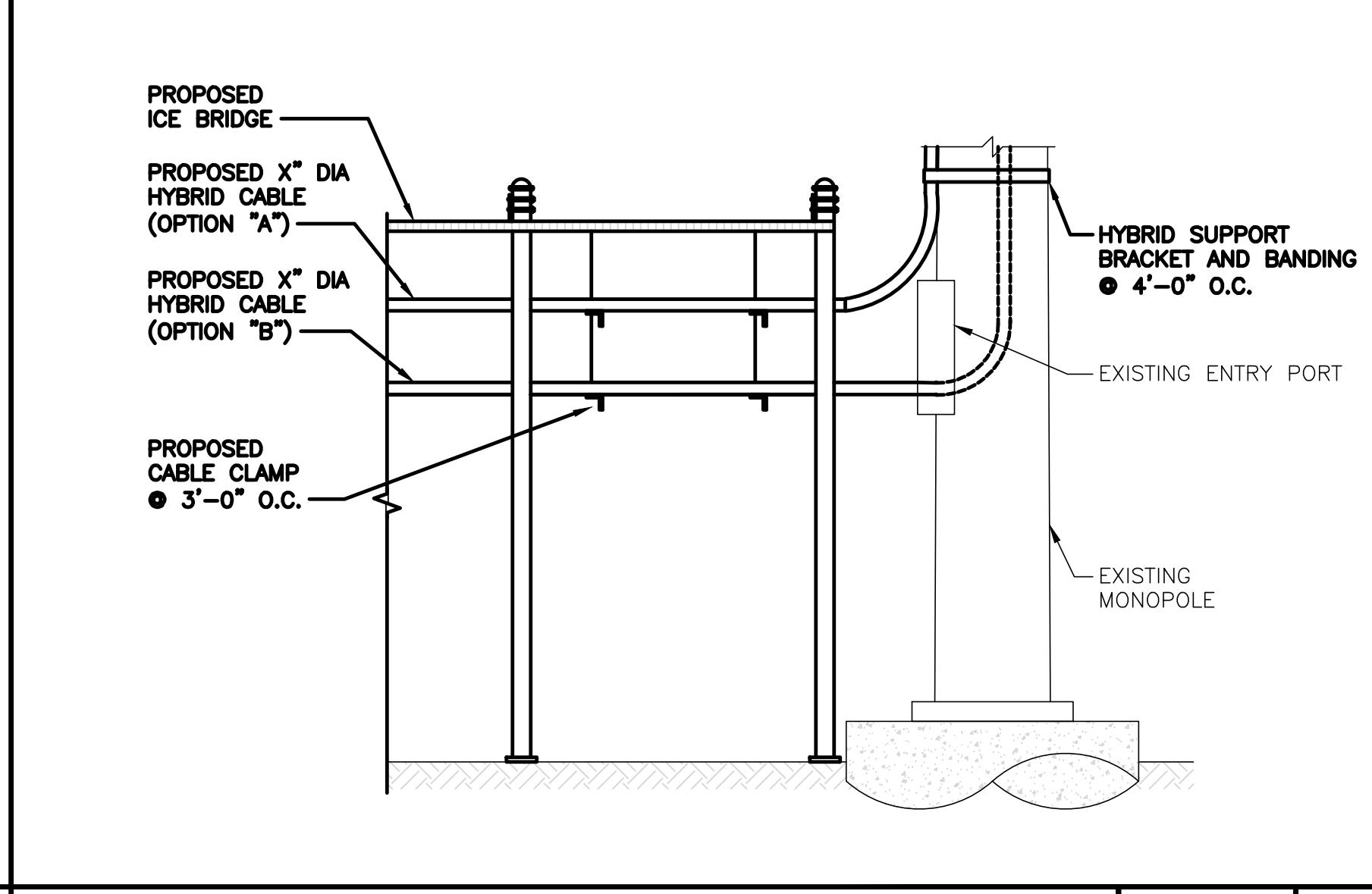
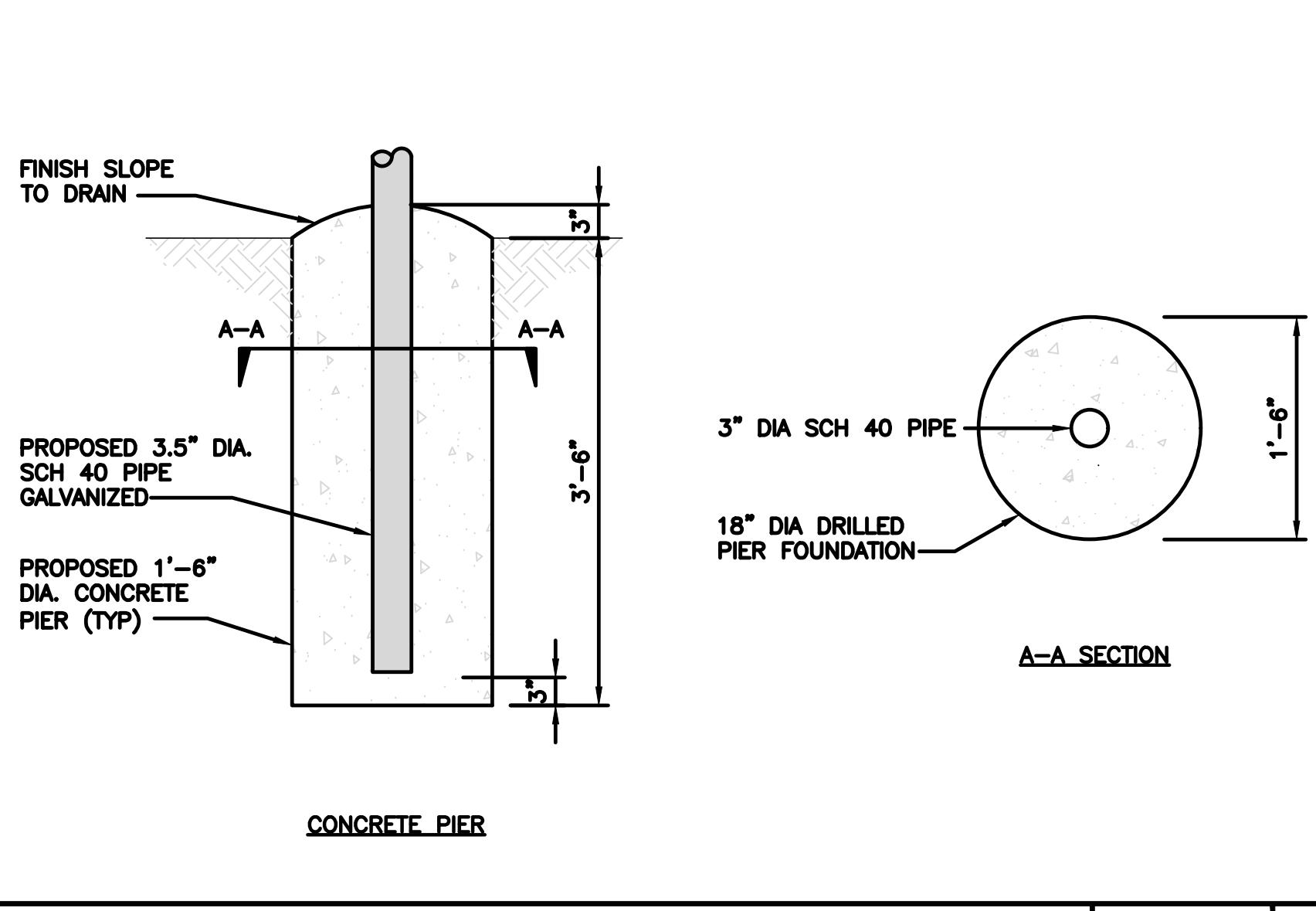
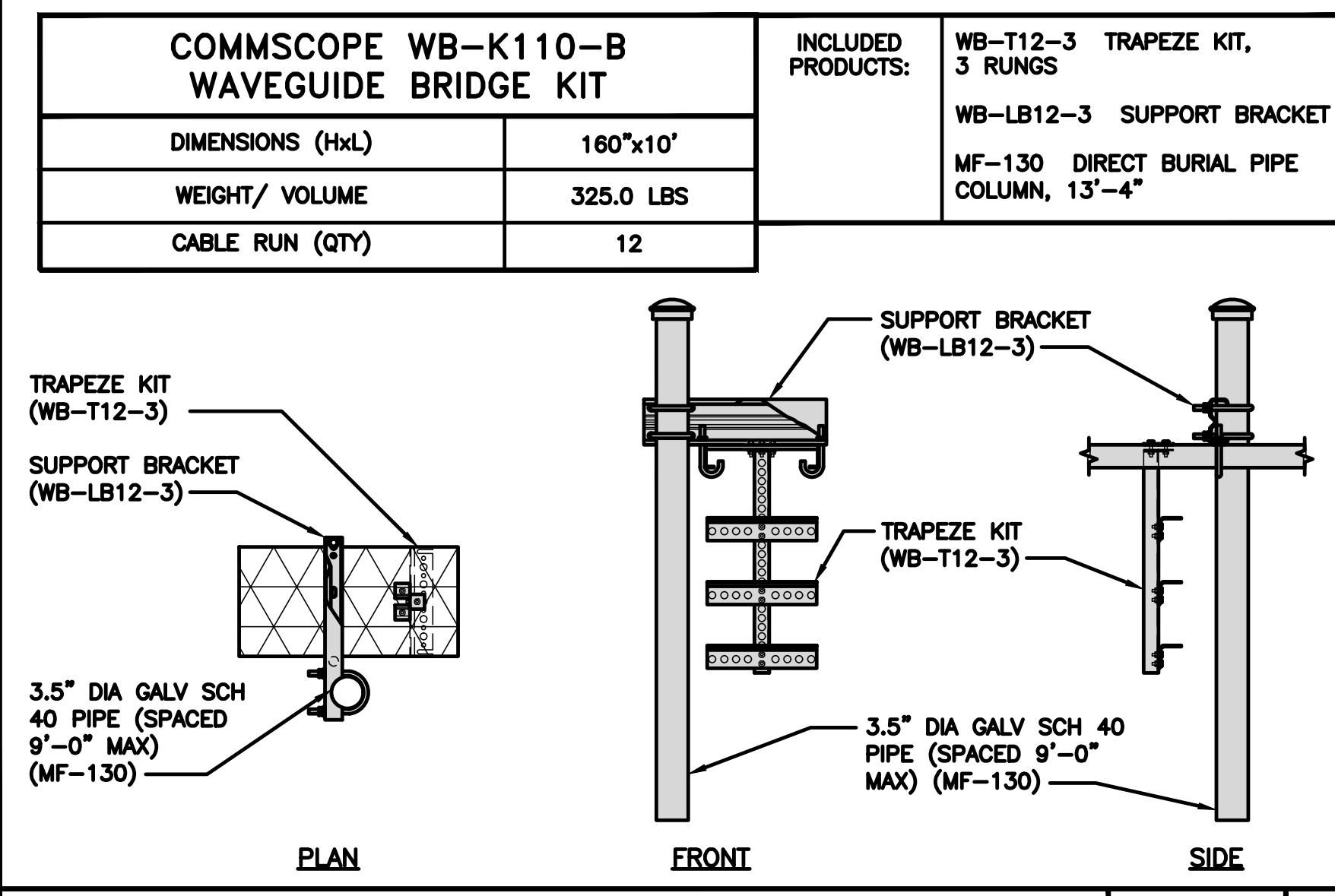




| CABINET DETAIL | NO SCALE | 1 | POWER PROTECTION CABINET (PPC) DETAIL | NO SCALE | 2 | NOT USED | NO SCALE | 3 |
|----------------|----------|---|---------------------------------------|----------|---|----------|----------|---|
|----------------|----------|---|---------------------------------------|----------|---|----------|----------|---|



| METER SOCKET DETAIL | NO SCALE | 4 | NOT USED | NO SCALE | 5 | FIBER TELCO ENCLOSURE DETAIL | NO SCALE | 6 |
|---------------------|----------|---|----------|----------|---|------------------------------|----------|---|
|---------------------|----------|---|----------|----------|---|------------------------------|----------|---|



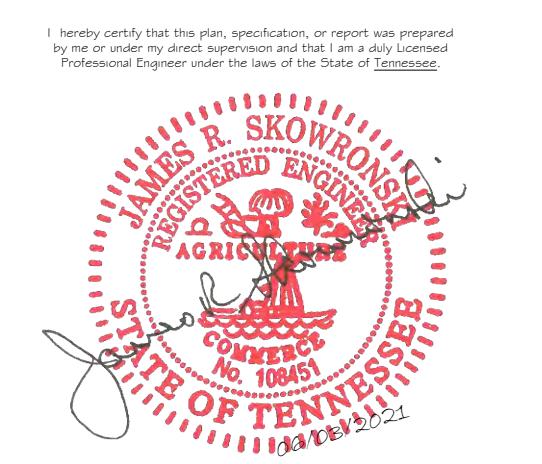
| ICE BRIDGE DETAIL | NO SCALE | 7 | TYPICAL ICE BRIDGE CONCRETE PIER DETAIL | NO SCALE | 8 | HYBRID CABLE RUN | NO SCALE | 9 |
|-------------------|----------|---|-----------------------------------------|----------|---|------------------|----------|---|
|-------------------|----------|---|-----------------------------------------|----------|---|------------------|----------|---|

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GCA      CWM      JW

RFDS REV #: ---

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### A&E PROJECT NUMBER

NABNA00141A

DISH Wireless L.L.C.  
PROJECT INFORMATION  
NABNA00141A  
1631 NW BROAD STREET  
MURFREESBORO TN, 37129

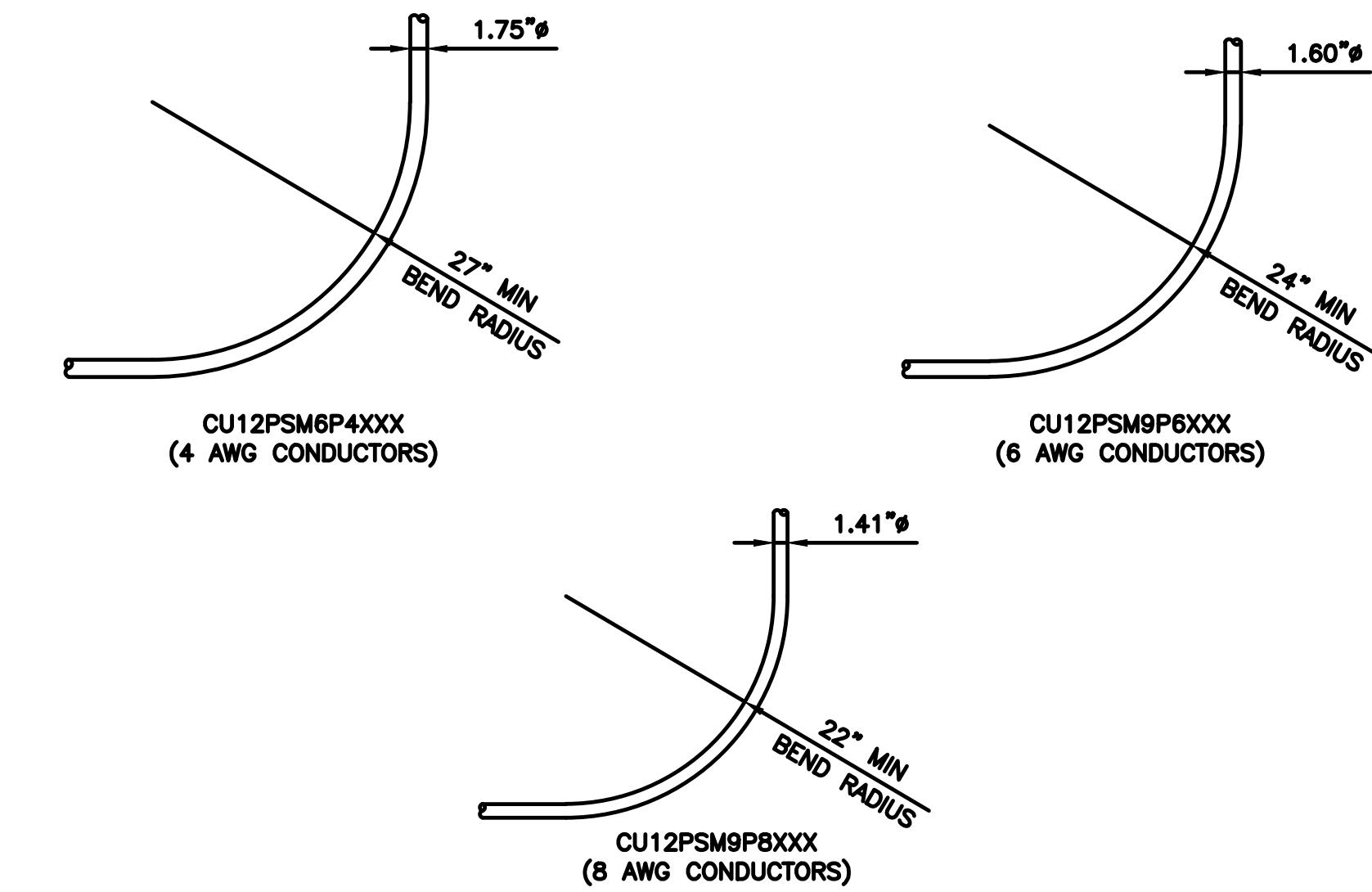
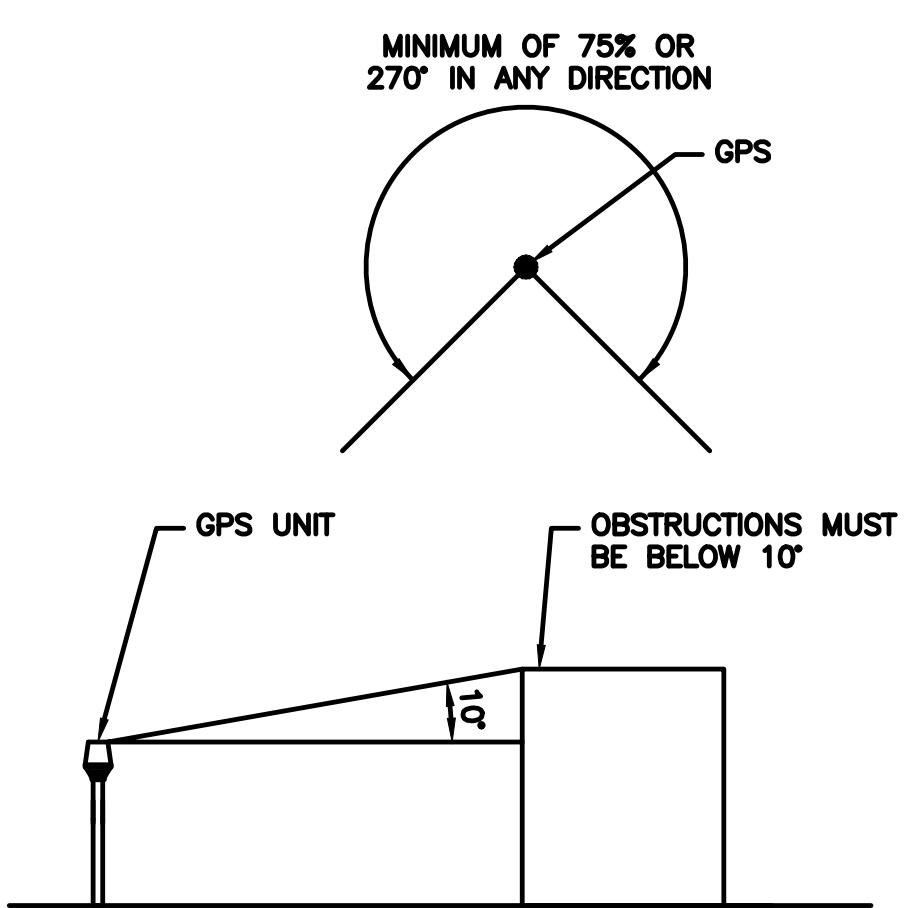
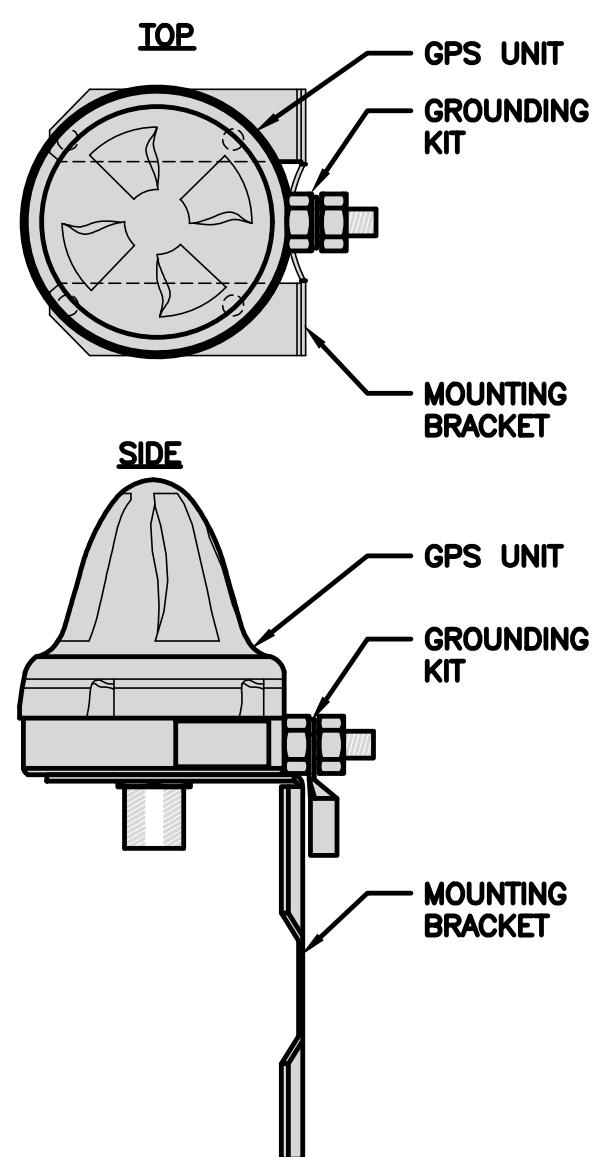
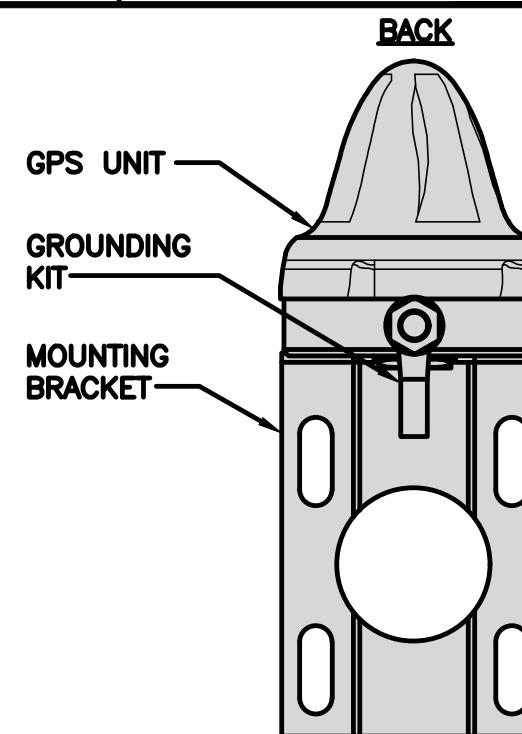
### SHEET TITLE

EQUIPMENT DETAILS

SHEET NUMBER

**A-4**

| ROSENBERGER<br>GPSGLONASS-36-N-S |                      |
|----------------------------------|----------------------|
| DIMENSION (DIA x H)              | 69mm x 98.5mm        |
| WEIGHT (WITH ACCESSORIES)        | 515.74g              |
| CONNECTOR                        | N-FEMALE             |
| FREQUENCY RANGE                  | 1559 MHz ~ 1610.5MHz |



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CLEVELAND, OH 44122

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## CONSTRUCTION DOCUMENTS

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|     |          |                         |
|     |          |                         |
|     |          |                         |
|     |          |                         |
|     |          |                         |

A&E PROJECT NUMBER  
NABNA00141A

DISH Wireless LLC,  
PROJECT INFORMATION  
NABNA00141A  
1631 NW BROAD STREET  
MURFREESBORO TN, 37129

SHEET TITLE  
EQUIPMENT DETAILS

SHEET NUMBER

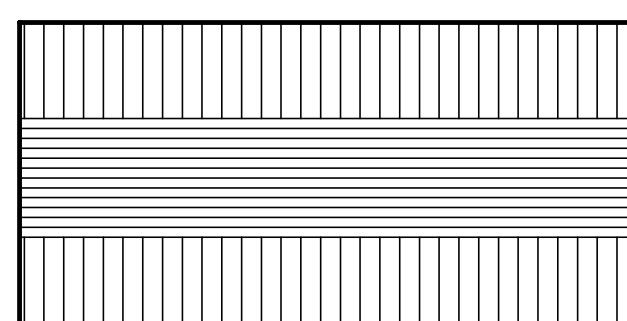
**A-5**

|                           |          |   |                                          |          |   |                                                                 |          |   |
|---------------------------|----------|---|------------------------------------------|----------|---|-----------------------------------------------------------------|----------|---|
| <u>GPS ANTENNA DETAIL</u> | NO SCALE | 1 | <u>GPS MINIMUM SKY VIEW REQUIREMENTS</u> | NO SCALE | 2 | <u>CABLES UNLIMITED HYBRID CABLE<br/>MINIMUM BEND RADIIUSES</u> | NO SCALE | 3 |
|---------------------------|----------|---|------------------------------------------|----------|---|-----------------------------------------------------------------|----------|---|

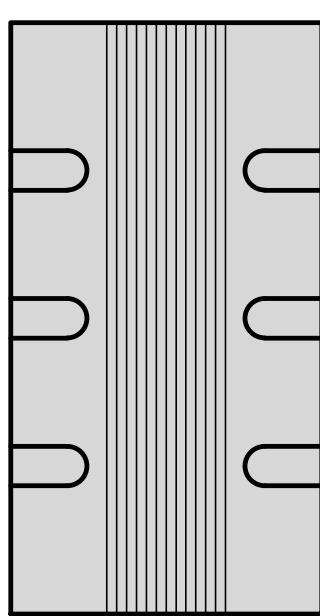
|                 |          |   |                 |          |   |                 |          |   |
|-----------------|----------|---|-----------------|----------|---|-----------------|----------|---|
| <u>NOT USED</u> | NO SCALE | 4 | <u>NOT USED</u> | NO SCALE | 5 | <u>NOT USED</u> | NO SCALE | 6 |
|-----------------|----------|---|-----------------|----------|---|-----------------|----------|---|

|                 |          |   |                 |          |   |                 |          |   |
|-----------------|----------|---|-----------------|----------|---|-----------------|----------|---|
| <u>NOT USED</u> | NO SCALE | 7 | <u>NOT USED</u> | NO SCALE | 8 | <u>NOT USED</u> | NO SCALE | 9 |
|-----------------|----------|---|-----------------|----------|---|-----------------|----------|---|

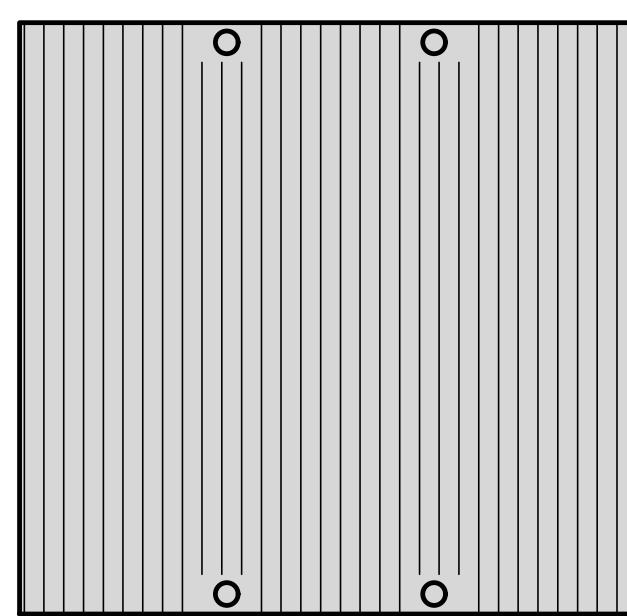
|                                           |                              |
|-------------------------------------------|------------------------------|
| <b>FUJITSU</b><br><b>TA08025-B604 RRH</b> |                              |
| DIMENSIONS (HxWxD) (KG/IN)                | 380x400x200/14.9"x15.7"x7.8" |
| WEIGHT(KG,LB)/ VOLUME                     | 29kg,63.9lb/ 30L             |
| POWER SUPPLY                              | DC-58~36V                    |



PLAN

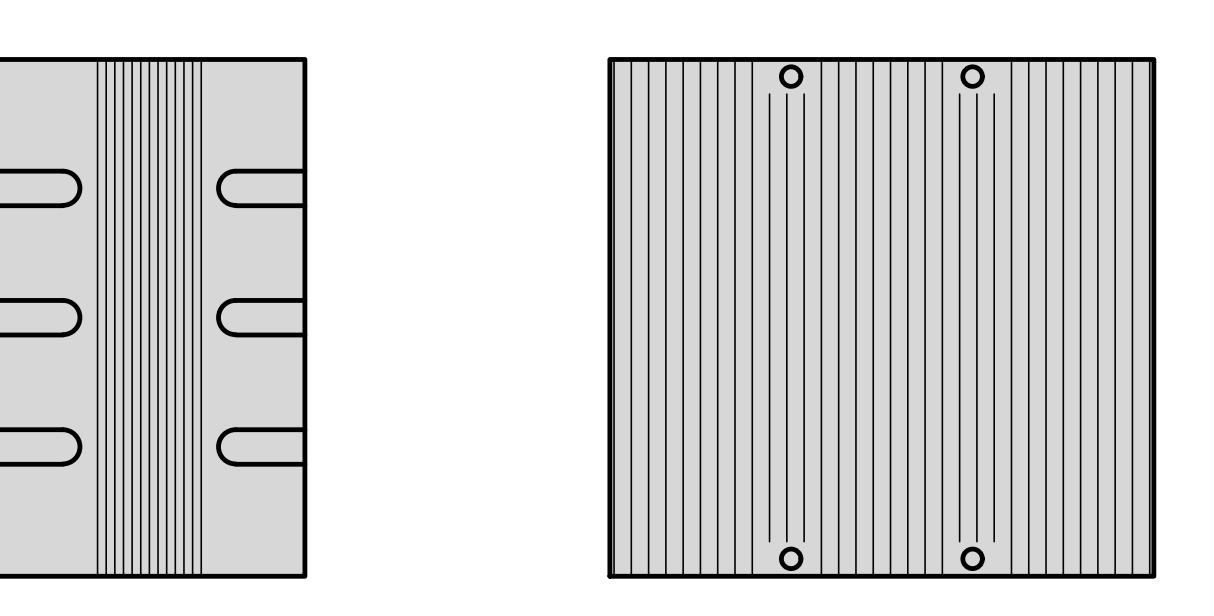


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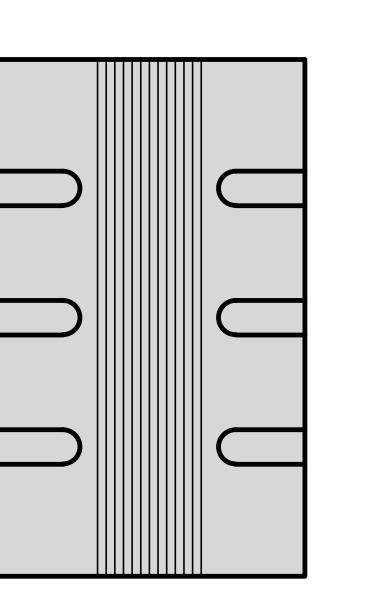


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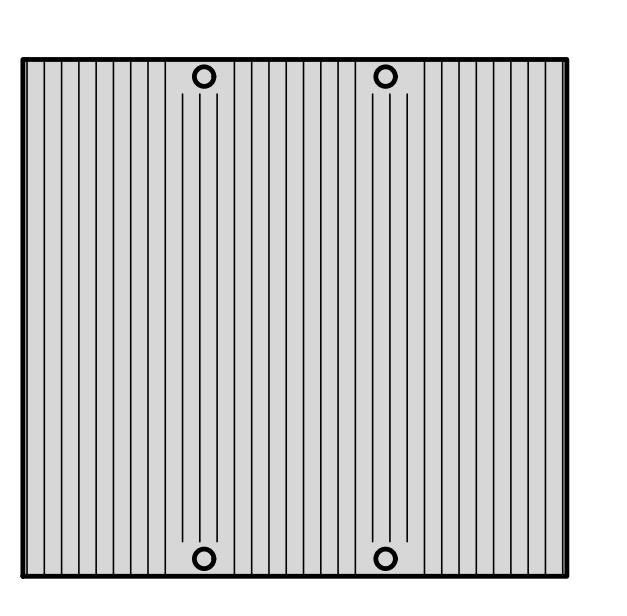
|                                           |                              |
|-------------------------------------------|------------------------------|
| <b>FUJITSU</b><br><b>TA08025-B605 RRH</b> |                              |
| DIMENSIONS (HxWxD) (KG/IN)                | 380x400x230/14.9"x15.7"x9.0" |
| WEIGHT(KG,LB)/ VOLUME                     | 34kg,74.9lb/ 35L             |
| POWER SUPPLY                              | DC-58~36V                    |



PLAN

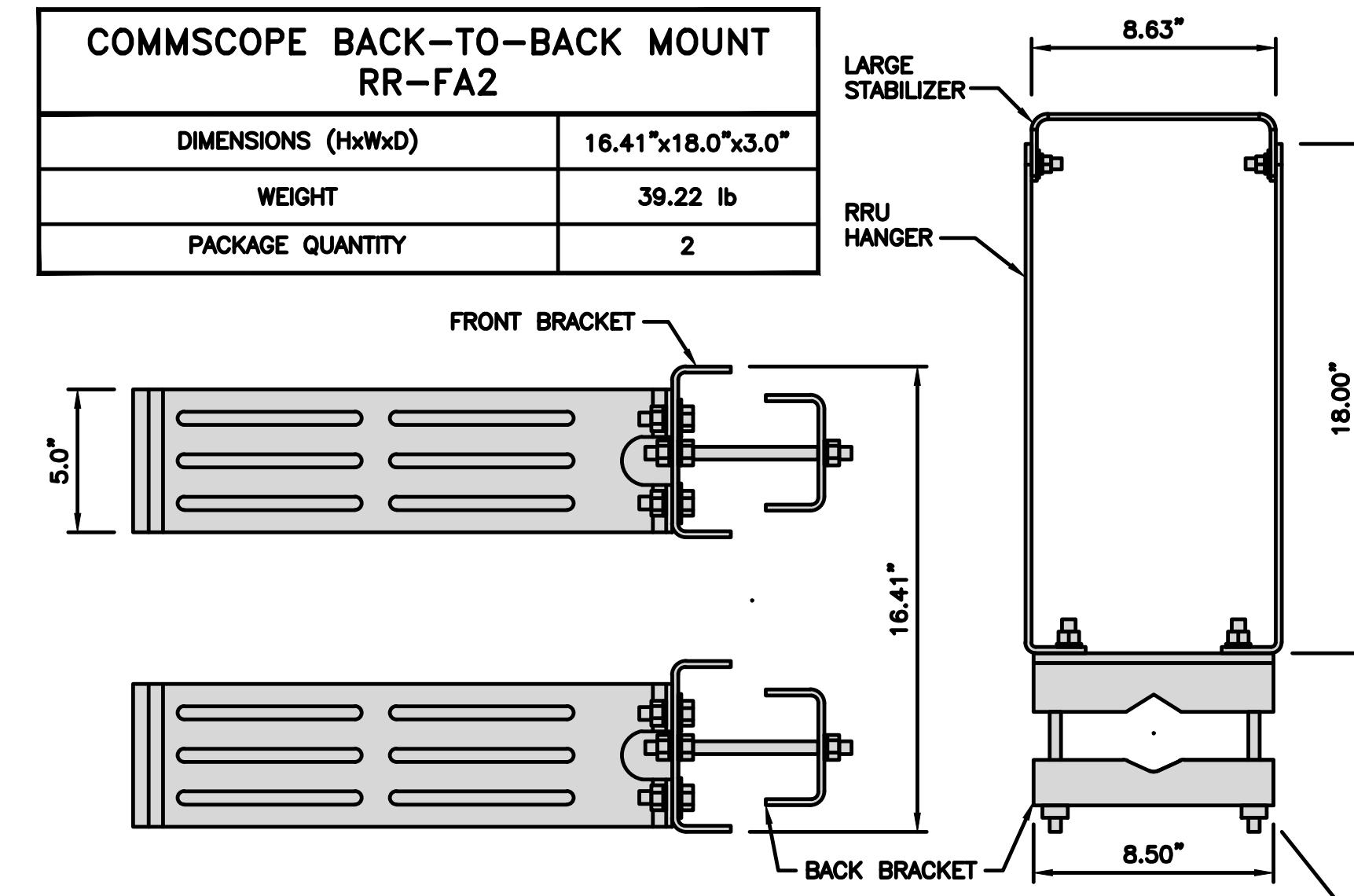


SIDE



FRONT

|                                                      |                   |
|------------------------------------------------------|-------------------|
| <b>COMMSCOPE BACK-TO-BACK MOUNT</b><br><b>RR-FA2</b> |                   |
| DIMENSIONS (HxWxD)                                   | 16.41"x18.0"x3.0" |
| WEIGHT                                               | 39.22 lb          |
| PACKAGE QUANTITY                                     | 2                 |



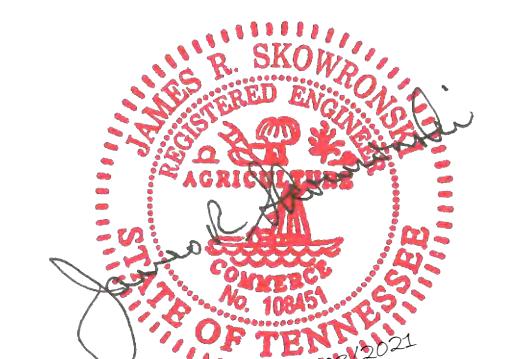
**dish**  
wireless.

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### A&E PROJECT NUMBER

NABNA00141A

DISH Wireless L.L.C.  
PROJECT INFORMATION  
NABNA00141A  
1631 NW BROAD STREET  
MURFREESBORO TN, 37129

### EQUIPMENT DETAILS

### SHEET NUMBER

**A-6**

### REMOTE RADIO HEAD DETAIL

NO SCALE

1

### REMOTE RADIO HEAD DETAIL

NO SCALE

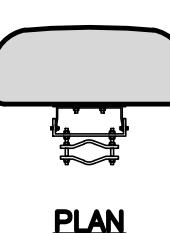
2

### REMOTE RADIO MOUNT DETAIL

NO SCALE

3

|                                                     |                   |
|-----------------------------------------------------|-------------------|
| <b>JMA WIRELESS</b><br><b>MX08FR0665-20 ANTENNA</b> |                   |
| DIMENSIONS (HxWxD)                                  | 72.0"x20.0"x8.0"  |
| TOTAL WEIGHT                                        | 54 LB             |
| RF PORTS, CONNECTOR TYPE                            | 8 x 4.3-10 FEMALE |



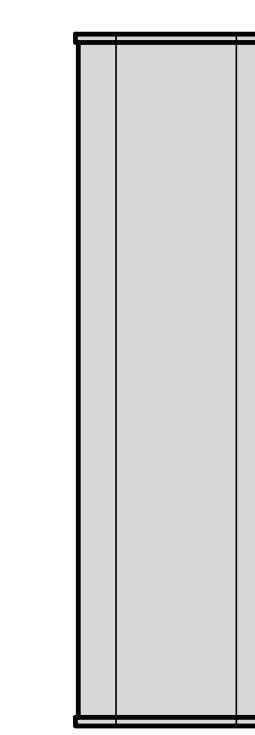
PLAN



BACK

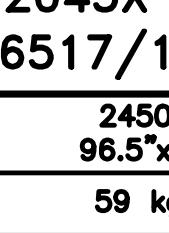


SIDE

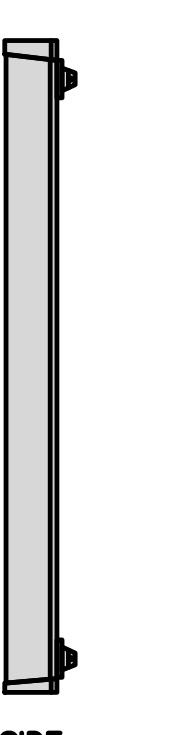


FRONT

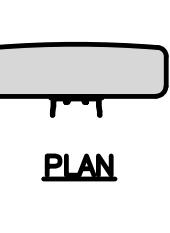
|                                                               |                                  |
|---------------------------------------------------------------|----------------------------------|
| <b>CELLMAX 12045X</b><br><b>CMA-UBTULBULBHH/6517/17/21/21</b> |                                  |
| DIMENSIONS (HxWxD)(MM/IN)                                     | 2450x680x196<br>96.5"x26.7"x196" |
| TOTAL WEIGHT (kg/lb)                                          | 59 kg/130 lbs                    |
| CONNECTORS                                                    | 8 x 4.3-10 FEMALE                |



PLAN

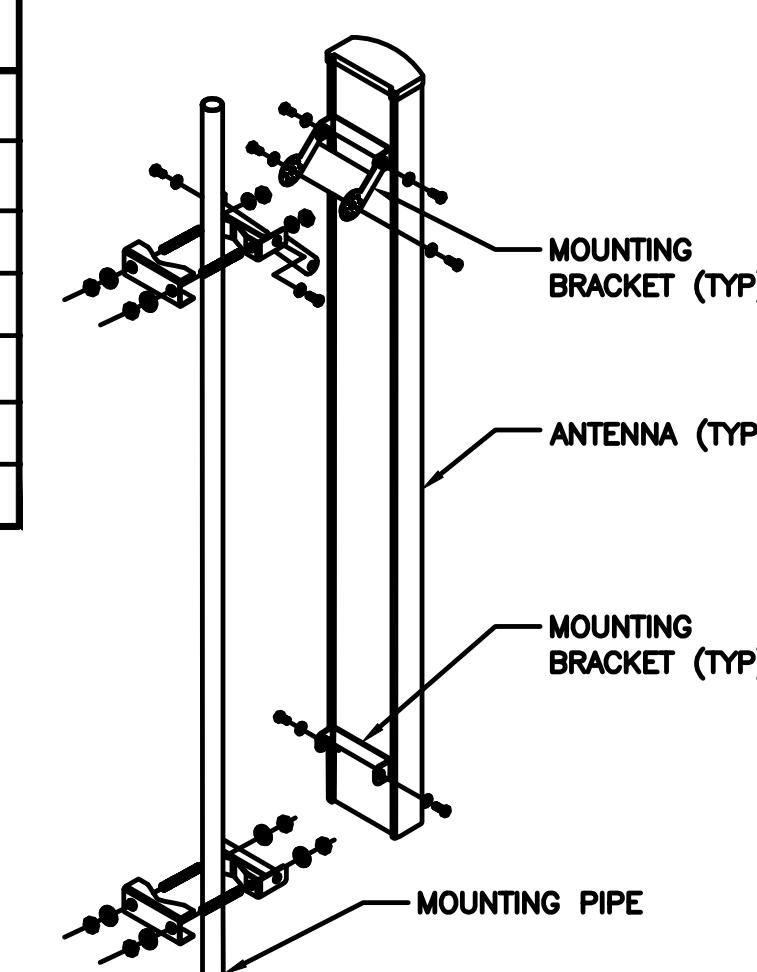


SIDE



FRONT

|                                                        |                     |
|--------------------------------------------------------|---------------------|
| <b>M04 MOUNTING BRACKET</b><br><b>HPA-33R-BUU-H4-K</b> |                     |
| WIDTH                                                  | 5" (135mm)          |
| DEPTH                                                  | 2" (51mm)           |
| HEIGHT                                                 | 8" (213mm)          |
| TOTAL WEIGHT (WITH BRACKETS)                           | 1.5 LBS (15.50 Kg)  |
| HOUSING MATERIAL                                       | ASA/ABS/ALUMINUM    |
| RADOME COLOR                                           | LIGHT GRAY          |
| CONNECTOR                                              | 1X8-PIN DAISY CHAIN |



### ANTENNA DETAIL

NO SCALE

4

### ANTENNA DETAIL

NO SCALE

5

### ANTENNA MOUNTING DETAIL

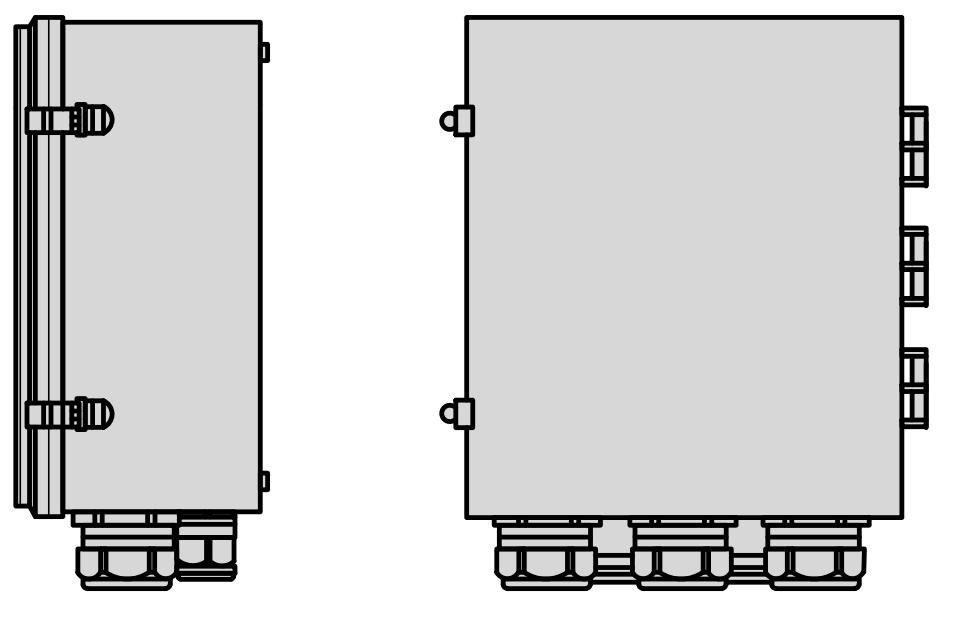
NO SCALE

6

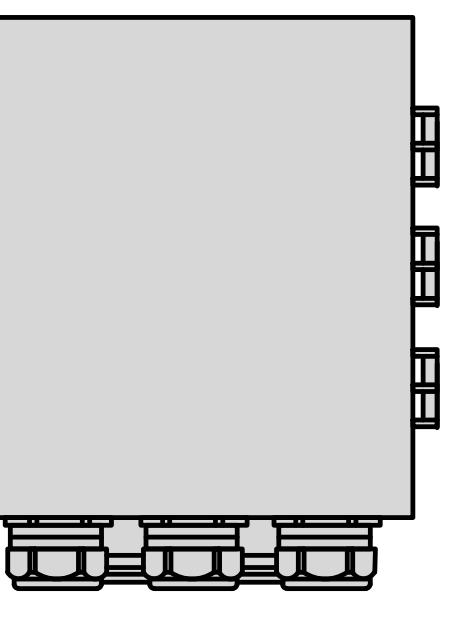
|                                                              |                     |
|--------------------------------------------------------------|---------------------|
| <b>RAYCAP RDIDC-9181-PF-48</b><br><b>DC SURGE PROTECTION</b> |                     |
| DIMENSIONS (HxWxD)                                           | 18.98"x14.39"x8.15" |
| WEIGHT                                                       | 21.82 LBS           |



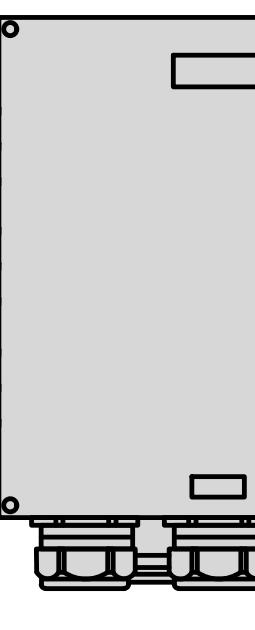
PLAN



SIDE

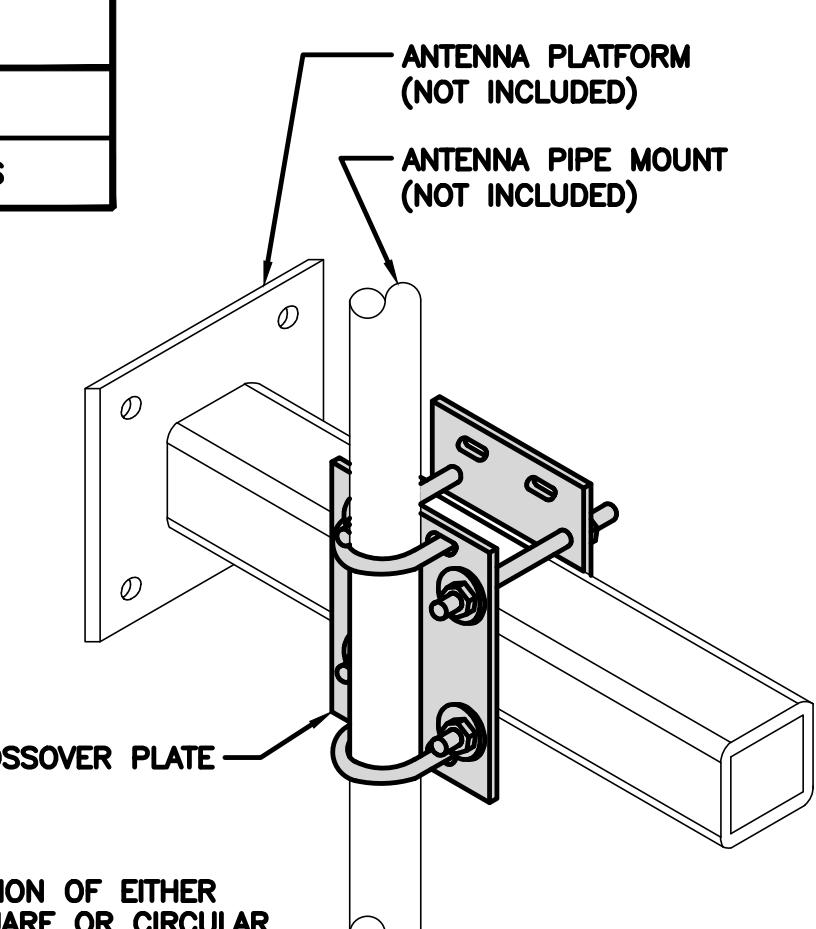
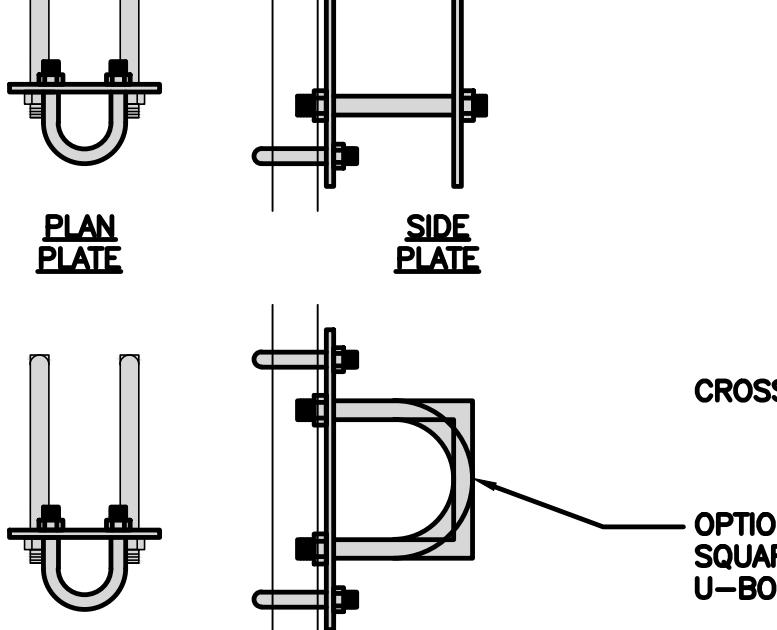


BACK



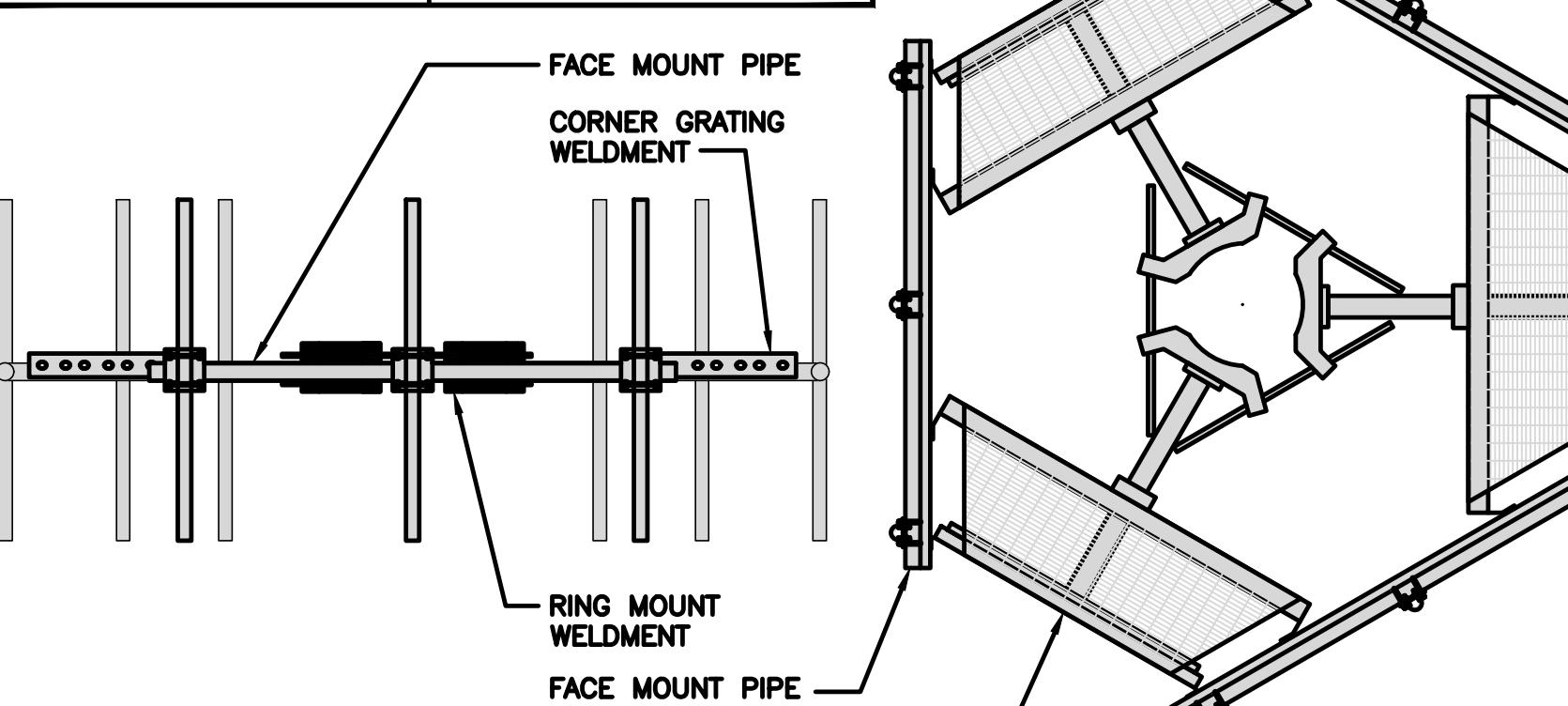
FRONT

|                                                    |            |
|----------------------------------------------------|------------|
| <b>COMMSCOPE XP-2040</b><br><b>CROSSOVER PLATE</b> |            |
| DIMENSIONS (HxW)                                   | 10"x12"    |
| WEIGHT                                             | 11.023 LBS |



|                                                       |            |
|-------------------------------------------------------|------------|
| <b>SITEPRO1 SNP8-396</b><br><b>SNUB-NOSE PLATFORM</b> |            |
| FACE SIZE                                             | 8'-0"      |
| WEIGHT                                                | 1786.28 LB |

ANTENNA PIPE MOUNTS (6) 2-3/8" O.D.



### SURGE SUPPRESSION DETAIL

NO SCALE

7

### RRH/OVP MOUNT DETAIL

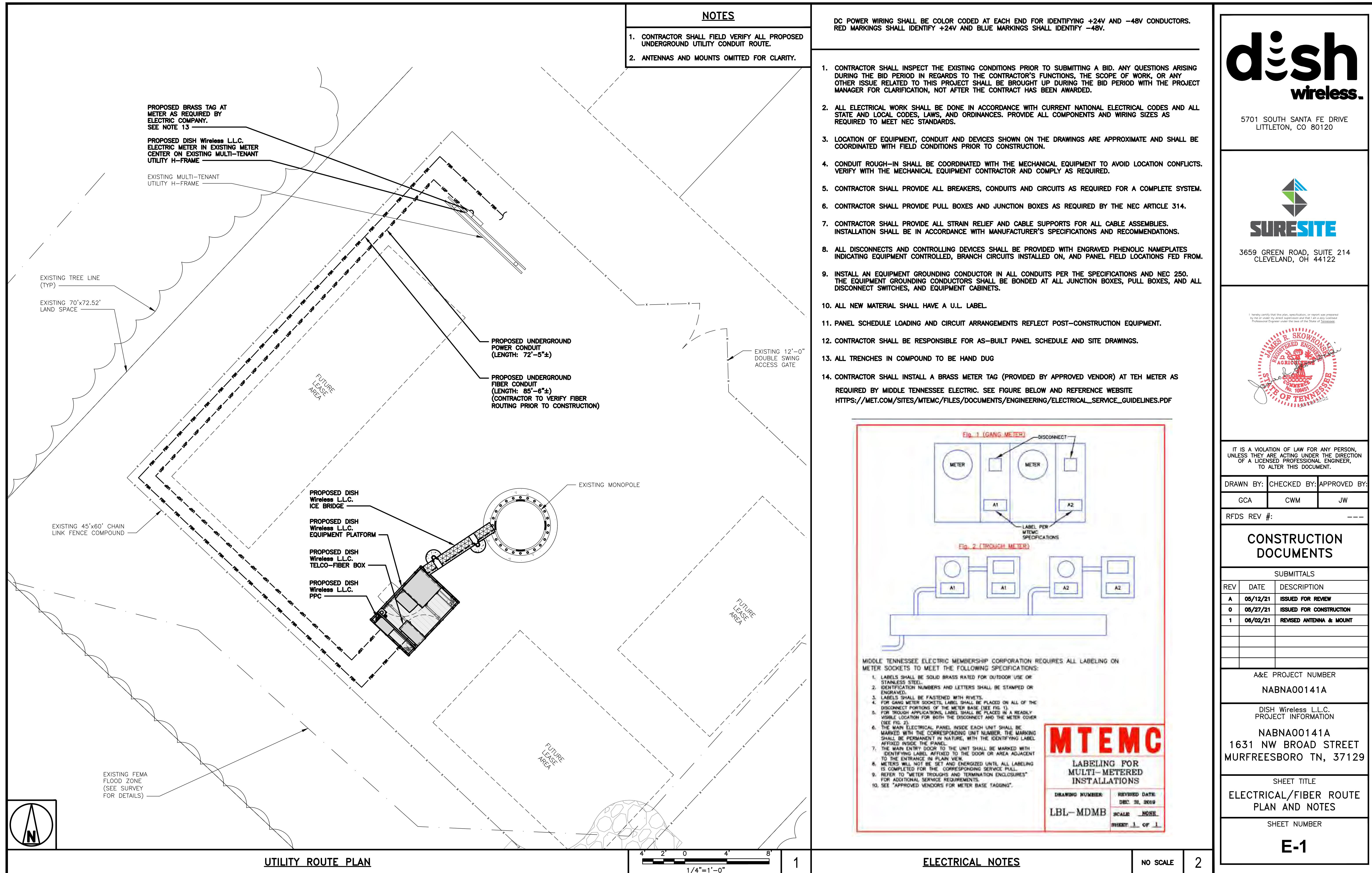
NO SCALE

8

### ANTENNA PLATFORM DETAIL

NO SCALE

9



| CARLON EXPANSION FITTINGS |                                 |        |              |               |
|---------------------------|---------------------------------|--------|--------------|---------------|
| COUPLING END PART#        | MALE TERMINAL ADAPTER END PART# | SIZE   | STD CTN QTY. | TRAVEL LENGTH |
| E945D                     | E945DX                          | 1/2"   | 20           | 4"            |
| E945E                     | E945EX                          | 3/4"   | 15           | 4"            |
| E945F                     | E945FX                          | 1"     | 10           | 4"            |
| E945G                     | E945GX                          | 1 1/4" | 5            | 4"            |
| E945H                     | E945HX                          | 1 1/2" | 5            | 4"            |
| E945J                     | E945JX                          | 2"     | 15           | 8"            |
| E945K                     | E945KX                          | 2 1/2" | 10           | 8"            |
| E945L                     | E945LX                          | 3"     | 10           | 8"            |
| E945M                     | E945MX                          | 3 1/2" | 5            | 8"            |
| E945N                     | E945NX                          | 4"     | 5            | 8"            |
| E945P                     | E945PX                          | 5"     | 1            | 8"            |
| E945R                     | E945RX                          | 6"     | 1            | 8"            |

NOTE: CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

VARIES PER PART NUMBER

SLIP JOINT (SEE CHART FOR PART NUMBER)

TRENCHING NOTES

- CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
- TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT OSHA TRENCHING AND EXCAVATION SAFETY STANDARDS.
- ALL CONDUITS SHALL BE INSTALLED IN COMPLIANCE WITH THE CURRENT NATIONAL ELECTRIC CODE (NEC) OR AS REQUIRED BY THE LOCAL JURISDICTION, WHICHEVER IS THE MOST STRINGENT.

SEE TRENCHING NOTE 1

BACKFILL PER SITE WORK SPECIFICATIONS (SEE GENERAL NOTES)

SLOPE TO SUIT SOIL CONDITION IN ACCORDANCE WITH LOCAL REGULATIONS SEE TRENCHING NOTE 2

30° OR 6° BELOW FROST LINE, WHICHEVER IS GREATER

VERTICAL DEPTH SEE TRENCHING NOTE 2

UTILITY WARNING TAPE

SAND BEDDING PER SITE WORK SPECIFICATIONS

DISH Wireless LLC. PROVIDES 12AWG WIRE (6' TAIL)

PROPOSED DISH Wireless LLC. UNISTRUT

PROPOSED DISH Wireless LLC. 10 AMP DISTRIBUTION BREAKER

PROPOSED DISH Wireless LLC. 12 AWG WIRE

PROPOSED DISH Wireless LLC. 1-1/2" POWER FROM CABINET

DISH Wireless LLC. INSTALLS 1-1/2" CONDUITS FOR POWER AND FIBER TO CABINET

PROPOSED DISH Wireless LLC. 2" CONDUIT FROM COMMERCIAL FIBER VAULT

EXPANSION JOINT DETAIL NO SCALE 1

TYPICAL UNDERGROUND TRENCH DETAIL NO SCALE 2

DARK TELCO BOX - INTERIOR WIRING LAYOUT NO SCALE 3

LIT TELCO BOX - INTERIOR WIRING LAYOUT (OPTIONAL) NO SCALE 4

NOT USED NO SCALE 5

NOT USED NO SCALE 6

NOT USED NO SCALE 7

NOT USED NO SCALE 8

NOT USED NO SCALE 9

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and was a duly licensed Professional Engineer registered in the State of Tennessee.

JAMES R. SKOWRONSKI, P.E., #10645  
REGISTERED ENGINEER  
AGRICULTURE & COMMERCIAL  
STATE OF TENNESSEE  
333 DEADERICK ST.  
NASHVILLE, TN 37203-2000

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DRAWN BY: CWM  
CHECKED BY: JW  
APPROVED BY: GCA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

| REV | DATE     | DESCRIPTION             |
|-----|----------|-------------------------|
| A   | 05/12/21 | ISSUED FOR REVIEW       |
| O   | 05/27/21 | ISSUED FOR CONSTRUCTION |
| 1   | 06/02/21 | REVISED ANTENNA & MOUNT |

A&E PROJECT NUMBER  
NABNA00141A

DISH Wireless LLC.  
PROJECT INFORMATION  
NABNA00141A  
1631 NW BROAD STREET  
MURFREESBORO TN, 37129

SHEET TITLE  
ELECTRICAL DETAILS

SHEET NUMBER  
E-2

**dish**  
wireless.

5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



SURE SITE  
3659 GREEN ROAD, SUITE 214  
CLEVELAND, OH 44122

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JAMES R. SKOWRONSKI  
REGISTERED ENGINEER  
AGRICULTURE  
STATE OF TENNESSEE  
NO. 10645  
EXPIRED 03/2024

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DRAWN BY: CHECKED BY: APPROVED BY:  
GCA CWM JW

RFDS REV #: ---

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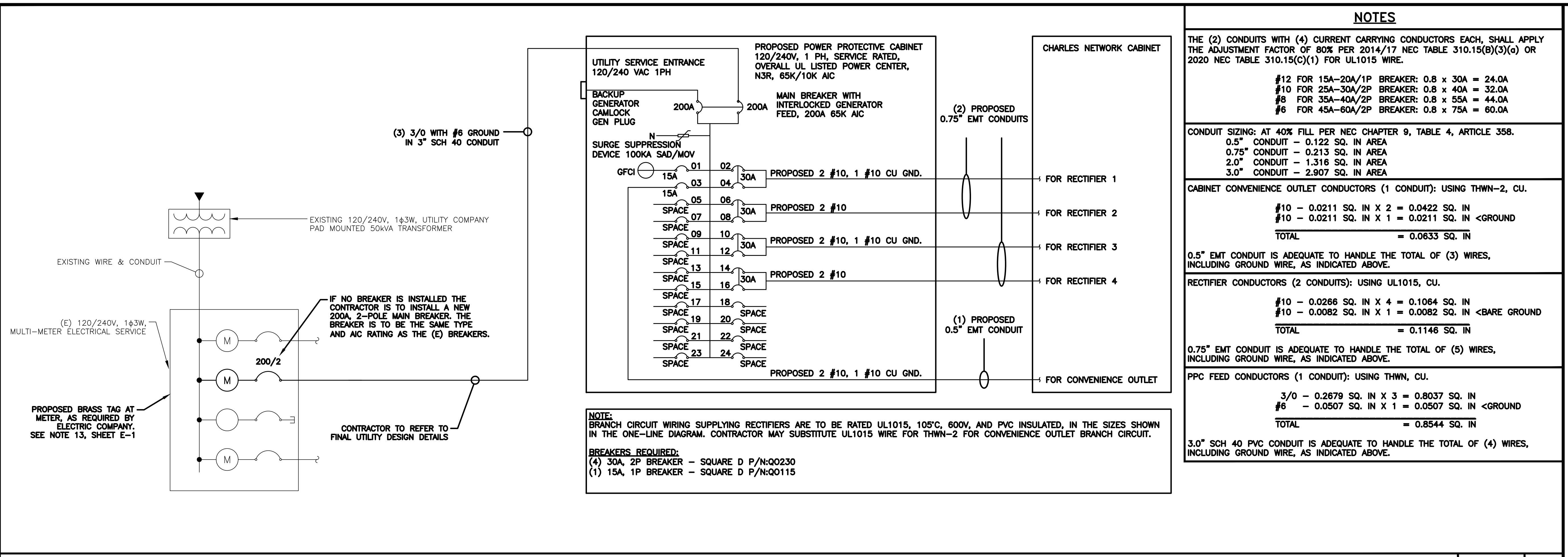
A&E PROJECT NUMBER  
NABNA00141A

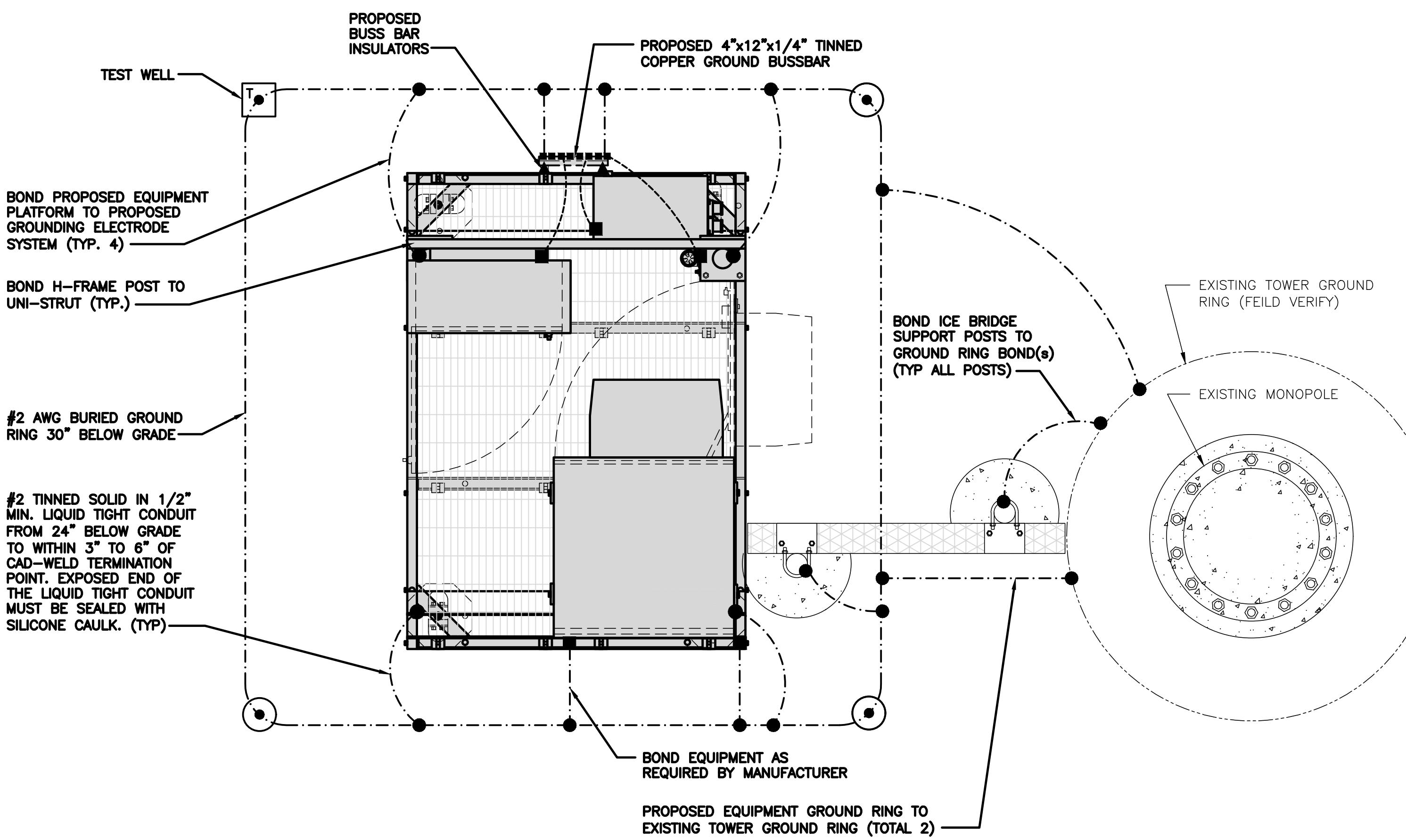
DISH Wireless LLC.  
PROJECT INFORMATION  
NABNA00141A  
1631 NW BROAD STREET  
MURFREESBORO TN, 37129

SHEET TITLE  
ELECTRICAL ONE-LINE  
& PANEL SCHEDULE

SHEET NUMBER

E-3



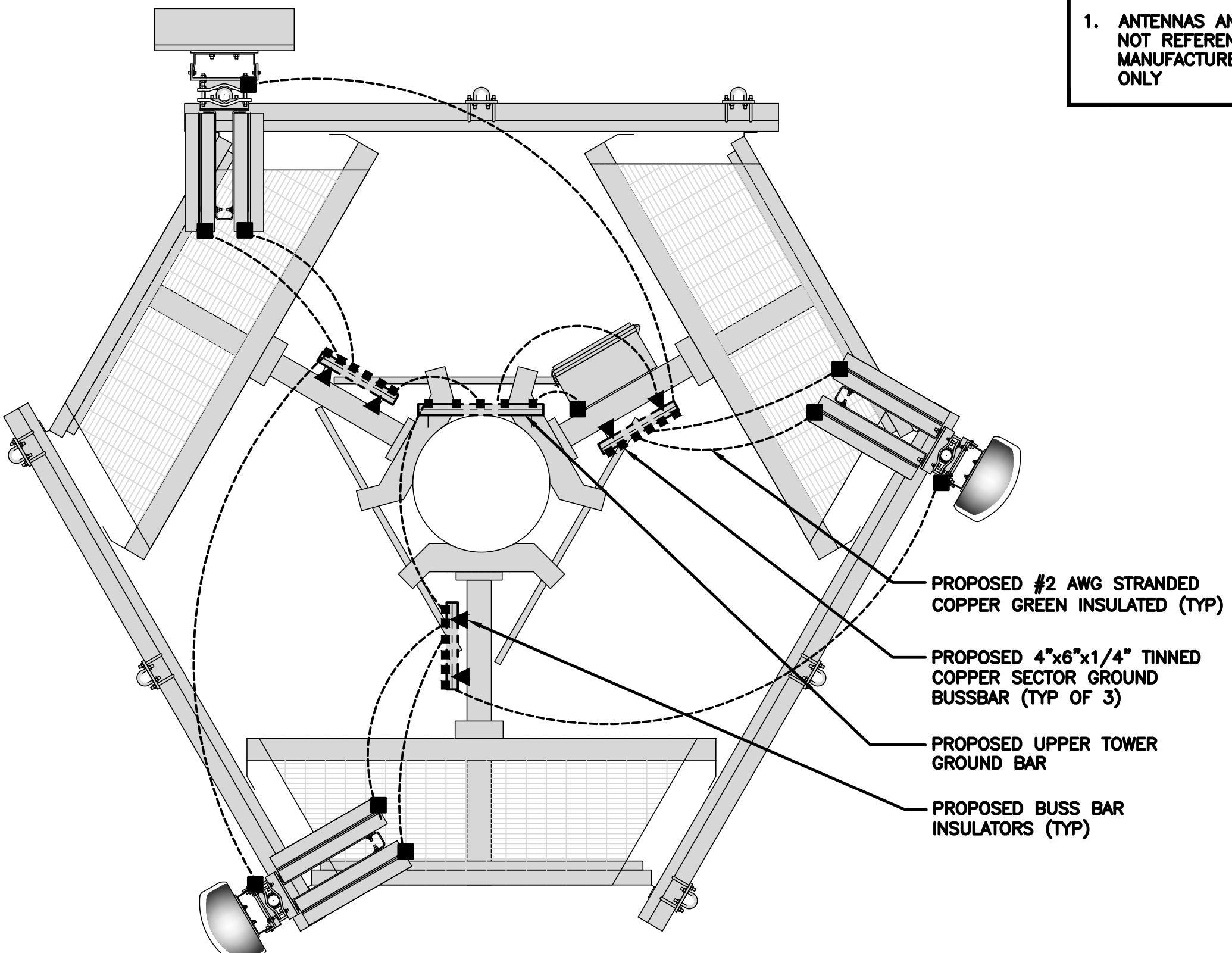


TYPICAL EQUIPMENT GROUNDING PLAN

NO SCALE 1

NOTES

1. ANTENNAS AND OVP SHOWN ARE GENERIC AND NOT REFERENCING TO A SPECIFIC MANUFACTURER. THIS LAYOUT IS FOR REFERENCE ONLY



TYPICAL ANTENNA GROUNDING PLAN

NO SCALE 2

GROUNDING KEY NOTES

|                         |                               |
|-------------------------|-------------------------------|
| ● EXOTHERMIC CONNECTION |                               |
| ■ MECHANICAL CONNECTION |                               |
| — GROUND BUS BAR        | — #2 AWG STRANDED & INSULATED |
| ○ GROUND ROD            | — #2 AWG SOLID COPPER TINNED  |

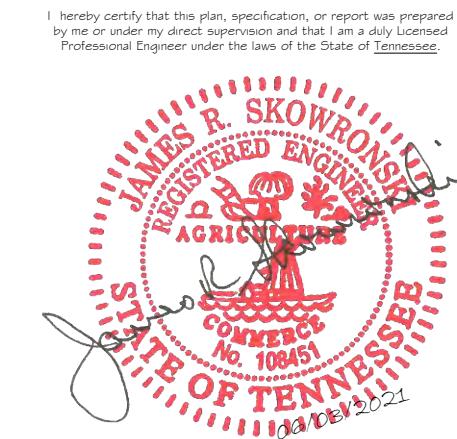
GROUNDING LEGEND

1. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
2. CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND DISH Wireless LLC. GROUNDING AND BONDING REQUIREMENTS AND MANUFACTURER'S SPECIFICATIONS.
3. ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.

GROUNDING KEY NOTES

- (A) EXTERIOR GROUND RING: #2 AWG SOLID COPPER, BURIED AT A DEPTH OF AT LEAST 30 INCHES BELOW GRADE, OR 6 INCHES BELOW THE FROST LINE AND APPROXIMATELY 24 INCHES FROM THE EXTERIOR WALL OR FOOTING.
- (B) TOWER GROUND RING: THE GROUND RING SYSTEM SHALL BE INSTALLED AROUND AN ANTENNA TOWER'S LEGS, AND/OR GUY ANCHORS. WHERE SEPARATE SYSTEMS HAVE BEEN PROVIDED FOR THE TOWER AND THE BUILDING, AT LEAST TWO BONDS SHALL BE MADE BETWEEN THE TOWER RING GROUND SYSTEM AND THE BUILDING RING GROUND SYSTEM USING MINIMUM #2 AWG SOLID COPPER CONDUCTORS.
- (C) INTERIOR GROUND RING: #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTOR EXTENDED AROUND THE PERIMETER OF THE EQUIPMENT AREA. ALL NON-TELECOMMUNICATIONS RELATED METALLIC OBJECTS FOUND WITHIN A SITE SHALL BE GROUNDED TO THE INTERIOR GROUND RING WITH #6 AWG STRANDED GREEN INSULATED CONDUCTOR.
- (D) BOND TO INTERIOR GROUND RING: #2 AWG SOLID TINNED COPPER WIRE PRIMARY BONDS SHALL BE PROVIDED AT LEAST AT FOUR POINTS ON THE INTERIOR GROUND RING, LOCATED AT THE CORNERS OF THE BUILDING.
- (E) GROUND ROD: UL LISTED COPPER CLAD STEEL MINIMUM 1/2" DIAMETER BY EIGHT FEET LONG. GROUND RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES. GROUND RODS SHALL BE DRIVEN TO THE DEPTH OF GROUND RING CONDUCTOR.
- (F) CELL REFERENCE GROUND BAR: POINT OF GROUND REFERENCE FOR ALL COMMUNICATIONS EQUIPMENT FRAMES. ALL BONDS ARE MADE WITH #2 AWG UNLESS NOTED OTHERWISE STRANDED GREEN INSULATED COPPER CONDUCTORS. BOND TO GROUND RING WITH (2) #2 SOLID TINNED COPPER CONDUCTORS.
- (G) HATCH PLATE GROUND BAR: BOND TO THE INTERIOR GROUND RING WITH TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS. WHEN A HATCH-PLATE AND A CELL REFERENCE GROUND BAR ARE BOTH PRESENT, THE CRGB MUST BE CONNECTED TO THE HATCH-PLATE AND TO THE INTERIOR GROUND RING USING (2) TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS EACH.
- (H) EXTERIOR CABLE ENTRY PORT GROUND BARS: LOCATED AT THE ENTRANCE TO THE CELL SITE BUILDING. BOND TO GROUND RING WITH A #2 AWG SOLID TINNED COPPER CONDUCTORS WITH AN EXOTHERMIC WELD AND INSPECTION SLEEVE.
- (I) ITELCO GROUND BAR: BOND TO BOTH CELL REFERENCE GROUND BAR OR EXTERIOR GROUND RING.
- (K) FRAME BONDING: THE BONDING POINT FOR TELECOM EQUIPMENT FRAMES SHALL BE THE GROUND BUS THAT IS NOT ISOLATED FROM THE EQUIPMENT'S METAL FRAMEWORK.
- (L) INTERIOR UNIT BONDS: METAL FRAMES, CABINETS AND INDIVIDUAL METALLIC UNITS LOCATED WITHIN THE AREA OF THE INTERIOR GROUND RING REQUIRE A #6 AWG STRANDED GREEN INSULATED COPPER BOND TO THE INTERIOR GROUND RING.
- (M) FENCE AND GATE GROUNDING: METAL FENCES WITHIN 7 FEET OF THE EXTERIOR GROUND RING OR OBJECTS BONDED TO THE EXTERIOR GROUND RING SHALL BE BONDED TO THE GROUND RING WITH A #2 AWG SOLID TINNED COPPER CONDUCTOR AT AN INTERVAL NOT EXCEEDING 25 FEET. BONDS SHALL BE MADE AT EACH GATE POST AND ACROSS GATE OPENINGS.
- (N) EXTERIOR UNIT BONDS: METALLIC OBJECTS, EXTERNAL TO OR MOUNTED TO THE BUILDING, SHALL BE BONDED TO THE EXTERIOR GROUND RING. USING #2 TINNED SOLID COPPER WIRE
- (P) ICE BRIDGE SUPPORTS: EACH ICE BRIDGE LEG SHALL BE BONDED TO THE GROUND RING WITH #2 AWG BARE TINNED COPPER CONDUCTOR. PROVIDE EXOTHERMIC WELDS AT BOTH THE ICE BRIDGE LEG AND BURIED GROUND RING.
- (Q) DURING ALL DC POWER SYSTEM CHANGES INCLUDING DC SYSTEM CHANGE OUTS, RECTIFIER REPLACEMENTS OR ADDITIONS, BREAKER DISTRIBUTION CHANGES, BATTERY ADDITIONS, BATTERY REPLACEMENTS AND INSTALLATIONS OR CHANGES TO DC CONVERTER SYSTEMS IT SHALL BE REQUIRED THAT SERVICE CONTRACTORS VERIFY ALL DC POWER SYSTEMS ARE EQUIPPED WITH A MASTER DC SYSTEM RETURN GROUND CONDUCTOR FROM THE DC POWER SYSTEM COMMON RETURN BUS DIRECTLY CONNECTED TO THE CELL SITE REFERENCE GROUND BAR
- (R) TOWER TOP COLLECTOR BUSS BAR IS TO BE MECHANICALLY BONDED TO PROPOSED ANTENNA MOUNT COLLAR. REFER TO DISH Wireless LLC. GROUNDING NOTES.

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DRAWN BY: CHECKED BY: APPROVED BY:

GCA CWM JW

RFDS REV #: ---

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|     |          |                         |
|     |          |                         |
|     |          |                         |

A&E PROJECT NUMBER  
NABNA00141A

DISH Wireless LLC.  
PROJECT INFORMATION  
NABNA00141A  
1631 NW BROAD STREET  
MURFREESBORO TN, 37129

SHEET TITLE  
GROUNDING PLANS  
AND NOTES

SHEET NUMBER

G-1

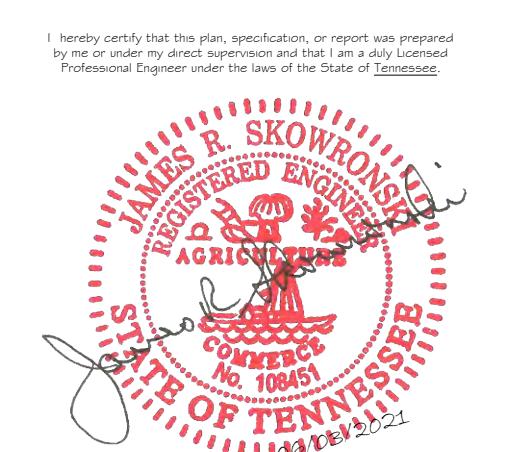


**dish**  
wireless.

5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



3659 GREEN ROAD, SUITE 214  
CLEVELAND, OH 44122



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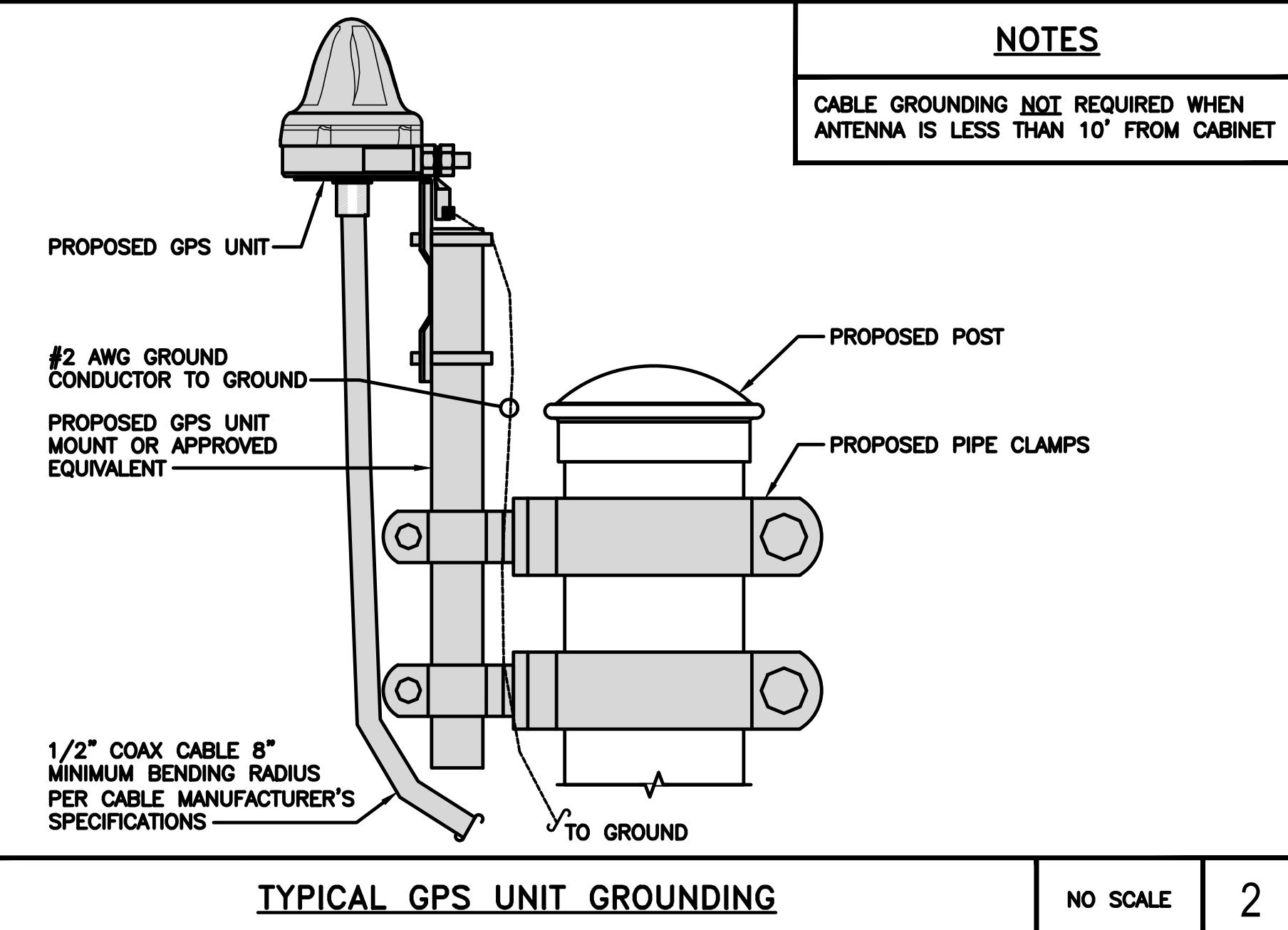
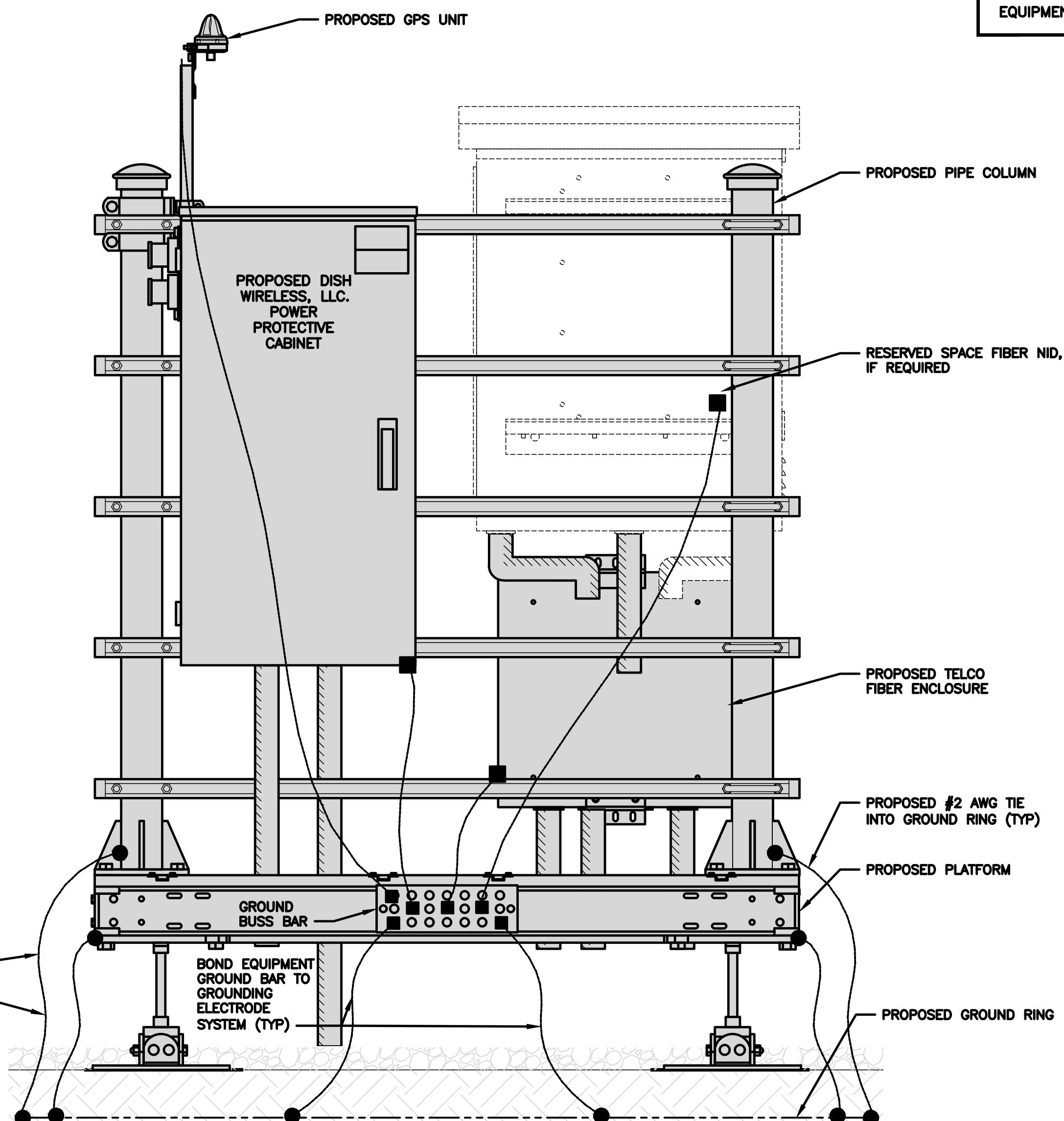
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DISH Wireless LLC,  
PROJECT INFORMATION  
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1631 NW BROAD STREET  
MURFREESBORO TN, 37129

SHEET TITLE  
GROUNDING DETAILS

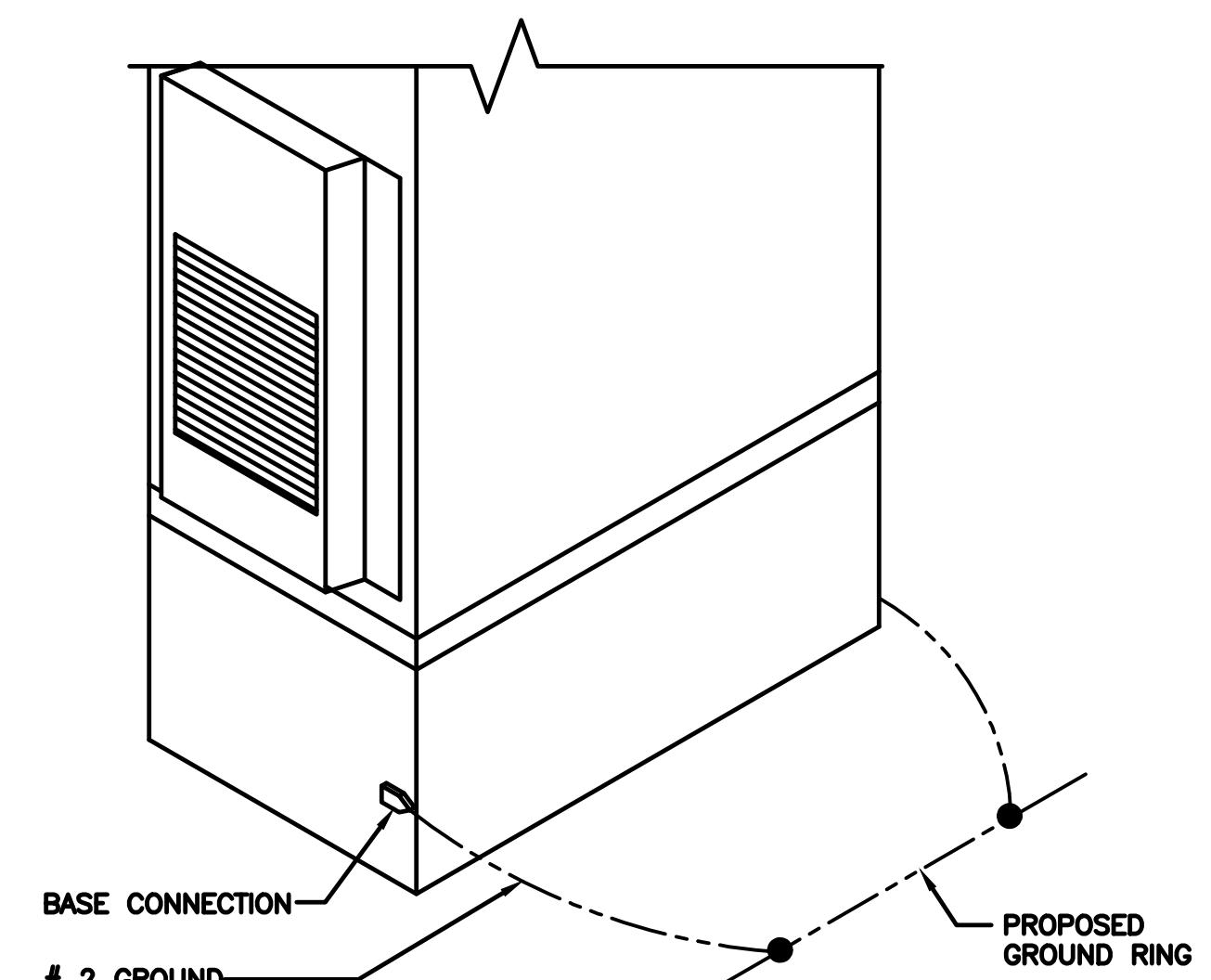
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G-2



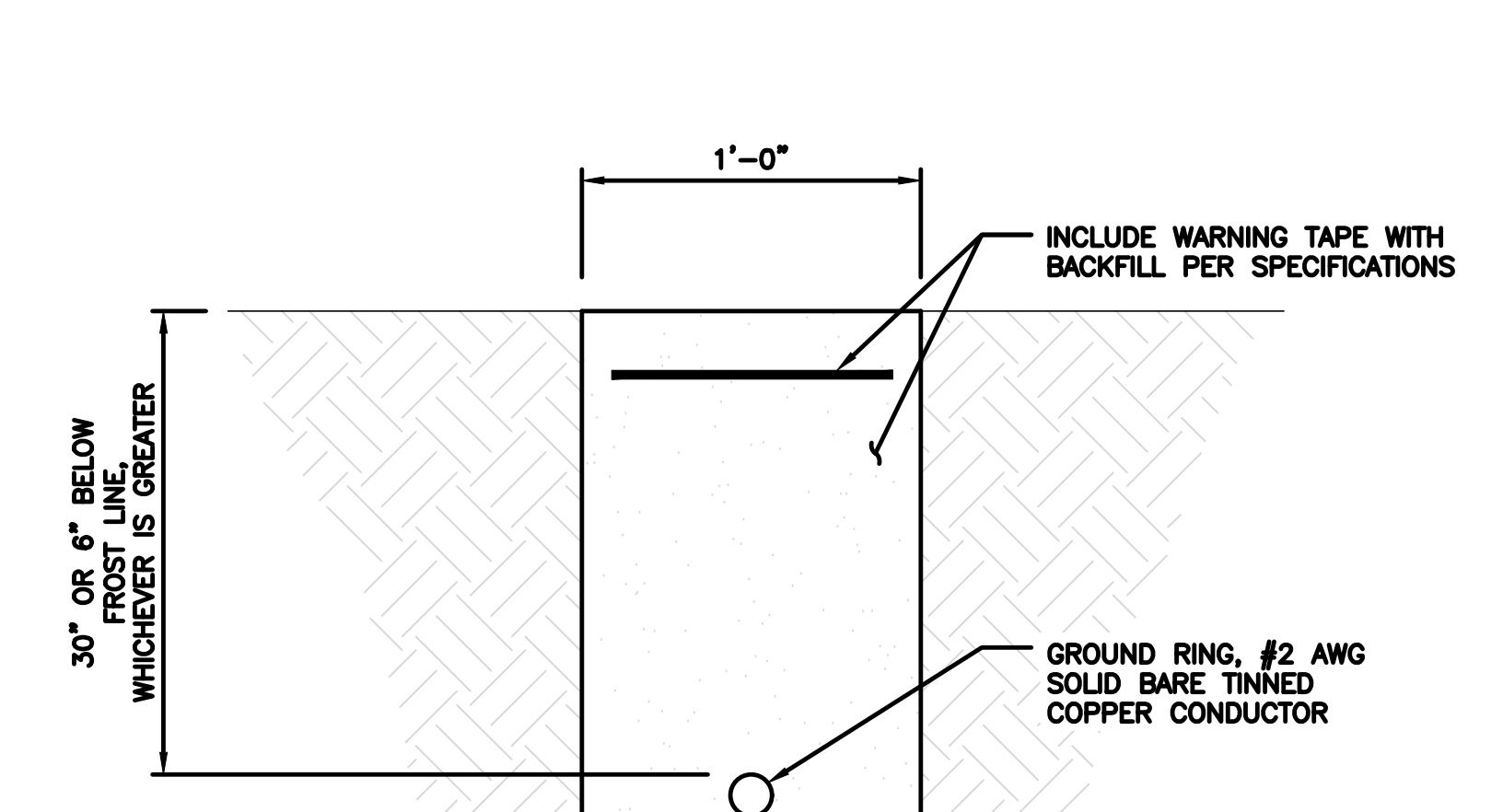
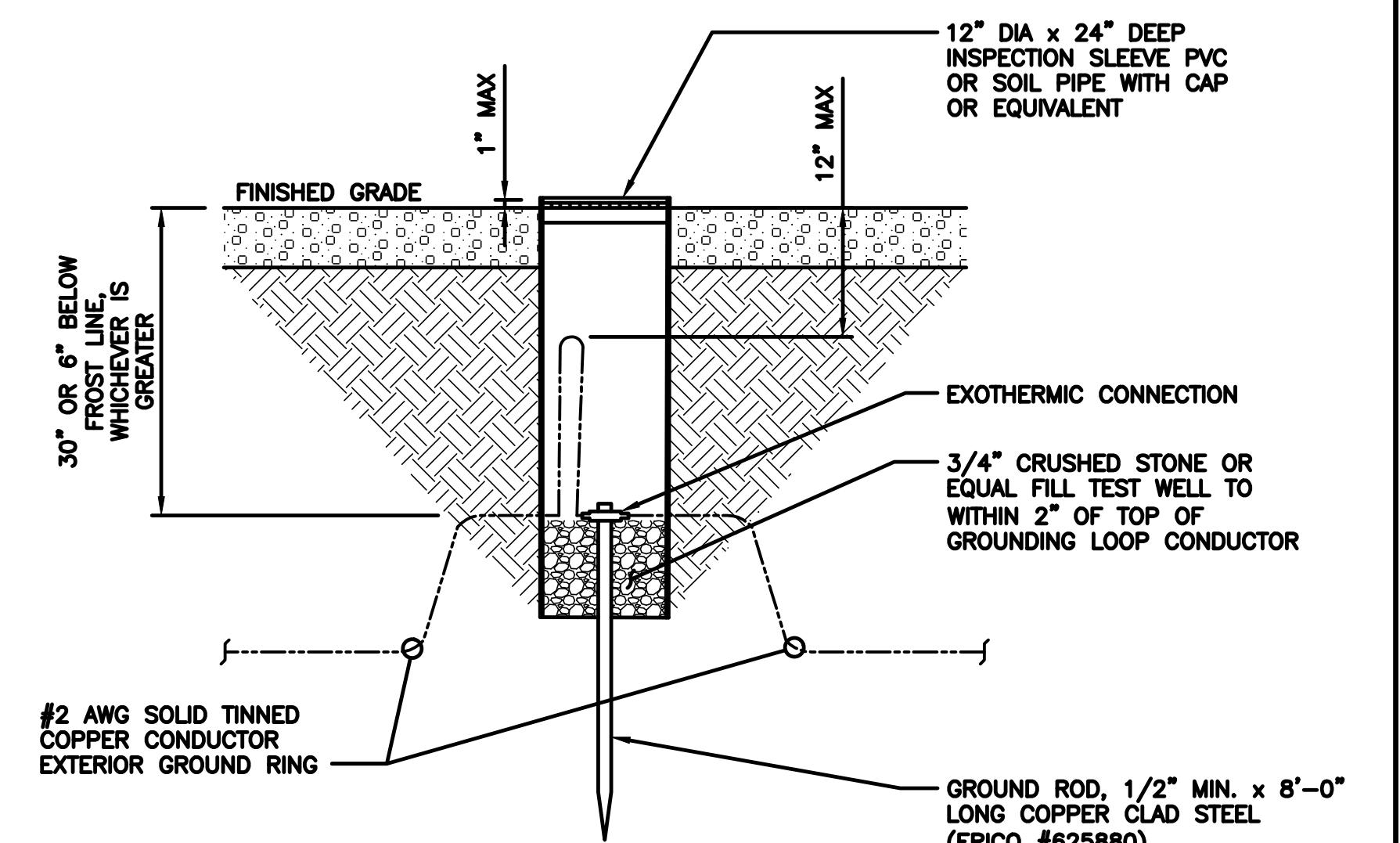
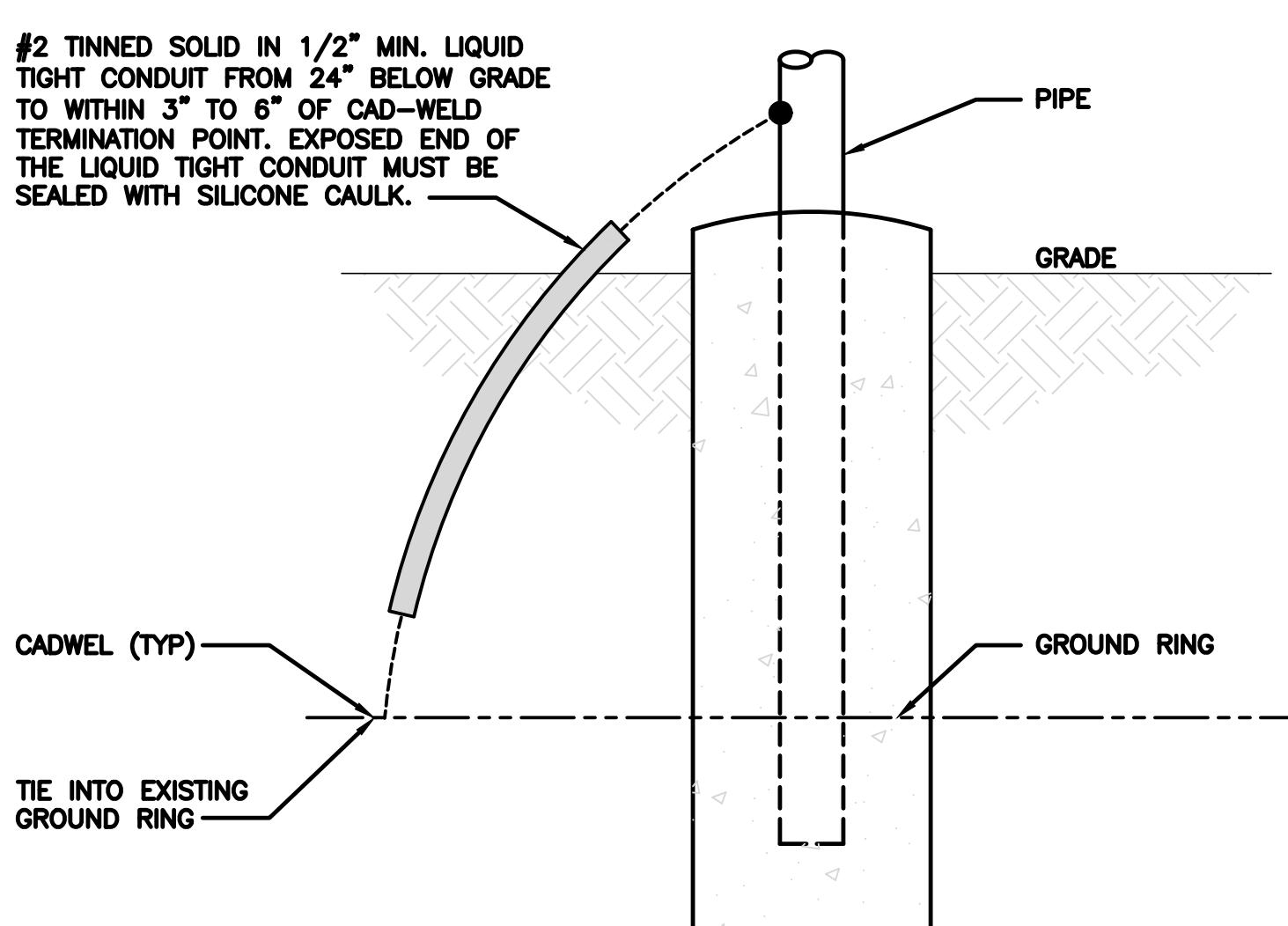
TYPICAL GPS UNIT GROUNDING

NO SCALE 2



OUTDOOR CABINET GROUNDING

NO SCALE 3



TRANSITIONING GROUND DETAIL

NO SCALE

4

TYPICAL TEST GROUND ROD WITH INSPECTION SLEEVE

NO SCALE

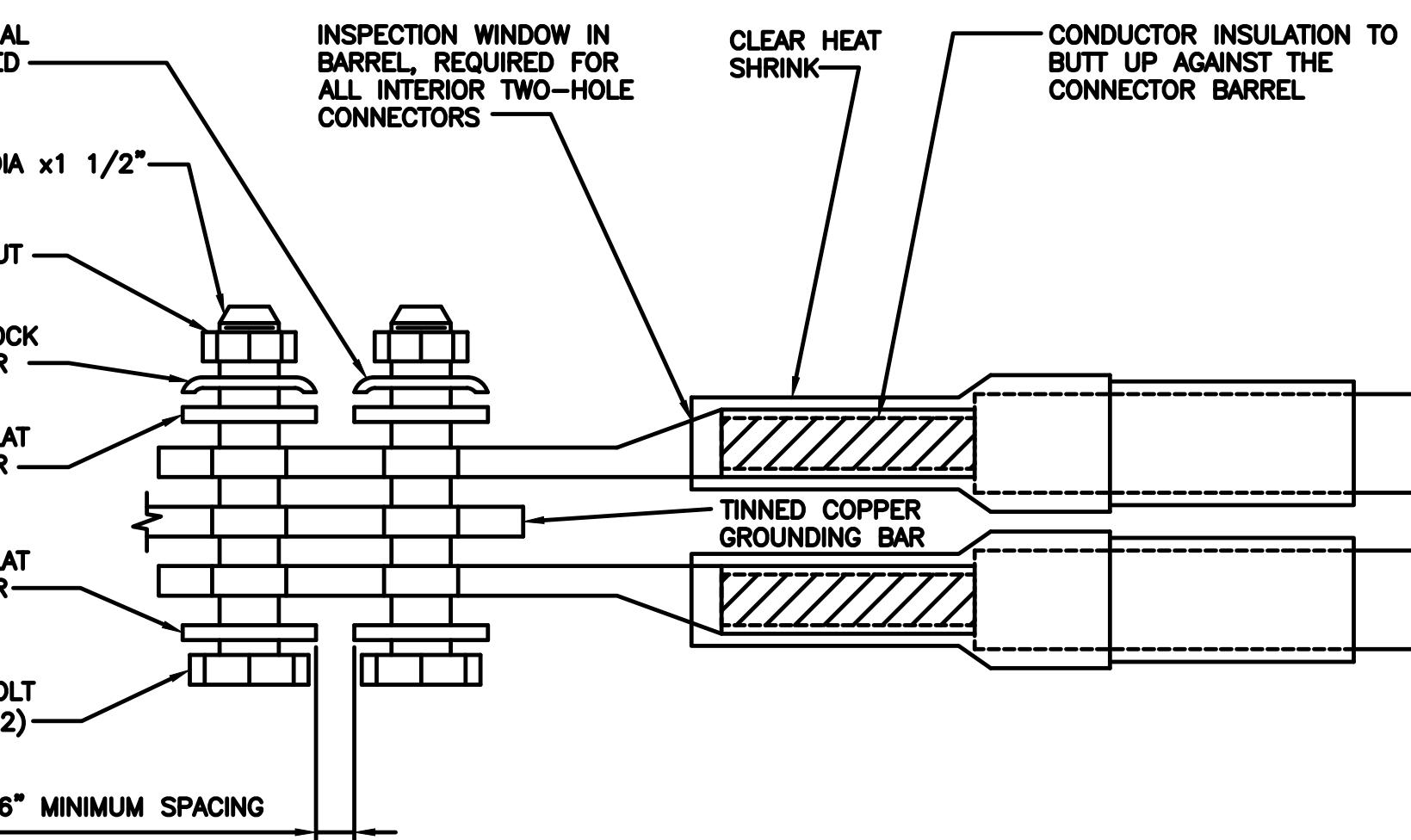
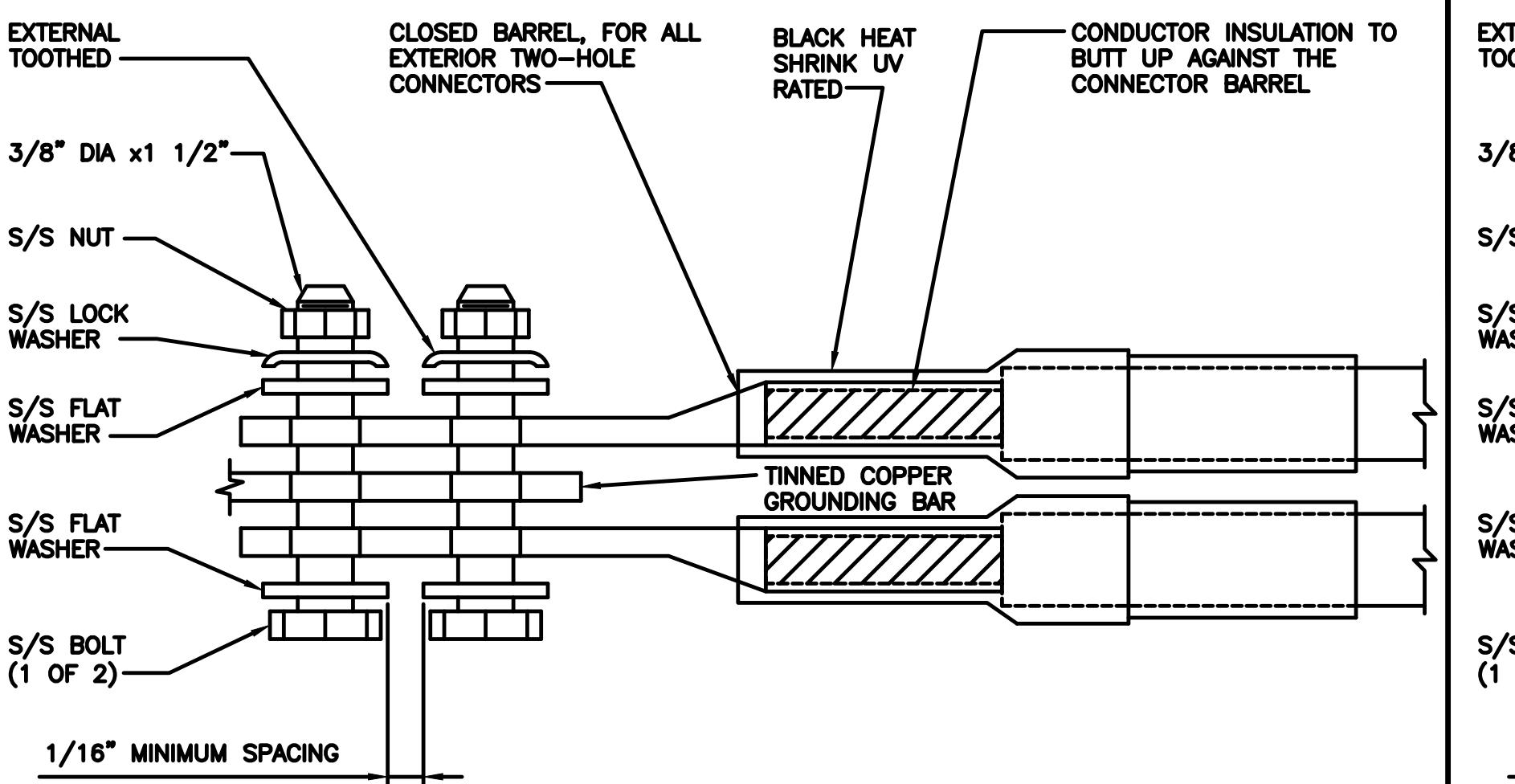
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TYPICAL GROUND RING TRENCH

NO SCALE

6

1. EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUND BAR. ROUTE CONDUCTORS TO BURIED GROUND RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
  2. ALL EXTERIOR GROUNDING HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
  3. FOR GROUND BOND TO STEEL ONLY: COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
  4. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUND CONDUCTOR DOWN TO GROUNDING BUS.
  5. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUND BAR AND BOLTED ON THE BACK SIDE.
  6. ALL GROUNDING PARTS AND EQUIPMENT TO BE SUPPLIED AND INSTALLED BY CONTRACTOR.
  7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUND BAR AS REQUIRED.
  9. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



3659 GREEN ROAD, SUITE 214  
CLEVELAND, OH 44122

TYPICAL GROUNDING NOTES      NO SCALE      1      TYPICAL EXTERIOR TWO HOLE LUG      NO SCALE      2      TYPICAL INTERIOR TWO HOLE LUG      NO SCALE      3

This technical diagram illustrates the assembly of a bus bar system. A central horizontal bus bar is shown, with two 2-hole long barrel tinned solid copper lugs attached to its ends. Each lug is secured with a stainless steel bolt, split washer, and flat washer, and tightened with a stainless steel nut. A note specifies that a minimum of three threads must be visible. Below the bus bar, a cherry insulator is installed if required. The entire assembly is mounted onto a base plate.

NOTE: MINIMUM OF 3 THREADS  
TO BE VISIBLE (TYP)

2 HOLE LONG BARREL  
TINNED SOLID COPPER  
(TYP)

TIN COATED SOLID  
COPPER BUS BAR

CHERRY INSULATOR  
INSTALLED IF REQUIRED

S/S BOLT (TYP)

S/S SPLIT WASHER (TYP)

S/S FLAT WASHER (TYP)

S/S FLAT WASHER (TYP)

S/S NUT (TYP)

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DRAWN BY: CHECKED BY: APPROVED BY:

SWA SWM SW

“

# CONSTRUCTION DOCUMENTS

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|   |                 |                                    |
|   |                 |                                    |
|   |                 |                                    |
|   |                 |                                    |

A&E PROJECT NUMBER  
NARNA00141A

DISH Wireless L.L.C.  
PROJECT INFORMATION

NABNA00141A  
31 NW BROAD STREET  
FREESBORO TN. 37129

**SHEET TITLE**

**ANSWER** The answer is 1000.

63

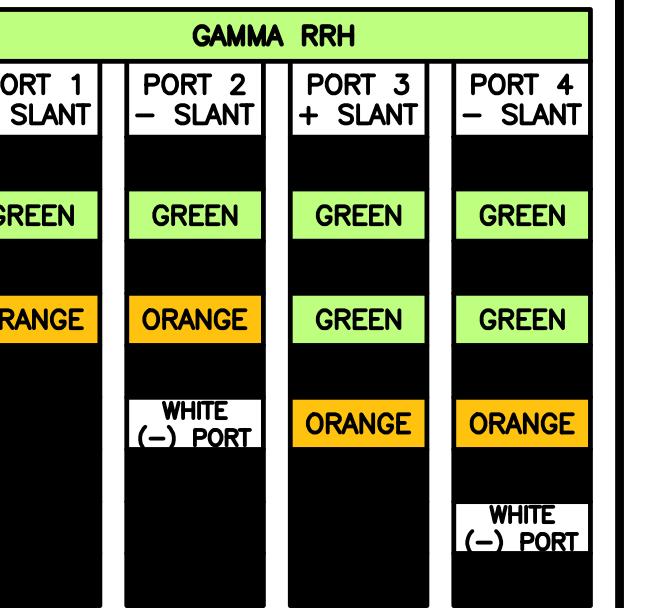
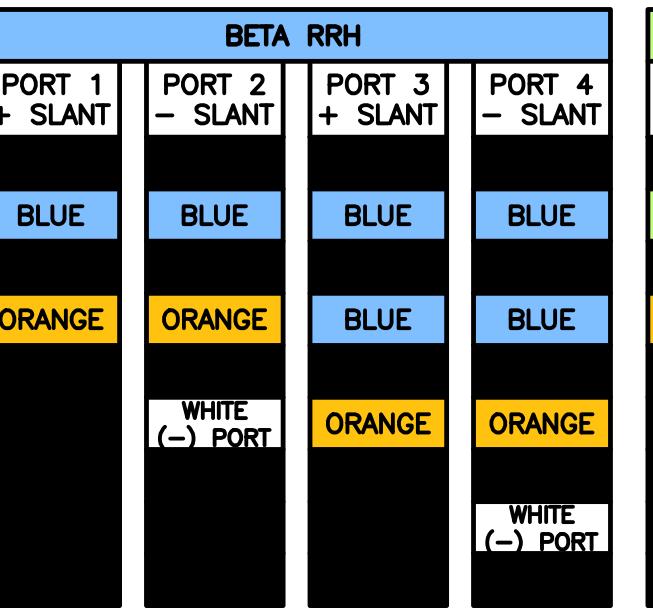
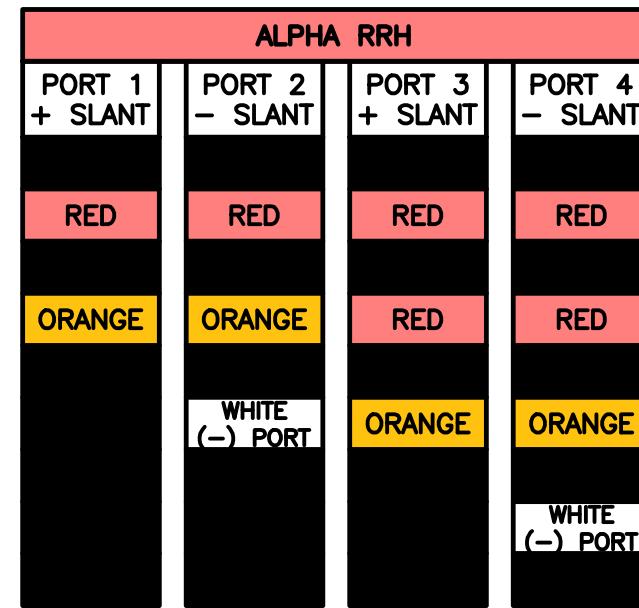
|                   |          |   |                 |          |   |                 |          |   |
|-------------------|----------|---|-----------------|----------|---|-----------------|----------|---|
| <u>LUG DETAIL</u> | NO SCALE | 4 | <u>NOT USED</u> | NO SCALE | 5 | <u>NOT USED</u> | NO SCALE | 6 |
| <u>NOT USED</u>   | NO SCALE | 7 | <u>NOT USED</u> | NO SCALE | 8 | <u>NOT USED</u> | NO SCALE | 9 |

## RF JUMPER COLOR CODING

3/4" TAPE WIDTHS WITH 3/4" SPACING

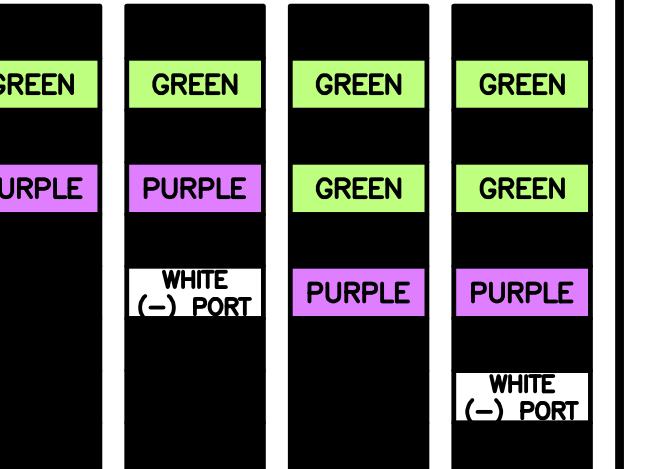
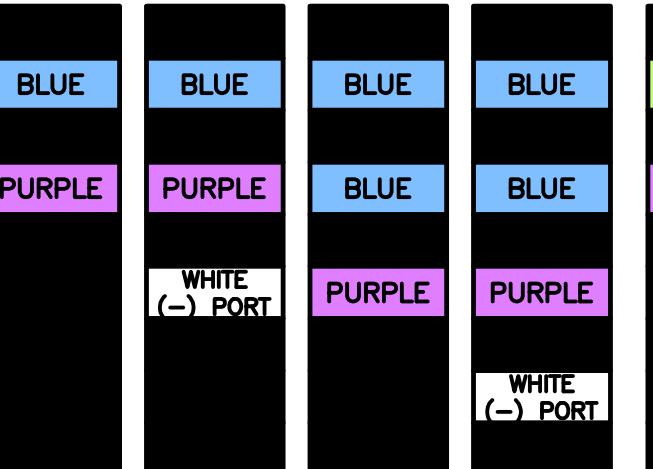
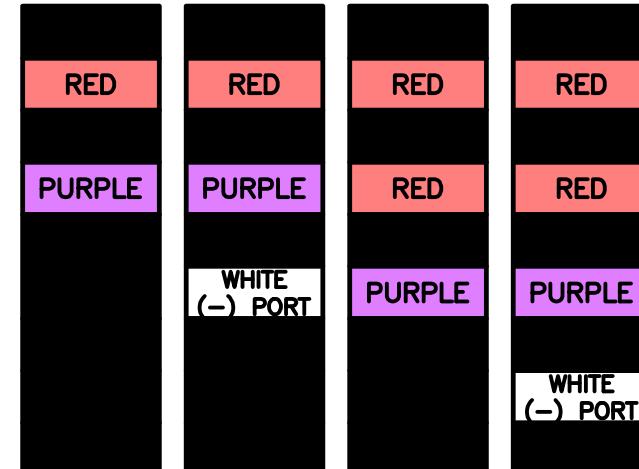
LOW-BAND RRH –  
(600MHz N71 BASEBAND) +  
(850MHz N26 BAND) +  
(700MHz N29 BAND) – OPTIONAL PER MARKET

ADD FREQUENCY COLOR TO SECTOR BAND  
(CBRS WILL USE YELLOW BANDS)



MID-BAND RRH –  
(AWS BANDS N66+N70)

ADD FREQUENCY COLOR TO SECTOR BAND  
(CBRS WILL USE YELLOW BANDS)



## HYBRID/DISCREET CABLES

INCLUDE SECTOR BANDS BEING SUPPORTED  
ALONG WITH FREQUENCY BANDS

EXAMPLE 1 – HYBRID, OR DISCREET, SUPPORTS  
ALL SECTORS, BOTH LOW-BANDS AND MID-BANDS

EXAMPLE 2 – HYBRID, OR DISCREET, SUPPORTS  
CBRS ONLY, ALL SECTORS

### EXAMPLE 1



### EXAMPLE 2



### EXAMPLE 3



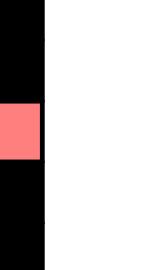
## FIBER JUMPERS TO RRHs

LOW-BAND RRH FIBER CABLES HAVE SECTOR  
STRIPE ONLY

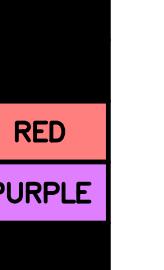
### LOW BAND RRH



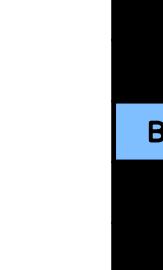
### HIGH BAND RRH



### LOW BAND RRH



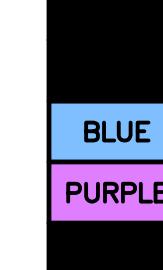
### HIGH BAND RRH



### LOW BAND RRH



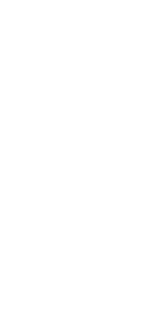
### HIGH BAND RRH



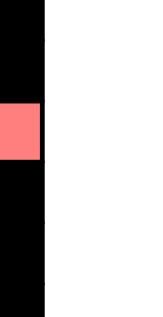
## POWER CABLES TO RRHs

LOW-BAND RRH POWER CABLES HAVE SECTOR  
STRIPE ONLY

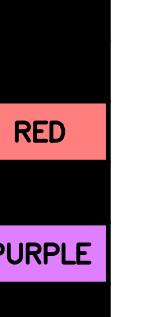
### LOW BAND RRH



### HIGH BAND RRH



### LOW BAND RRH



### HIGH BAND RRH



### LOW BAND RRH



### HIGH BAND RRH

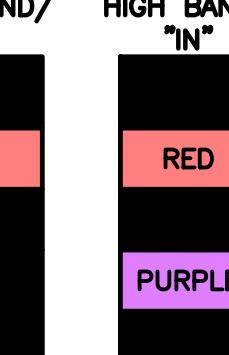


## RET MOTORS AT ANTENNAS

### ANTENNA 1 LOW BAND/ "IN"



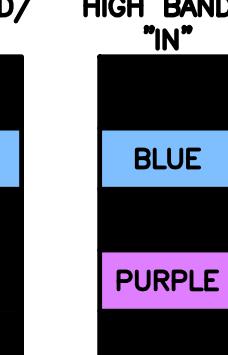
### ANTENNA 1 HIGH BAND/ "IN"



### ANTENNA 1 LOW BAND/ "IN"



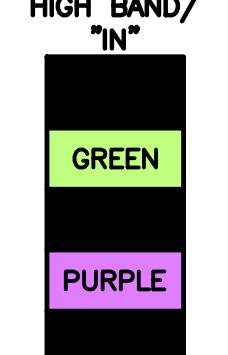
### ANTENNA 1 HIGH BAND/ "IN"



### ANTENNA 1 LOW BAND/ "IN"

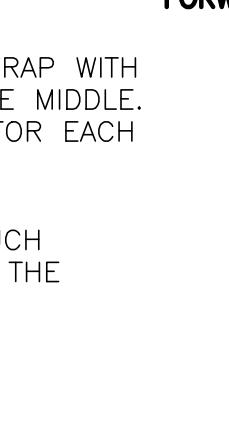


### ANTENNA 1 HIGH BAND/ "IN"



## MICROWAVE RADIO LINKS

### FORWARD AZIMUTH OF 0-120 DEGREES



### FORWARD AZIMUTH OF 120-240 DEGREES



### FORWARD AZIMUTH OF 240-360 DEGREES



LINKS WILL HAVE A 1.5–2 INCH WHITE WRAP WITH  
THE AZIMUTH COLOR OVERLAPPING IN THE MIDDLE.  
ADD ADDITIONAL SECTOR COLOR BANDS FOR EACH  
ADDITIONAL MW RADIO.

MICROWAVE CABLES WILL REQUIRE P-TOUCH  
LABELS INSIDE THE CABINET TO IDENTIFY THE  
LOCAL AND REMOTE SITE ID'S

NO SCALE

1

NOT USED

NO SCALE

4

LOW BANDS (N71+N26)  
OPTIONAL – (N29)

ORANGE

AWS  
(N66+N70+H-BLOCK)

PURPLE

CBRS TECH  
(3 GHz)

YELLOW

NEGATIVE SLANT PORT  
ON ANT/RRH

WHITE

ALPHA SECTOR

RED

BETA SECTOR

BLUE

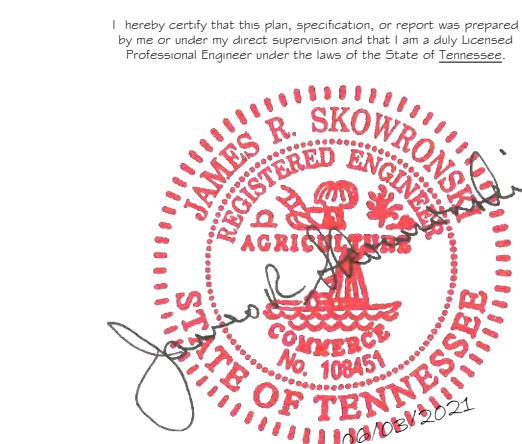
GAMMA SECTOR

GREEN

COLOR IDENTIFIER

NO SCALE

2



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GCA CWM JW

RFDS REV #: ---

## CONSTRUCTION DOCUMENTS

### SUBMITTALS

| REV | DATE     | DESCRIPTION             |
|-----|----------|-------------------------|
| A   | 05/12/21 | ISSUED FOR REVIEW       |
| O   | 05/27/21 | ISSUED FOR CONSTRUCTION |
| 1   | 06/02/21 | REVISED ANTENNA & MOUNT |

### A&E PROJECT NUMBER

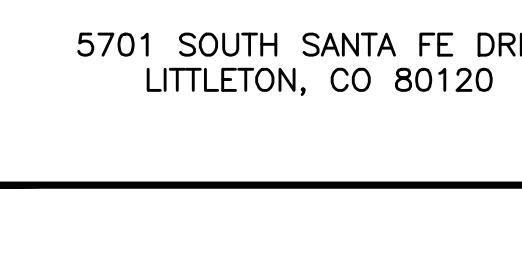
NABNA00141A

DISH Wireless LLC,  
PROJECT INFORMATION  
NABNA00141A  
1631 NW BROAD STREET  
MURFREESBORO TN, 37129

SHEET TITLE  
RF  
CABLE COLOR CODES

SHEET NUMBER

RF-1



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120

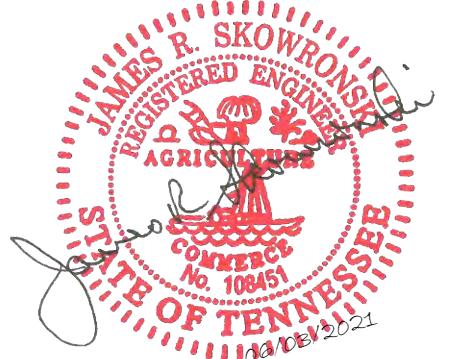
**dish**  
wireless.

5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



3659 GREEN ROAD, SUITE 214  
CLEVELAND, OH 44122

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and was a duly licensed Professional Engineer registered in the State of Tennessee.



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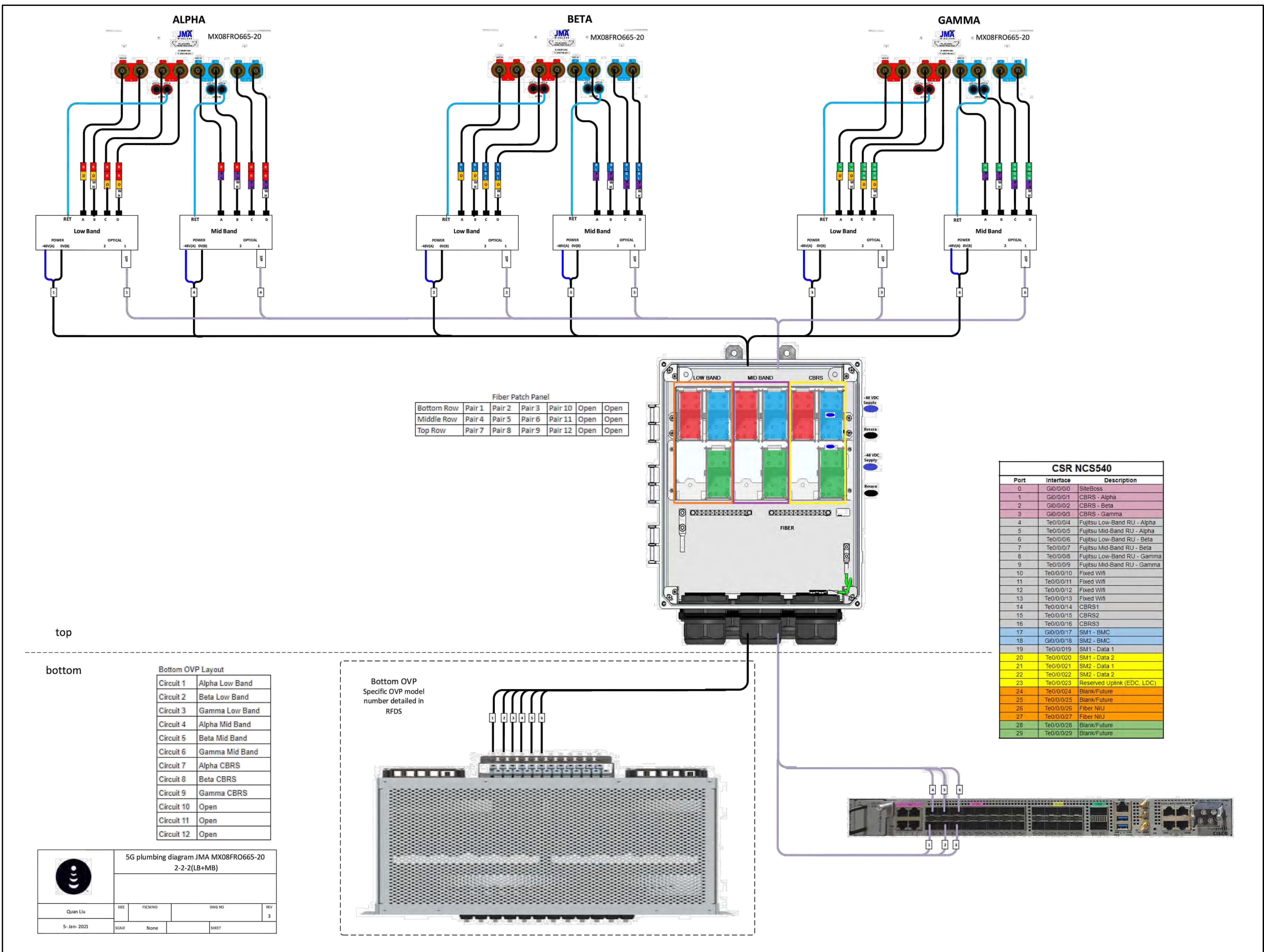
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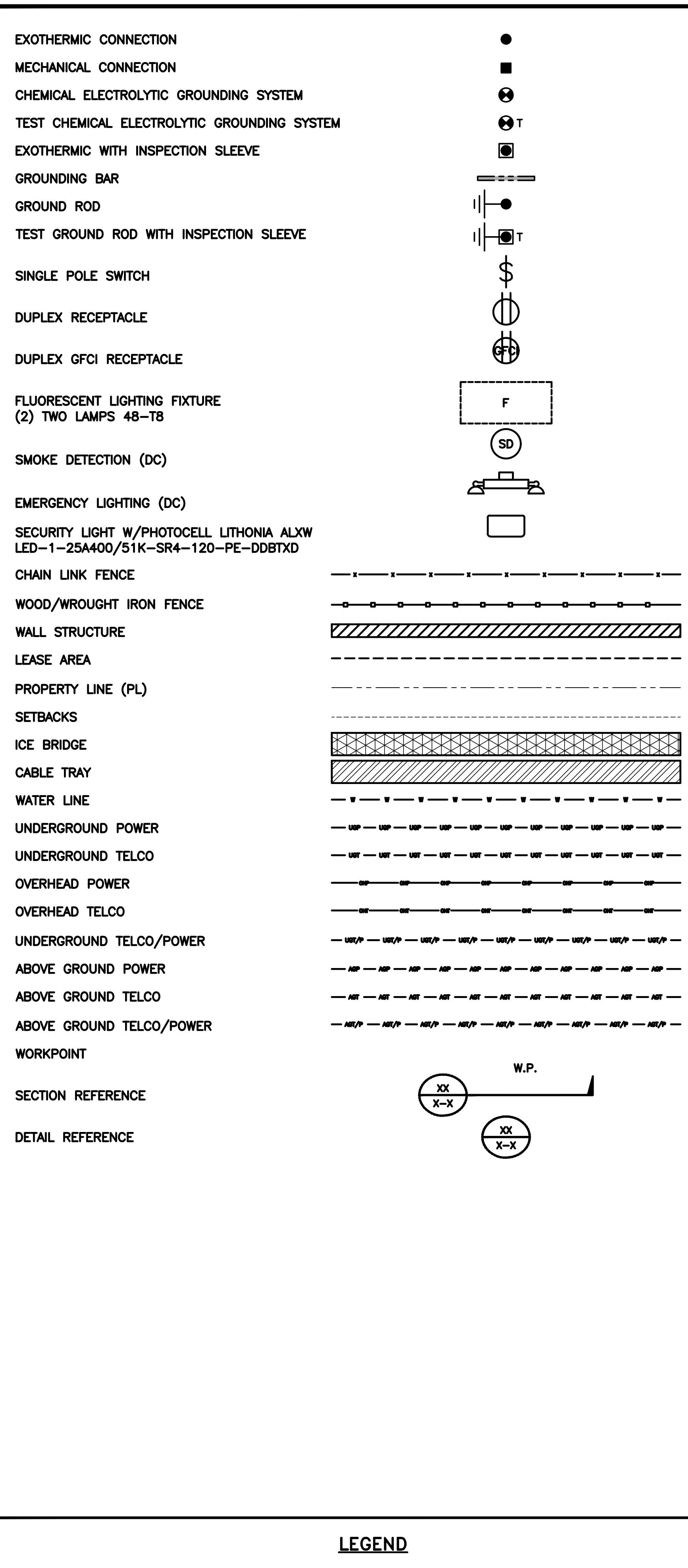
NABNA00141A  
1631 NW BROAD STREET  
MURFREESBORO TN, 37129

SHEET TITLE  
RF  
PLUMBING DIAGRAM

SHEET NUMBER

RF-2





|        |                                   |       |                                               |
|--------|-----------------------------------|-------|-----------------------------------------------|
| AB     | ANCHOR BOLT                       | IN    | INCH                                          |
| ABV    | ABOVE                             | INT   | INTERIOR                                      |
| AC     | ALTERNATING CURRENT               | LB(S) | POUND(S)                                      |
| ADDL   | ADDITIONAL                        | LF    | LINEAR FEET                                   |
| AFF    | ABOVE FINISHED FLOOR              | LTE   | LONG TERM EVOLUTION                           |
| AFG    | ABOVE FINISHED GRADE              | MAS   | MASONRY                                       |
| AGL    | ABOVE GROUND LEVEL                | MAX   | MAXIMUM                                       |
| AIC    | AMPERAGE INTERRUPTION CAPACITY    | MB    | MACHINE BOLT                                  |
| ALUM   | ALUMINUM                          | MECH  | MECHANICAL                                    |
| ALT    | ALTERNATE                         | MFR   | MANUFACTURER                                  |
| ANT    | ANTENNA                           | MGB   | MASTER GROUND BAR                             |
| APPROX | APPROXIMATE                       | MIN   | MINIMUM                                       |
| ARCH   | ARCHITECTURAL                     | MISC  | MISCELLANEOUS                                 |
| ATS    | AUTOMATIC TRANSFER SWITCH         | MTL   | METAL                                         |
| AWG    | AMERICAN WIRE GAUGE               | MTS   | MANUAL TRANSFER SWITCH                        |
| BATT   | BATTERY                           | MW    | MICROWAVE                                     |
| BLDG   | BUILDING                          | NEC   | NATIONAL ELECTRIC CODE                        |
| BLK    | BLOCK                             | NM    | NEWTON METERS                                 |
| BLKG   | BLOCKING                          | NO.   | NUMBER                                        |
| BM     | BEAM                              | #     | NUMBER                                        |
| BTC    | BARE TINNED COPPER CONDUCTOR      | NTS   | NOT TO SCALE                                  |
| BOF    | BOTTOM OF FOOTING                 | OC    | ON-CENTER                                     |
| CAB    | CABINET                           | OSHA  | OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION |
| CANT   | CANTILEVERED                      | OPNG  | OPENING                                       |
| CHG    | CHARGING                          | P/C   | PRECAST CONCRETE                              |
| CLG    | CEILING                           | PCS   | PERSONAL COMMUNICATION SERVICES               |
| CLR    | CLEAR                             | PCU   | PRIMARY CONTROL UNIT                          |
| COL    | COLUMN                            | PRC   | PRIMARY RADIO CABINET                         |
| COMM   | COMMON                            | PP    | POLARIZING PRESERVING                         |
| CONC   | CONCRETE                          | PSF   | POUNDS PER SQUARE FOOT                        |
| CONSTR | CONSTRUCTION                      | PSI   | POUNDS PER SQUARE INCH                        |
| DBL    | DOUBLE                            | PT    | PRESSURE TREATED                              |
| DC     | DIRECT CURRENT                    | PWR   | POWER CABINET                                 |
| DEPT   | DEPARTMENT                        | QTY   | QUANTITY                                      |
| DF     | DOUGLAS FIR                       | RAD   | RADIUS                                        |
| DIA    | DIAMETER                          | RECT  | RECTIFIER                                     |
| DIAG   | DIAGONAL                          | REF   | REFERENCE                                     |
| DIM    | DIMENSION                         | REINF | REINFORCEMENT                                 |
| DWG    | DRAWING                           | REQ'D | REQUIRED                                      |
| DWL    | DOWEL                             | RET   | REMOTE ELECTRIC TILT                          |
| EA     | EACH                              | RF    | RADIO FREQUENCY                               |
| EC     | ELECTRICAL CONDUCTOR              | RMC   | RIGID METALLIC CONDUIT                        |
| EL     | ELEVATION                         | RRH   | REMOTE RADIO HEAD                             |
| ELEC   | ELECTRICAL                        | RRU   | REMOTE RADIO UNIT                             |
| EMT    | ELECTRICAL METALLIC TUBING        | RWY   | RACEWAY                                       |
| ENG    | ENGINEER                          | SCH   | SCHEDULE                                      |
| EQ     | EQUAL                             | SHT   | SHEET                                         |
| EXP    | EXPANSION                         | SIAD  | SMART INTEGRATED ACCESS DEVICE                |
| EXT    | EXTERIOR                          | SIM   | SIMILAR                                       |
| EW     | EACH WAY                          | SPEC  | SPECIFICATION                                 |
| FAB    | FABRICATION                       | SQ    | SQUARE                                        |
| FF     | FINISH FLOOR                      | SS    | STAINLESS STEEL                               |
| FG     | FINISH GRADE                      | STD   | STANDARD                                      |
| FIF    | FACILITY INTERFACE FRAME          | STL   | STEEL                                         |
| FIN    | FINISH(ED)                        | TEMP  | TEMPORARY                                     |
| FLR    | FLOOR                             | THK   | THICKNESS                                     |
| FDN    | FOUNDATION                        | TMA   | TOWER MOUNTED AMPLIFIER                       |
| FOC    | FACE OF CONCRETE                  | TN    | TOE NAIL                                      |
| FOM    | FACE OF MASONRY                   | TOA   | TOP OF ANTENNA                                |
| FOS    | FACE OF STUD                      | TOC   | TOP OF CURB                                   |
| FOW    | FACE OF WALL                      | TOF   | TOP OF FOUNDATION                             |
| FS     | FINISH SURFACE                    | TOP   | TOP OF PLATE (PARAPET)                        |
| FT     | FOOT                              | TOS   | TOP OF STEEL                                  |
| FTG    | FOOTING                           | TOW   | TOP OF WALL                                   |
| GA     | GAUGE                             | TVSS  | TRANSIENT VOLTAGE SURGE SUPPRESSION           |
| GEN    | GENERATOR                         | TYP   | TYPICAL                                       |
| GFCI   | GROUND FAULT CIRCUIT INTERRUPTER  | UG    | UNDERGROUND                                   |
| GLB    | GLUE LAMINATED BEAM               | UL    | UNDERWRITERS LABORATORY                       |
| GLV    | GALVANIZED                        | UNO   | UNLESS NOTED OTHERWISE                        |
| GPS    | GLOBAL POSITIONING SYSTEM         | UMTS  | UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM    |
| GND    | GROUND                            | UPS   | UNINTERRUPTIBLE POWER SYSTEM (DC POWER PLANT) |
| GSM    | GLOBAL SYSTEM FOR MOBILE          | VIF   | VERIFIED IN FIELD                             |
| HDG    | HOT DIPPED GALVANIZED             | W     | WIDE                                          |
| HDR    | HEADER                            | W/    | WITH                                          |
| HGR    | HANGER                            | WD    | WOOD                                          |
| HVAC   | HEAT/VENTILATION/AIR CONDITIONING | WP    | WEATHERPROOF                                  |
| HT     | HEIGHT                            | WT    | WEIGHT                                        |
| IGR    | INTERIOR GROUND RING              |       |                                               |

LEGEND

ABBREVIATIONS

**dish wireless.**  
5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120

**SURE SITE**  
3659 GREEN ROAD, SUITE 214  
CLEVELAND, OH 44122

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and is a duly licensed Professional Engineer registered in the State of Tennessee.

JAMES R. SKOWRONSKI  
REGISTERED ENGINEER  
AGRICULTURE  
STATE OF TENNESSEE  
No. 10845

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A&E PROJECT NUMBER  
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DISH Wireless LLC.  
PROJECT INFORMATION  
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1631 NW BROAD STREET  
MURFREESBORO TN, 37129

SHEET TITLE  
LEGEND AND  
ABBREVIATIONS

SHEET NUMBER

GN-1

**SITE ACTIVITY REQUIREMENTS:**

1. NOTICE TO PROCEED – NO WORK SHALL COMMENCE PRIOR TO CONTRACTOR RECEIVING A WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE DISH Wireless L.L.C. AND TOWER OWNER NOC & THE DISH Wireless L.L.C. AND TOWER OWNER CONSTRUCTION MANAGER.
2. "LOOK UP" – DISH Wireless L.L.C. AND TOWER OWNER SAFETY CLIMB REQUIREMENT:  
THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR DISH Wireless L.L.C. AND DISH Wireless L.L.C. AND TOWER OWNER POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND DISH Wireless L.L.C. AND TOWER OWNER STANDARDS, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA-322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH DISH Wireless L.L.C. AND TOWER OWNER INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON DISH Wireless L.L.C. AND TOWER OWNER TOWER SITE AND LATEST VERSION OF ANSI/TIA-1019-A-2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY DISH Wireless L.L.C. AND TOWER OWNER PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES INCLUDING PRIVATE LOCATES SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND DISH PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF DISH Wireless L.L.C. AND TOWER OWNER, AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS AND RADIOS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

**GENERAL NOTES:**

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:  
CONTRACTOR:GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION  
CARRIER:DISH Wireless L.L.C.  
TOWER OWNER:TOWER OWNER
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.

6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CARRIER POC AND TOWER OWNER.

7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND TOWER OWNER PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.

11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION, BEFORE SUBMITTING BIDS, TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.

12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF DISH Wireless L.L.C. AND TOWER OWNER

13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

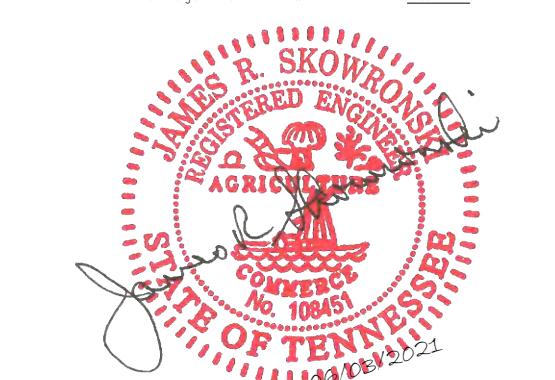


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DISH Wireless L.L.C.  
PROJECT INFORMATION

NABNA00141A  
1631 NW BROAD STREET  
MURFREESBORO TN, 37129

SHEET TITLE  
GENERAL NOTES

SHEET NUMBER

**GN-2**

**CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:**

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH ( $f'_c$ ) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°F AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE-THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER-TO-CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH ( $F_y$ ) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:

#4 BARS AND SMALLER 40 ksi

#5 BARS AND LARGER 60 ksi

6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

- CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"

- CONCRETE EXPOSED TO EARTH OR WEATHER:

- #6 BARS AND LARGER 2"

- #5 BARS AND SMALLER 1-1/2"

- CONCRETE NOT EXPOSED TO EARTH OR WEATHER:

- SLAB AND WALLS 3/4"

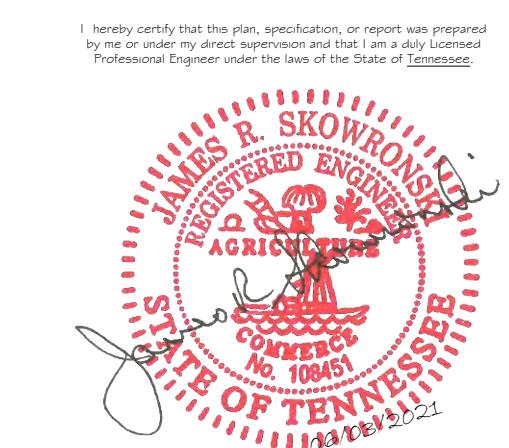
- BEAMS AND COLUMNS 1-1/2"

7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

**ELECTRICAL INSTALLATION NOTES:**

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
- 4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
- 4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. TIE WRAPS ARE NOT ALLOWED.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI-CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75°C (90°C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.

16. ELECTRICAL METALLIC TUBING (EMT) OR METAL-CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNTOWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER-ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIDIGLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3 (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR DISH Wireless L.L.C. AND TOWER OWNER BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "DISH Wireless L.L.C.".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 801203659 GREEN ROAD, SUITE 214  
CLEVELAND, OH 44122IT IS A VIOLATION OF LAW FOR ANY PERSON,  
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TO ALTER THIS DOCUMENT.DRAWN BY:  CHECKED BY:  APPROVED BY:  
GCA  CWM  JWRFDS REV #: **CONSTRUCTION DOCUMENTS****SUBMITTALS**

| REV | DATE     | DESCRIPTION             |
|-----|----------|-------------------------|
| A   | 05/12/21 | ISSUED FOR REVIEW       |
| 0   | 05/27/21 | ISSUED FOR CONSTRUCTION |
| 1   | 06/02/21 | REVISED ANTENNA & MOUNT |
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**A&E PROJECT NUMBER**  
NABNA00141A**DISH Wireless L.L.C.**  
**PROJECT INFORMATION**NABNA00141A  
1631 NW BROAD STREET  
MURFREESBORO TN, 37129**SHEET TITLE**  
**GENERAL NOTES****SHEET NUMBER**

GN-3

**GROUNDING NOTES:**

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON-METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). DO NOT ATTACH GROUNDING TO FIRE SPRINKLER SYSTEM PIPES.

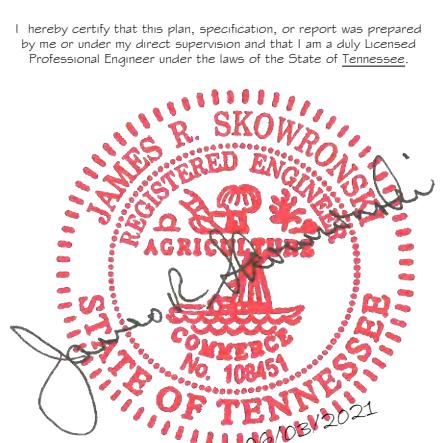
**dish**  
wireless.

5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



**SURE SITE**

3659 GREEN ROAD, SUITE 214  
CLEVELAND, OH 44122



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and was a duly licensed Professional Engineer registered in the State of Tennessee.

IT IS A VIOLATION OF LAW FOR ANY PERSON,  
UNLESS THEY ARE ACTING UNDER THE DIRECTION  
OF A LICENSED PROFESSIONAL ENGINEER,  
TO ALTER THIS DOCUMENT.

|           |             |              |
|-----------|-------------|--------------|
| DRAWN BY: | CHECKED BY: | APPROVED BY: |
| GCA       | CWM         | JW           |

RFDS REV #:

**CONSTRUCTION DOCUMENTS**

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**A&E PROJECT NUMBER**  
NABNA00141A

**DISH Wireless LLC,  
PROJECT INFORMATION**

NABNA00141A  
1631 NW BROAD STREET  
MURFREESBORO TN, 37129

**SHEET TITLE**  
GENERAL NOTES

**SHEET NUMBER**

**GN-4**