

ADMINISTRATIVE REVIEW APPLICATION

(Code Section 99.06, 153.037)



CITY OF DUBLIN

Land Use and
Long Range Planning
5800 Shier-Rings Road
Dublin, Ohio 43014-1236

Phone/TDD: 614-410-4600
Fax: 614-410-4747
Web Site: www.dublin.oh.us

I. PLEASE CHECK THE TYPE OF APPLICATION:

COIC Districts Select District: <input type="checkbox"/> HDP <input type="checkbox"/> LDP <input type="checkbox"/> I-VC <input type="checkbox"/> I-CC <input checked="" type="checkbox"/> Wireless Communication Facility	Application Type (COIC Only) <input type="checkbox"/> Pre-Application Review <input type="checkbox"/> Development Plan Review <input checked="" type="checkbox"/> Administrative Review <input type="checkbox"/> Administrative Departures
--	--

Please utilize the applicable Supplemental Application Requirements sheet for additional submittal requirements.

II. PROPERTY INFORMATION: This section must be completed.

Property Address(es): 7673 Army Road (CB03XC053/875280)	
Tax ID/Parcel Number(s): 273-000368	Parcel Size(s) (Acres): 52.067
Existing Land Use/Development: Telecom Facility	Existing Zoning: R1

PLEASE COMPLETE THE FOLLOWING:

Describe the Existing Land Use/Development: Existing Telecommunication facility at Army Park

Describe the Request: Sprint wants to upgrade their equipment at this site. Changing antennas on the tower include 3 new panel antennas, adding 2 new cabinets, 6 new RRU's - swapping coax cables for 3 new Hybrid Fiber Optic Cables

III. CURRENT PROPERTY OWNER(S). Please attach additional sheets if needed.

Name (Individual or Organization): City of Dublin	
Mailing Address: (Street, City, State, Zip Code) 5800 Shier-Rings Road	
Daytime Telephone: 614-410-4600	Fax: 614-410-4747
Email or Alternate Contact Information: RRAYC.DUBLIN.OH.US	

RECEIVED
13-031 ARTW
MAR 27 2013

IV. APPLICANT(S): This is the person(s) who is submitting the application if different than the property owner(s) listed in part III. Please complete if applicable.

Name: <u>Bret Plante</u>	Applicant is also property owner: yes <input type="checkbox"/> no <input checked="" type="checkbox"/>
Organization (Owner, Developer, Contractor, etc.): <u>Crown Castle</u>	
Mailing Address: (Street, City, State, Zip Code) <u>11 Grandview Circle Ste 200</u>	
Daytime Telephone: <u>724-416-2383</u>	Fax: <u>724-416-4662</u>
Email or Alternate Contact Information: <u>Bret.Plante@CrownCastle.com</u>	

V. REPRESENTATIVE(S) OF APPLICANT / PROPERTY OWNER: This is the person(s) who is submitting the application on behalf of the applicant listed in part IV or property owner listed in part III. Please complete if applicable.

Name: <u>Shelley Curtner</u>	
Organization (Owner, Developer, Contractor, etc.): <u>Powder River Development</u>	
Mailing Address: (Street, City, State, Zip Code) <u>485 Metro Place S, Dublin 43017</u>	
Daytime Telephone: <u>614-389-3910</u>	Fax: <u>614-389-3914</u>
Email or Alternate Contact Information: <u>SHELLEY.CURTNER@POWDERRIVERDEV.COM</u>	

VI. AUTHORIZATION FOR OWNER'S APPLICANT or REPRESENTATIVE(S): If the applicant is not the property owner, this section must be completed and notarized.

Bret Plante, the owner, hereby authorize Powder River Development, Shelley Curtner to act as my applicant or representative(s) in all matters pertaining to the processing and approval of this application, including modifying the project. I agree to be bound by all representations and agreements made by the designated representative.

Signature of Current Property Owner: [Signature] Date: 3/25/13

Check this box if the Authorization for Owner's Applicant or Representative(s) is attached as a **COMPONENT OF PENNSYLVANIA**

Subscribed and sworn before me this 25th day of March, 2013

State of Pennsylvania

County of Washington

Notary Public

[Signature]

Notarial Seal
 Dianne L. Gerhold, Notary Public
 Canonsburg Boro, Washington County
 My Commission Expires June 9, 2016
 MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

VII. AUTHORIZATION TO VISIT THE PROPERTY: Site visits to the property by City representatives are essential to process this application. The Owner/Applicant, as noted below, hereby authorizes City representatives to visit, photograph and post a notice on the property described in this application.

I, _____, the owner or authorized representative, hereby authorize City representatives to visit, photograph and post a notice on the property described in this application.

Signature of applicant or authorized representative: _____ Date: _____

VIII. UTILITY DISCLAIMER: The Owner/Applicant acknowledges the approval of this request for review by the Dublin Planning and Zoning Commission and/or Dublin City Council does not constitute a guarantee or binding commitment that the City of Dublin will be able to provide essential services such as water and sewer facilities when needed by said Owner/Applicant.

I, SHELLEY J. CURTNER, the owner or authorized representative, acknowledge that approval of this request does not constitute a guarantee or binding commitment that the City of Dublin will be able to provide essential services such as water and sewer facilities when needed by said Owner/Applicant.

Signature of applicant or authorized representative: Shelley J. Curtner Date: 3/25/13

IX. APPLICANT'S AFFIDAVIT: This section must be completed and notarized.

I, SHELLEY CURTNER, the owner or authorized representative, have read and understand the contents of this application. The information contained in this application, attached exhibits and other information submitted is complete and in all respects true and correct, to the best of my knowledge and belief.

Signature of applicant or authorized representative: Shelley Curtner Date: 3/27/13

Subscribed and sworn to before me this 27th day of March, 2013

State of Ohio

County of Franklin

Notary Public Robyn D. Harp



Robyn D. Harp
Notary Public, State of Ohio
My Commission Expires 09-09-2014

FOR OFFICE USE ONLY			
Amount Received: <u>1835</u>	Application No: <u>13-021</u>	ART Decision:	ART Action:
Receipt No: <u>270036</u>	Map Zone:	Date Received: <u>3-27-13</u>	Received By: <u>CH</u>
Type of Request:			
N, S, E, W (Circle) Side of:			
N, S, E, W (Circle) Side of Nearest Intersection:			
Distance from Nearest Intersection:			
Existing Zoning District:			



IRISH TOWER, LLC



Samsung Telecommunications America
1301 East Lookout Dr
Richardson, TX 75082

RE: CB03XC053
Sprint Network Vision – Cluster Mount Structural Assessment

To Whom It May Concern,

This letter is to confirm Irish Tower's structural assessment of the existing Sprint antenna mounting system located at 7673 Avery Road, Dublin, OH 43017. The intent of the review is to determine if the proposed modification of antennas and equipment will exceed the structural capacity of the existing mounting system.

The existing antenna mounting system has been categorized as cluster mount. Sprint currently has three (3) existing CDMA panel antennas mounted to light pole cluster mount at a RAD elevation of eighty (80'-0") above ground level. Sprint is proposing the following step to complete the equipment upgrade:

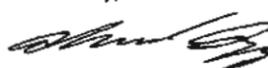
- Step 1 – Final Configuration
Sprint is proposing to install two (2) KMW ET-X-TS-70-15-62-18-iR-RD and one (1) Commscope SBCHH-1D90B panel antennas, and three (3) Samsung RRH-C2A and three (3) Samsung RRH-P4 RRU's at the same elevation as the existing antennas on the existing platform.
No interim step on this site

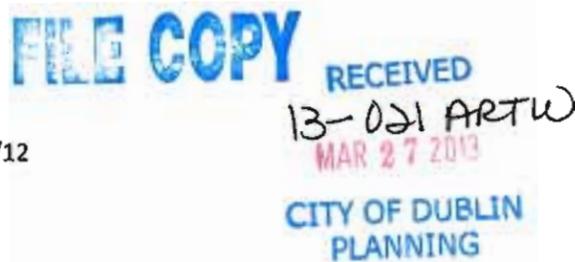
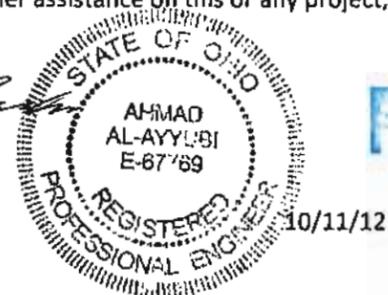
By engineering inspection, the existing antenna mounting system is capable of supporting the existing and proposed equipment without causing an overstressed condition in the mounting system.

The professional engineer certified analyses and designs are inclusive of the entire antenna structure including towers, tower platform, arms and all other aspects of the structure that will support the Sprint Network Vision equipment deployment. Note analyses and certification of the tower structure may have been performed by others and has been submitted separately.

We appreciate the opportunity of providing our continuing professional services. If you have any questions or need further assistance on this or any project, please do not hesitate to contact us.

Sincerely,


Ahmad Al-Ayyubi, P.E.
Engineering Supervisor
Aria Services, Inc.

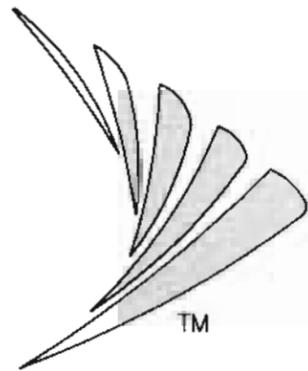


IRISH TOWER LLC, 4603 BERMUDA DR. SUGAR LAND, TX 77479



Know what's below.
Call before you dig.

Sprint®



THIS IS AN EXISTING SPRINT WIRELESS TELECOMMUNICATION FACILITY NETWORK VISION EQUIPMENT UPGRADE

NETWORK VISION MMBS LAUNCH DUBLIN FIRE STATION

CB03XC053

7673 AVERY ROAD
DUBLIN, OH 43017
FRANKLIN COUNTY



LATITUDE: 40.128000 / 40° 07' 40.8" (NAD 83) (GPS READING)
LONGITUDE: -83.162060 / -83° 09' 43.4" (NAD 83) (GPS READING)

80.0' MONOPOLE; 83.0' TOP OF LIGHTNING ROD; 77.0' PROPOSED RAD CENTER
COLUMBUS MARKET



GENERAL DYNAMICS
WIRELESS SERVICES

REV	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	10-29-12	ISSUED FOR CONSTRUCTION	JRV	DSB
2	10-29-12	MISC REVISIONS	JRV	DSB
3	10-29-12	ISSUED FOR CONSTRUCTION	JRV	DSB

BENCHMARK SERVICES, INC.
PO Box 5 318 North Main Street
Huntingburg, Indiana 47542
Phone: (812) 683-3049



LICENSURE



PROJECT INFORMATION
NETWORK VISION MMBS LAUNCH
DUBLIN FIRE STATION
CB03XC053
7673 AVERY ROAD
DUBLIN OH 43017
FRANKLIN COUNTY

JOB NO
2012-101-Benchmark Ohio Cell Towers

DRAWN BY	CHECKED BY	DATE
JRV	DSB	10-29-12

SHEET TITLE
COVER SHEET

SHEET NUMBER REV

T-1 2

ALL WORK AND MATERIALS SHALL BE PERFORMED AND 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 CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

BUILDING/DWELLING CODE 2007 OHIO BUILDING CODE (IBC 2009)
STRUCTURAL CODE 2011 OHIO BUILDING CODE (IBC 2009)
PLUMBING CODE 2011 OHIO PLUMBING CODE (IPC 2009)
MECHANICAL CODE 2011 OHIO BUILDING CODE (MCC 2009)
ELECTRICAL CODE 2011 NATIONAL ELECTRICAL CODE (NEC) - NFPA 70
FIRE/LIFE SAFETY CODE 2011 OHIO FIRE CODE (2009 IFC)

ACCESSIBILITY REQUIREMENTS.
FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS REQUIREMENTS ARE NOT REQUIRED IN ACCORDANCE WITH THE 2009 IBC BUILDING CODE

CODE BLOCK

SPRINT PROPOSES TO MODIFY AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY

- REMOVE (0) EXISTING PANEL ANTENNAS
- INSTALL (2) NEW PANEL ANTENNAS (1 PER SECTOR)
- REMOVE (0) EQUIPMENT CABINETS
- INSTALL (1) NEW MMBS CABINET
- INSTALL (1) NEW BDU CABINET
- REMOVE ALL EXISTING SPRINT ANTENNA COAXIAL CABLES
- INSTALL (3) NEW HYBRIFLEX FIBER OPTIC CABLES USING EXISTING COAX ROUTE (1 PER SECTOR)
- INSTALL (6) NEW RRUS

PROJECT DESCRIPTION

APPROVAL	SIGNATURE	DATE
SITE ACQUISITION MANAGER		
CONSTRUCTION MANAGER		
ASE MANAGER		
PLANNING CONSULTANT		
RF MANAGER		
RF ENGINEER		
PROPERTY OWNER		
SPRINT REPRESENTATIVE		
AAV MANAGER		

SIGNATURE BLOCK



AREA MAP



VICINITY MAP

1. Depart from Port Columbus International Airport, OH, travel 0.3 mi
2. Keep straight onto International Gateway, travel 1.0 mi
3. Keep right at the fork, travel 180 ft
4. Keep left at the fork, travel 0.4 mi
5. Slight left to stay on International Gateway, travel 0.3 mi
6. Take the ramp onto I-670 E, travel 1.5 mi
7. Continue onto US-52 E, travel 0.3 mi
8. Take the exit on the left onto I-270 N toward Cleveland, travel 17.8 mi
9. Take exit 17B for US-33/0H-161 W toward Mansfield, travel 0.5 mi
10. Turn right onto OH-161 W/US-33 W, travel 0.8 mi
11. Take the exit toward Avery-Murfield Dr/Dublin, travel 0.3 mi
12. Turn right onto Avery-Murfield Dr, travel 0.4 mi
13. At the traffic circle, continue straight to stay on Avery-Murfield Dr, travel 0.3 mi
14. Turn left onto Avery Rd, travel 1.3 mi
15. Turn left into parking lot, site is about 400 feet west of parking lot

DRIVING DIRECTIONS

SHEET	DESCRIPTION
T-1	TITLE SHEET
N-1	GENERAL NOTES
N-2	GENERAL NOTES
A-1	OVERALL SITE PLAN
A-2	COMPOUND & EQUIPMENT PLANS
A-3	ELEVATION & ANTENNA PLANS (ALL SECTORS)
A-4	EQUIPMENT DETAILS
A-5	EQUIPMENT DETAILS (OUTDOOR SPECIFICATIONS)
A-6	EQUIPMENT DETAILS
RF-1	ANTENNA AND CABLE COLOR CODING DETAILS
E-1	ONE-LINE DIAGRAM & POWER PANEL SCHEDULE
E-2	ELECTRICAL DETAILS
E-3	GROUNDING & ROUTING PLANS
E-4	GROUNDING DETAILS
E-5	GROUNDING DETAILS

SHEET INDEX

APPLICANT:
GENERAL DYNAMICS ON
BEHALF OF SPRINT
77 'A' STREET NEEDHAM, MA 02494
CONTACT TO BE DETERMINED
PHONE # TO BE DETERMINED

PROPERTY INFORMATION:
PROPERTY OWNER CROWN CASTLE INTL
ADDRESS 2000 CORPORATE DR
CANNONSBURG PA 15317
CONTACT TARA RUNION
PHONE # 502 318-1342
TOWER OWNER CROWN CASTLE INTL
SITE ID 875287

ZONING CLASSIFICATION OPEN
CONSTRUCTION TYPE V5
OCCUPANCY UNMANNED
JURISDICTION OH-CITY OF DUBLIN
CURRENT USE UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
NEW USE UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY

PARCEL NUMBER (S)
TO BE DETERMINED

LEASE AREA
120 SFT

PROJECT SUMMARY

ENGINEER
COMPANY BENCHMARK SERVICES, INC
STREET ADDRESS 318 NORTH MAIN STREET
CITY/STATE/ZIP HUNTINGBURG, IN 47542
CONTACT GARY VAN WANKLE
PHONE # 812-683-3049
EMAIL BENCHMARK@INSIGHTBB.COM

STRUCTURAL ENGINEER
COMPANY CROWN CASTLE INTL
STREET ADDRESS 2000 CORPORATE DR
CANNONSBURG, PA 15317
CONTACT TARA RUNION
PHONE # 502-318-1342

SITE ACQ. PROJECT MANAGER:
COMPANY GENERAL DYNAMICS INFORMATION TECHNOLOGY
STREET ADDRESS 921 EASTWIND DRIVE, SUITE 112
CITY/STATE/ZIP WESTERVILLE, OH 43081
CONTACT JULIANNE MOTT
PHONE # 612-212-6255
EMAIL JULIANNE.MOTT@GDI.COM

CONSTRUCTION MANAGER
COMPANY GENERAL DYNAMICS INFORMATION TECHNOLOGY
STREET ADDRESS 921 EASTWIND DRIVE, SUITE 112
CITY/STATE/ZIP WESTERVILLE, OH 43081
CONTACT DAN ENTLEER
PHONE # 248-207-3638
EMAIL DAN.ENTLEER@GDI.COM

BUILDING DEPARTMENT:
COMPANY DUBLIN LAND USE AND LONG RANGE PLANNING
CONTACT DAVE MARSHALL, REVIEW SERVICES ANALYST
PHONE # 614-418-4864
EMAIL DMARSHALL@DUBLIN.OH.US

ELECTRICAL COMPANY
COMPANY OHIO EDISON
PHONE # 855-544-4677

TELCO COMPANY:
COMPANY AMERITECH
STREET ADDRESS 46375 GRANT STREET
CITY/STATE/ZIP ROGERS, OH 44455
PHONE # 800-896-0123

RF ENGINEER
COMPANY SAMSUNG TECHNOLOGIES OF AMERICA
STREET ADDRESS 27007 HILLS TECH DRIVE
CITY/STATE/ZIP FARMINGTON HILLS MI 48331
CONTACT JOE WERTHER
PHONE # 483-247-1171
EMAIL JOE.WERTHER@SAMSUNG.COM



PROJECT TEAM

GENERAL CONSTRUCTION NOTES

- ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE LOCAL BUILDING CODE, THE LATEST EDITION AND ALL OTHER APPLICABLE CODES AND ORDINANCES.
- CONTRACTOR SHALL CONSTRUCT SITE IN ACCORDANCE WITH THESE DRAWINGS AND SPRINT INTEGRATED CONSTRUCTION STANDARDS FOR WIRELESS SITES (LATEST REVISION). THE SPECIFICATION IS THE RULING DOCUMENT AND ANY DISCREPANCIES BETWEEN THE SPECIFICATION AND THESE DRAWINGS SHOULD BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.
- CONTRACTOR SHALL VISIT THE JOB SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE NEW WORK AND SHALL MAKE PROVISIONS AS TO THE COST THEREOF. FIELD CONDITIONS AND DIMENSIONS AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK. NO COMPENSATION WILL BE AWARDED BASED ON CLAIM OF LACK OF KNOWLEDGE OF FIELD CONDITIONS.
- PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT AND APPURTENANCES, AND LABOR NECESSARY TO EFFECT ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS OTHERWISE NOTED. SPACING BETWEEN EQUIPMENT IS REQUIRED CLEARANCE. THEREFORE, IT IS CRITICAL TO FIELD VERIFY DIMENSIONS, SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE WORK.
- DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.
- CONTRACTOR SHALL RECEIVE CLARIFICATION IN WRITING, AND SHALL RECEIVE IN WRITING AUTHORIZATION TO PROCEED BEFORE STARTING WORK ON ANY ITEMS NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONTRACT DOCUMENTS.
- CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK USING THE BEST CONSTRUCTION SKILLS AND ATTENTION. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER CONTRACT, UNLESS OTHERWISE NOTED.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFORM TO ALL OSHA REQUIREMENTS.
- CONTRACTOR SHALL COORDINATE HIS WORK WITH THE SUPERINTENDENT OF BUILDINGS & GROUNDS AND SCHEDULE HIS ACTIVITIES AND WORKING HOURS IN ACCORDANCE WITH THE REQUIREMENTS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS WORK WITH THE WORK OF OTHERS AS IT MAY RELATE TO RADIO EQUIPMENT, ANTENNAS AND ANY OTHER PORTIONS OF THE WORK.
- INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS UNLESS SPECIFICALLY OTHERWISE INDICATED OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.
- MAKE NECESSARY PROVISIONS TO PROTECT EXISTING SURFACES, EQUIPMENT, IMPROVEMENTS, PIPING ETC. AND IMMEDIATELY REPAIR ANY DAMAGE THAT OCCURS DURING CONSTRUCTION.
- IN DRILLING HOLES INTO CONCRETE WHETHER FOR FASTENING OR ANCHORING PURPOSES, OR PENETRATIONS THROUGH THE FLOOR FOR CONDUIT RUNS, PIPE RISERS, ETC., MUST BE CLEARLY UNDERSTOOD THAT REINFORCING STEEL SHALL NOT BE DRILLED INTO, CUT OR DAMAGED UNDER ANY CIRCUMSTANCES (UNLESS NOTED OTHERWISE). LOCATIONS OF REINFORCING STEEL ARE NOT DEFINITELY KNOWN AND THEREFORE MUST BE SEARCHED FOR BY APPROPRIATE METHODS AND EQUIPMENT.
- REPAIR ALL EXISTING WALL SURFACES DAMAGED DURING CONSTRUCTION SUCH THAT THEY MATCH AND BLEND IN WITH ADJACENT SURFACES.
- SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH U.L. LISTED AND FIRE CODE APPROVED MATERIALS.
- KEEP CONTRACT AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DIRT, DEBRIS, AND RUBBISH. EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY OF THE OWNER SHALL BE REMOVED, LEAVE PREMISES IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, OIL, OR SMUDGES OF ANY NATURE. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL ITEMS UNTIL COMPLETION OF CONSTRUCTION.
- MINIMUM BEND RADIUS OF ANTENNA CABLES SHALL BE IN ACCORDANCE WITH CABLE MANUFACTURERS RECOMMENDATIONS.
- 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 THE ENGINEER.
- CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION SHALL BE IN CONFORMANCE WITH JURISDICTIONAL OR STATE AND LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL AND COORDINATED WITH LOCAL REGULATORY AUTHORITIES.
- LIGHT SHADED LINES AND NOTES REPRESENT WORK PREVIOUSLY DONE. DARK SHADED LINES AND NOTES REPRESENT THE SCOPE OF WORK FOR THIS PROJECT. CONTRACTOR SHALL VERIFY IF EXISTING CONSTRUCTION IS COMPLETE. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY EXISTING CONDITIONS THAT DEVIATE FROM THE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.
- CONTRACTOR SHALL SECURE ALL NECESSARY PERMITS AND/OR WRITING CERTIFICATES REQUIRED FOR THE ELECTRICAL SERVICE UPGRADE. IN ADDITION, CONTRACTOR SHALL PROVIDE ALL NECESSARY COORDINATION AND SCHEDULING WITH THE SERVING ELECTRICAL UTILITY AND LOCAL INSPECTION AUTHORITIES.

ELECTRICAL NOTES

- ELECTRICAL CONTRACTOR SHALL SUPPLY AND INSTALL ANY/ALL ELECTRICAL WORK INDICATED. ANY/ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH DRAWINGS AND ANY/ALL APPLICABLE SPECIFICATIONS. IF ANY PROBLEMS ARE ENCOUNTERED BY COMPLYING WITH THESE REQUIREMENTS, CONTRACTOR SHALL NOTIFY "CONSTRUCTION MANAGER" AS SOON AS POSSIBLE, AFTER THE DISCOVERY OF THE PROBLEMS, AND SHALL NOT PROCEED WITH THAT PORTION OF WORK, UNTIL THE "CONSTRUCTION MANAGER" HAS DIRECTED THE CORRECTIVE ACTIONS TO BE TAKEN.
- ELECTRICAL CONTRACTOR SHALL VISIT THE JOB SITE AND FAMILIARIZE HIMSELF WITH ANY/ALL CONDITIONS AFFECTING ELECTRICAL AND COMMUNICATION INSTALLATION AND MAKE PROVISIONS AS TO THE COST THEREOF. ALL EXISTING CONDITIONS OF ELECTRICAL EQUIP., LIGHT FIXTURES, ETC., THAT ARE PART OF THE FINAL SYSTEM, SHALL BE VERIFIED BY THE CONTRACTOR, PRIOR TO THE SUBMITTAL OF HIS BID. FAILURE TO COMPLY WITH THIS PARAGRAPH WILL IN NO WAY RELIEVE CONTRACTOR OF PERFORMING ALL WORK NECESSARY FOR A COMPLETE AND WORKING SYSTEM.
- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITION OF THE NEC AND ALL CODES AND LOCAL ORDINANCES OF THE LOCAL POWER & TELEPHONE COMPANIES HAVING JURISDICTION AND SHALL INCLUDE BUT NOT BE LIMITED TO:
 - A. UL -- UNDERWRITERS LABORATORIES
 - B. NEC -- NATIONAL ELECTRICAL CODE
 - C. NEMA -- NATIONAL ELECTRICAL MANUFACTURERS ASSOC.
 - D. OSHA -- OCCUPATIONAL SAFETY AND HEALTH ACT
 - E. IBC -- INTERNATIONAL BUILDING CODE
 - F. NFPA -- NATIONAL FIRE CODES

- DO NOT SCALE ELECTRICAL DRAWINGS, REFER TO SITE PLANS AND ELEVATIONS FOR EXACT LOCATIONS OF ALL EQUIPMENT, AND CONFIRM WITH "CONSTRUCTION MANAGER" ANY SIZES AND LOCATIONS WHEN NEEDED.
- EXISTING SERVICES: CONTRACTOR SHALL NOT INTERRUPT EXISTING SERVICES WITHOUT WRITTEN PERMISSION OF THE GOIT.
- CONTRACTOR SHALL PAY FOR ANY/ALL PERMITS, FEES, INSPECTIONS AND TESTING. CONTRACTOR IS TO OBTAIN PERMITS AND APPROVED SUBMITTALS PRIOR TO THE WORK BEGINNING OR ORDERING EQUIPMENT.
- THE TERM "PROVIDE" USED IN CONSTRUCTION DOCUMENTS AND SPECIFICATIONS, INDICATES THAT THE CONTRACTOR SHALL FURNISH AND INSTALL.
- CONTRACTOR SHALL CONFIRM WITH LOCAL UTILITY COMPANY ANY/ALL REQUIREMENTS SUCH AS THE: LUG SIZE RESTRICTIONS, CONDUIT ENTRY, SIZE OF TRANSFORMERS, SCHEDULED DOWNTIME FOR THE OWNERS' CONFIRMATION, ETC. ANY/ALL CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE CONSTRUCTION MANAGER, PRIOR TO BEGINNING ANY WORK.
- MINIMUM WIRE SIZE SHALL BE #12 AWG, NOT INCLUDING CONTROL WIRING, UNLESS NOTED OTHERWISE. ALL CONDUCTORS SHALL BE COPPER WITH THIN INSULATION.
- OUTLET BOXES SHALL BE PRESSED STEEL IN DRY LOCATIONS, CAST ALLOY WITH THREADED HUBS IN WET/DAMP LOCATIONS AND SPECIAL ENCLOSURES FOR OTHER CLASSIFIED AREAS.
- IT IS NOT THE INTENT OF THESE PLANS TO SHOW EVERY MINOR DETAIL OF THE CONSTRUCTION. CONTRACTOR IS EXPECTED TO FURNISH AND INSTALL ALL ITEMS FOR A COMPLETE ELECTRICAL SYSTEM AND PROVIDE ALL REQUIREMENTS FOR THE EQUIPMENT TO BE PLACED IN PROPER WORKING ORDER.
- ELECTRICAL SYSTEM SHALL BE AS COMPLETELY AND EFFECTIVELY GROUNDED, AS REQUIRED BY SPECIFICATION, SET FORTH BY SPRINT.
- ALL WORK SHALL BE PERFORMED BY A LICENSED ELECTRICAL CONTRACTOR BY A FIRST CLASS, WORKMANLIKE MANNER. THE COMPLETED SYSTEM SHALL BE FULL OPERATIVE AND SUBJECT TO REGULATORY INSPECTION AND APPROVAL BY CONSTRUCTION MANAGER.
- ALL WORK SHALL BE COORDINATED WITH OTHER TRADES TO AVOID INTERFERENCE WITH THE PROGRESS OF CONSTRUCTION.
- CONTRACTOR SHALL GUARANTEE ANY/ALL MATERIALS AND WORK FREE FROM DEFECTS OR A PERIOD OF NOT LESS THAN TWO YEARS FROM DATE OF CUSTOMER'S ACCEPTANCE.
- THE CORRECTION OF ANY DEFECTS SHALL BE COMPLETED WITHOUT ANY ADDITIONAL CHARGE AND SHALL INCLUDE THE REPLACEMENT OF THE REPAIR OF ANY OTHER PHASE OF THE INSTALLATION, WHICH MAY HAVE BEEN DAMAGED THEREIN WITHIN 48 HOURS.
- ADEQUATE AND REQUIRED LIABILITY INSURANCE SHALL BE PROVIDED FOR PROTECTION AGAINST PUBLIC LOSS AND ANY/ALL PROPERTY DAMAGE FOR THE DURATION OF WORK.
- PROVIDE AND INSTALL CONDUIT, CONDUCTORS, PULL WIRES, BOXES, COVER PLATES AND DEVICES FOR ALL OUTLETS AS INDICATED.
- DITCHING AND BACK FILL: CONTRACTOR SHALL PROVIDE FOR ALL UNDERGROUND INSTALLED CONDUIT AND/OR CABLES INCLUDING EXCAVATION AND BACKFILLING AND COMPACTION REFER TO NOTES AND REQUIREMENTS, EXCAVATION, AND BACKFILLING.
- MATERIALS, PRODUCTS AND EQUIPMENT, INCLUDING ALL COMPONENTS THEREOF, SHALL BE NEW AND SHALL APPEAR ON THE LIST OF U.L. APPROVED ITEMS AND SHALL MEET OR EXCEED THE REQUIREMENTS OF THE NEC, NEMA AND IEEE.
- CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OR MANUFACTURERS CATALOG INFORMATION OF ANY/ALL LIGHTING FIXTURES, SWITCHES AND ALL OTHER ELECTRICAL ITEMS FOR APPROVAL BY THE CONSTRUCTION MANAGER PRIOR TO INSTALLATION.
- ANY CUTTING OR PATCHING DEEMED NECESSARY FOR ELECTRICAL WORK IS THE ELECTRICAL CONTRACTORS RESPONSIBILITY AND SHALL BE INCLUDED IN THE COST FOR WORK AND PERFORMED TO THE SATISFACTION OF THE "CONSTRUCTION MANAGER" UPON FINAL ACCEPTANCE.
- THE ELECTRICAL CONTRACTOR SHALL LABEL ALL PANELS WITH ONLY TYPEWRITTEN DIRECTORIES. ALL ELECTRICAL WIRING SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
- DISCONNECT SWITCHES SHALL BE N.E.C. RATED HEAVY-DUTY, QUICK-MAKE AND QUICK-BREAK ENCLOSURES, AS REQUIRED BY EXPOSURE TYPE.
- ALL CONNECTIONS SHALL BE MADE WITH A PROTECTIVE COATING OF AN ANTI-OXIDE COMPOUND SUCH AS "NO-OXIDE A" BY DEARBORNE CHEMICAL CO. COAT ALL WIRE SURFACES BEFORE CONNECTING. EXPOSED COPPER SURFACES, INCLUDING GROUND BARS, SHALL BE TREATED - NO SUBSTITUTIONS.
- REACEWAYS: CONDUIT SHALL BE SCHEDULE 40 PVC MEETING OR EXCEEDING NEMA TC2 - 1890. CONTRACTOR SHALL PLUG AND CAP EACH END OF SPARE AND EMPTY CONDUITS AND PROVIDE TWO SEPARATE PULL STRINGS -- 200 LBS TEST POLYETHYLENE CORD. ALL CONDUIT BENDS SHALL BE A MINIMUM OF 2 FT. RADIUS. RGS CONDUITS WHEN SPECIFIED, SHALL MEET UL-6 FOR GALVANIZED STEEL. ALL FITTINGS SHALL BE SUITABLE FOR USE WITH THREADED RIGID CONDUIT. COAT ALL THREADS WITH "BRITZ ZINC" OR "GOLD CALV".
- SUPPORT OF ALL ELECTRICAL WORK SHALL BE AS REQUIRED BY NEC.
- CONDUCTORS: CONTRACTOR SHALL USE 98% CONDUCTIVITY COPPER WITH TYPE THIN INSULATION, 600 VOLT, COLOR CODED, USE SOLID CONDUCTORS FOR WIRE UP TO AND INCLUDING NO. 8 AWG. USE STRANDED CONDUCTORS FOR WIRE ABOVE NO. 8 AWG.
- CONNECTORS FOR POWER CONDUCTORS: CONTRACTOR SHALL USE PRESSURE TYPE INSULATED TWIST-ON CONNECTORS FOR NO. 10 AWG AND SMALLER. USE SOLDERLESS MECHANICAL TERMINAL LUGS FOR NO. 8 AWG AND LARGER.
- SERVICE: 240/120V, SINGLE PHASE, 3 WIRE CONNECTIONS AVAILABLE FROM UTILITY COMPANY. OWNER OR OWNERS AGENT WILL APPLY FOR POWER.
- TELEPHONE SERVICE: CONTRACTOR SHALL PROVIDE EMPTY CONDUITS WITH MULE TAPE AS INDICATED ON DRAWINGS.
- ELECTRICAL AND TELCO RACEWAYS TO BE BURIED A MINIMUM OF 2' DEPTH.
- CONTRACTOR SHALL PLACE TWO LENGTHS OF WARNING TAPE AT A DEPTH OF 12" BELOW GROUND AND DIRECTLY ABOVE ELECTRICAL AND TELCO SERVICE CONDUITS. CAUTIONS TAPE TO READ "CAUTION BURIED ELECTRIC" OR "BURIED TELCO".
- ALL BOLTS SHALL BE STAINLESS STEEL.

ANTENNA & COAX NOTES

- VERIFY EACH COAXIAL CABLE LENGTH, DIAMETER, ROUTING, COLOR CODING AND ALL APPURTENANCES WITH GOIT.
- THE MAXIMUM COAXIAL CABLE LENGTH AND CORRESPONDING COAXIAL CABLE DIAMETER IS SHOWN ON SHEET A-4. THIS CABLE LENGTH IS TO BE USED FOR FABRICATION OR CONSTRUCTION. ACTUAL ANTENNA CABLE LENGTH(S) MUST BE VERIFIED. COAXIAL CABLE SHALL BE PROVIDED BY GOIT.
- ALL COAX CABLES SHALL UTILIZE GROUND KITS, GROUNDED AS FOLLOWS:
 - A. NEAR ANTENNA RAD CENTER ELEVATION.
 - B. MIDDLE OF TOWER (MID-HIGH OF ANTENNA), IF CABLE RUN IS OVER 200'.
 - C. BOTTOM OF TOWER.
 - D. AT MASTER GROUND BAR 3'-0" FROM MMBS-BBU CABINET

- ALL TOP JUMPERS SHALL BE LENGTHS AS SHOWN AND INSTALLED BY CONTRACTOR.
- ALL CABLES SHALL BE COLOR CODED AS SHOWN ON SHEET RF-1 AND IN ACCORDANCE WITH SPRINT SPECIFICATIONS.
- BANDING SHALL BE IN ACCORDANCE WITH SHEET A-4, RF-1 AND AS FOLLOWS:
 - A. MAIN LINE COLOR BANDS SHALL BE 2" WIDE. MAINTAIN 1" SPACING BETWEEN COLORS.
 - B. FREQUENCY COLOR BANDS SHALL BE 2" WIDE WITH NO SPACE BETWEEN COLORS.
 - C. JUMPER COLOR BANDS SHALL BE 1" WIDE WITH 1" SPACE.
 - D. START COLOR BANDS 2" BEYOND WEATHERPROOFING.
 - E. START SELECTOR COLOR NEXT TO END CONNECTORS.
- FINAL COAXIAL ANTENNA CABLE SIZES SHALL BE DETERMINED BY SAMSUNG RF ENGINEER. SEE ANTENNA SCHEDULE SHEET A-4, BASED ON FINAL CABLE RUN LENGTHS DETERMINED BY GO.
- SEE CONSTRUCTION MANAGER FOR ANTENNA SUPPORT ASSEMBLY TYPE.
- ALL COAXIAL CABLE WILL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE AT DISTANCES NOT TO EXCEED 3' OR THE CABLE MANUFACTURERS SPECIFICATIONS WHICHEVER IS LESS, WITH HARDWARE SPECIFIED IN THE COAXIAL CABLE ROUTING DETAILS OF THE SUPPLIED STRUCTURAL REPORT.
- PROVIDE AT LEAST 6" OF SLACK IN THE MAIN COAXIAL CABLES AT THE ANTENNA MOUNTING ELEVATION TO PROVIDE FOR FUTURE CONNECTOR REPLACEMENT.

ANTENNA & HYBRID CABLE NOTES

- VERIFY EACH HYBRID CABLE LENGTH, ROUTING, DIAMETER, COLOR CODING AND ALL APPURTENANCES WITH GOIT.
- THE HYBRID CABLE AND DIAMETER LENGTH IS SHOWN ON A-4. EXCESS CABLE LENGTHS TO BE DRESSED IN A MANNER APPROVED BY GOIT. CABLES CANNOT BE CUT TO FIT.
- HYBRID CABLE INTERNAL GROUND WIRE TO BE GROUNDED AT TOP AND BOTTOM PER SAMSUNG'S (SPRINT) SPECIFICATIONS.
- EXCESS TOP 15' HYBRID CABLE FIBER JUMPERS TO BE DRESSED IN A MANNER APPROVED BY GOIT. CANNOT BE COILED, MUST BE SECURED TO TOWER MOUNTS..
- ALL MAIN CABLES SHALL BE COLOR CODED AS SHOWN ON SHEET RF-1 & IN ACCORDANCE WITH SPRINT SPECIFICATIONS.
- BANDING SHALL BE IN ACCORDANCE WITH SHEET A-4, RF-1.
 - A. MAIN LINE COLOR BANDS SHALL BE 2" WIDE. MAINTAIN 1" SPACING BETWEEN.
 - B. JUMPER COLOR BANDS SHALL BE 1" WIDE WITH 1" SPACE.
 - C. START COLOR BANDS 2" BEFORE MAIN CABLE END.
- FINAL HYBRID CABLE SIZES SHALL BE DETERMINED BY SAMSUNG RF ENGINEER. SEE HYBRID CABLE SCHEDULE SHEET RF-1, BASED ON FINAL CABLE RUN LENGTHS DETERMINED BY GOIT.
- ALL HYBRID CABLE WILL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE AT DISTANCES NOT TO EXCEED 3' HORIZONTALLY OR 4' VERTICALLY OR THE CABLE MANUFACTURER'S SPECIFICATIONS WHICHEVER IS LESS, WITH HARDWARE SPECIFIED IN THE HYBRID CABLE ROUTING DETAILS OF THE SUPPLIED STRUCTURAL SUPPORT.

SITE WORK NOTES

- DO NOT EXCAVATE OR DISTURB BEYOND THE PROPERTY LINES OR LEASE LINES, UNLESS OTHERWISE NOTED.
- DO NOT SCALE BUILDING DIMENSIONS FROM DRAWING.
- SIZE, LOCATION AND TYPE OF ANY UNDERGROUND UTILITIES OR IMPROVEMENTS SHALL BE ACCURATELY NOTED AND PLACED ON AS-BUILT DRAWINGS BY GENERAL CONTRACTOR AND ISSUED TO ARCHITECT/ENGINEER AT COMPLETION OF PROJECT.
- ALL EXISTING UTILITIES, FACILITIES, CONDITIONS AND THEIR DIMENSIONS SHOWN ON PLANS HAVE BEEN PLOTTED FROM AVAILABLE RECORDS. THE ENGINEER AND OWNER ASSUME NOT RESPONSIBILITY WHATSOEVER AS TO THE SUFFICIENCY OR ACCURACY OF THE INFORMATION SHOWN ON THE PLANS OR THE MANNER OF THEIR REMOVAL OR ADJUSTMENT. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL EXISTING UTILITIES AND FACILITIES PRIOR TO START OF CONSTRUCTION. CONTRACTOR SHALL ALSO OBTAIN FROM EACH UTILITY COMPANY DETAILED INFORMATION RELATIVE TO WORKING SCHEDULES AND METHODS OF REMOVING OR ADJUSTING EXISTING UTILITIES.
- CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES BOTH HORIZONTALLY AND VERTICALLY PRIOR TO START OF CONSTRUCTION. ANY DISCREPANCIES OR DOUBTS AS TO THE INTERPRETATION OF PLANS SHALL BE IMMEDIATELY REPORTED TO THE ARCHITECT/ENGINEER FOR RESOLUTION AND INSTRUCTION, AND NO FURTHER WORK SHALL BE PERFORMED UNTIL THE DISCREPANCY IS CHECKED AND CORRECTED BY THE ARCHITECT/ENGINEER. FAILURE TO SECURE SUCH INSTRUCTION MEANS CONTRACTOR WILL HAVE WORKED AT HIS/HER OWN RISK AND EXPENSE.
- CONTRACTOR SHALL CALL LOCAL DIGGER HOT LINE FOR UTILITY LOCATIONS 48 HOURS PRIOR TO START OF CONSTRUCTION.
- ALL NEW AND EXISTING UTILITY STRUCTURES ON SITE AND IN AREAS TO BE DISTURBED BY CONSTRUCTION SHALL BE ADJUSTED TO FINISH ELEVATIONS PRIOR TO FINAL INSPECTION OF WORK.
- GRADING OF THE SITE WORK AREA IS TO BE SMOOTH AND CONTINUOUS IN SLOPE AND IS TO FEATHER INTO EXISTING GRADES AT THE GRADING LIMITS.
- ALL TEMPORARY EXCAVATIONS FOR THE INSTALLATION OF FOUNDATIONS, UTILITIES, ETC., SHALL BE PROPERLY LAID BACK OR BRACED IN ACCORDANCE WITH CORRECT OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) REQUIREMENTS.
- STRUCTURAL FILLS SUPPORTING PAVEMENTS SHALL BE COMPACTED TO 95% OF MAXIMUM STANDARD PROCTOR DRY DENSITY.
- NEW GRADES NOT IN BUILDING AND DRIVEWAY IMPROVEMENT AREA TO BE ACHIEVED BY FILLING WITH APPROVED CLEAN FILL AND COMPACTED TO 95% OF STANDARD PROCTOR DENSITY.
- ALL FILL SHALL BE PLACED IN UNIFORM LIFTS. THE LIFTS THICKNESS SHOULD NOT EXCEED THAT WHICH CAN BE PROPERLY COMPACTED THROUGHOUT ITS ENTIRE DEPTH WITH THE EQUIPMENT AVAILABLE.
- ANY FILLS PLACED ON EXISTING SLOPES THAT ARE STEEPER THAN 10 HORIZONTAL TO 1 VERTICAL SHALL BE PROPERLY BENCHED INTO THE EXISTING SLOPE AS DIRECTED BY A GEOTECHNICAL ENGINEER.
- CONTRACTOR SHALL CLEAN ENTIRE SITE DAILY AFTER CONSTRUCTION SUCH THAT NO PAPERS, TRASH, WEEDS, BRUSH OR ANY OTHER DEPOSITS WILL REMAIN. ALL MATERIALS COLLECTED DURING CLEANING OPERATIONS SHALL BE DISPOSED OF OFF-SITE BY THE GENERAL CONTRACTOR.
- ALL TREES AND SHRUBS WHICH ARE NOT IN DIRECT CONFLICT WITH THE IMPROVEMENTS SHALL BE PROTECTED BY THE GENERAL CONTRACTOR.
- ALL SITE WORK SHALL BE CAREFULLY COORDINATED BY GENERAL CONTRACTOR WITH LOCAL UTILITY COMPANY, TELEPHONE COMPAY, AND ANY OTHER UTILITY COMPANIES HAVING JURISDICTION OVER THIS LOCATOR.



GENERAL DYNAMICS WIRELESS SERVICES

REV	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	1-23-12	FINAL REVISION	JRV	DSB
2	10-30-12	MISC REVISIONS	JRV	DSB
3	10-22-12	AS-BUILT FOR CONSTRUCTION	JRV	DSB

BENCHMARK SERVICES, INC.
 PO Box 5 318 North Main Street
 Huntingburg, Indiana 47542
 Phone: (812) 683-3049

M CROWN CASTLE
 BUN # 875287

LICENSURE

STATE OF OHIO
 RALPH M. WALLEM
 E-67208
 REGISTERED PROFESSIONAL ENGINEER

Ralph M. Wallem

PROJECT INFORMATION
NETWORK VISION MMBS LAUNCH
DUBLIN FIRE STATION
 CB03XC053
 7673 AVERY ROAD
 DUBLIN, OH 43017
 FRANKLIN COUNTY

JOB NO
2012-101-Benchmark Ohio Cell Towers

DRAWN BY JRV	CHECKED BY DSB	DATE 10-29-12
-----------------	-------------------	------------------

SHEET TITLE
GENERAL NOTES

SHEET NUMBER N-1	REV 2
----------------------------	-----------------

0. IN THIS SET OF CONSTRUCTION DOCUMENTS, UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE TO FINISH SURFACES UNLESS OTHERWISE NOTED. ANY USE OF DIMENSIONS OTHER THAN THOSE SHOWN IN THESE DRAWINGS IS STRICTLY PROHIBITED.

FOUNDATION, EXCAVATION AND BACKFILL NOTES

- ALL FINAL GRADED SLOPES SHALL BE A MAXIMUM OF 3 HORIZONTAL TO 1 VERTICAL.
- ALL EXCAVATIONS PREPARED FOR PLACEMENT OF CONCRETE SHALL BE OF UNDISTURBED SOILS, SUBSTANTIALLY HORIZONTAL AND FREE FROM ANY LOOSE, UNSUITABLE MATERIAL OR FROZEN SOILS, AND WITHOUT THE PRESENCE OF POUNDING WATER. DEWATERING FOR EXCESS GROUND WATER SHALL BE PROVIDED WHEN REQUIRED. COMPACTION OF SOILS UNDER CONCRETE PAD FOUNDATIONS SHALL NOT BE LESS THAN 95% OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY FOR THE SOIL IN ACCORDANCE WITH ASTM D1557.
- CONCRETE FOUNDATIONS SHALL NOT BE PLACED ON ORGANIC OR UNSUITABLE MATERIAL IF INADEQUATE BEARING CAPACITY IS REACHED AT THE DESIGNED EXCAVATION DEPTH, THE UNSATISFACTORY SOIL SHALL BE EXCAVATED TO ITS FULL DEPTH AND EITHER BE REPLACED WITH MECHANICALLY COMPACTED GRANULAR MATERIAL OR THE EXCAVATION SHALL BE FILLED WITH CONCRETE OF THE SAME TYPE SPECIFIED FOR THE FOUNDATION. CRUSHED STONE MAY BE USED TO STABILIZE THE BOTTOM OF THE EXCAVATION. ANY STONE SUB BASE MATERIAL, IF USED, SHALL NOT SUBSTITUTE FOR REQUIRED THICKNESS OF CONCRETE.
- ALL EXCAVATIONS SHALL BE CLEAN OF UNSUITABLE MATERIAL SUCH AS VEGETATION, TRASH, DEBRIS, AND SO FORTH PRIOR TO BACK FILLING. BACK FILL SHALL CONSIST OF APPROVED MATERIALS SUCH AS EARTH, LOAM SANDY CLAY, SAND AND GRAVEL, OR SOFT SHALE, FREE FROM CLODS OR LARGE STONES OVER 2 1/2" MAX DIMENSIONS. ALL BACK FILL SHALL BE PLACED IN COMPACTED LAYERS.
- ALL FILL MATERIALS AND FOUNDATION BACK FILL SHALL BE PLACED MAXIMUM 8" THICK LIFTS BEFORE COMPACTION. EACH LIFT SHALL BE WETTED IF REQUIRED AND COMPACTED TO NOT LESS THAN 95% OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY FOR SOIL IN ACCORDANCE WITH ASTM D1557.
- NEWLY PLACED CONCRETE FOUNDATIONS SHALL CURE A MINIMUM OF 72 HRS PRIOR TO BACK FILLING.
- FINISHED GRADING SHALL BE SLOPED TO PROVIDE POSITIVE DRAINAGE AND PREVENT STANDING WATER. THE FINAL (FINISH) ELEVATION OF SLAB FOUNDATIONS SHALL SLOPE AWAY IN ALL DIRECTIONS FROM THE CENTER. FINISH GRADE OF CONCRETE PADS SHALL BE A MAXIMUM OF 4 INCHES ABOVE FINAL FINISH GRADE ELEVATIONS. PROVIDE SURFACE FILL GRAVEL TO ESTABLISH SPECIFIED ELEVATIONS WHERE REQUIRED.
- NEWLY GRADED SURFACE AREAS TO RECEIVE GRAVEL SHALL BE COVERED WITH GEOTEXTILE FABRIC TYPE: TYPAR-340 AS MANUFACTURED BY CONSTRUCTION MATERIAL 1-800-239-3841 OR AN APPROVED EQUIVALENT. SHOWING ON PLANS. THE GEOTEXTILE FABRIC SHALL BE BLACK BY COLOR TO CONTROL THE OCCURRENCE OF VEGETATIVE GROWTH AND EXTEND TO WITHIN 1 FOOT OUTSIDE THE SITE FENCING OR ELECTRICAL GROUNDING SYSTEM PERIMETER WHICH EVER IS GREATER. ALL FABRIC SHALL BE COVERED WITH A MINIMUM OF 4" DEEP COMPACTED STONE OR GRAVEL AS SPECIFIED. I.E. FOOT TYPE No. 57 FOR FENCED COMPOUND; FOOT TYPE No. 67 FOR ACCESS DRIVE AREA.
- IN ALL AREAS TO RECEIVE FILL REMOVE ALL VEGETATION, TOPSOIL, DEBRIS, WET AND UNSATISFACTORY SOIL MATERIALS, OBSTRUCTIONS, AND DELETERIOUS MATERIALS FROM GROUND SURFACE. PLOW STRIP OR BREAK UP SLOPED SURFACES STEEPER THAN 1 VERTICAL TO 4 HORIZONTAL SUCH THAT FILL MATERIAL WILL BIND WITH EXISTING/PREPARED SOIL SURFACE.
- WHEN SUB GRADE OR PREPARED GROUND SURFACE HAS A DENSITY LESS THAN THAT REQUIRED FOR THE FILL MATERIAL, SCARIFY THE GROUND SURFACE TO DEPTH REQUIRED, PULVERIZE, MOISTURE CONDITION AND/OR AERATE THE SOILS AND RE-COMPACT TO THE REQUIRED DENSITY PRIOR TO PLACEMENT OF FILLS.
- IN AREAS WHICH EXISTING GRAVEL SURFACING IS REMOVED OR DISTURBED DURING CONSTRUCTION OPERATIONS, REPLACE GRAVEL SURFACING TO MATCH ADJACENT GRAVEL SURFACING AND RESTORED TO THE SAME THICKNESS AND COMPACTION AS SPECIFIED. ALL RESTORED GRAVEL SURFACING SHALL BE FREE FROM CORRUGATIONS AND WAVES.
- EXISTING GRAVEL SURFACING MAY BE EXCAVATED SEPARATELY AND REUSED WITH THE CONDITION THAT ANY UNFAVORABLE AMOUNTS OF ORGANIC MATTER, OR OTHER DELETERIOUS MATERIALS ARE REMOVED PRIOR TO REUSE. FURNISH ANY ADDITIONAL GRAVEL RESURFACING MATERIAL AS NEEDED TO PROVIDE A FULL DEPTH COMPACTED SURFACE THROUGHOUT SITE.
- GRAVEL SUB SURFACE SHALL BE PREPARED TO REQUIRED COMPACTION AND SUB GRADE ELEVATIONS BEFORE GRAVEL SURFACING IS PLACED AND/OR RESTORED. ANY LOOSE OR DISTURBED MATERIALS SHALL BE THOROUGHLY COMPACTED AND ANY DEPRESSIONS IN THE SUB GRADE SHALL BE FILLED AND COMPACTED WITH APPROVED SELECTED MATERIAL. GRAVEL SURFACING MATERIAL SHALL NOT BE USED FOR FILLING DEPRESSIONS IN THE SUB GRADE.
- PROTECT EXISTING GRAVEL SURFACING AND SUB GRADE IN AREAS WHERE EQUIPMENT LOADS WILL OPERATE.
- DAMAGE TO EXISTING STRUCTURES AND/OR UTILITIES RESULTING FROM CONTRACTORS NEGLIGENCE SHALL BE REPAIRED AND/OR REPLACED TO THE OWNERS SATISFACTION AT NO ADDITIONAL COST TO THE CONTRACT.
- ALL SUITABLE BORROW MATERIAL FOR BACK FILL OF THE SITE SHALL BE INCLUDED IN THE BID. EXCESS TOPSOIL AND UNSUITABLE MATERIAL SHALL BE DISPOSED OF OFF SITE AT LOCATIONS APPROVED BY GOVERNING AGENCIES AT NO ADDITIONAL COST TO THE CONTRACT.

ENVIRONMENTAL NOTES

- ALL WORK PERFORMED SHALL BE DONE IN ACCORDANCE WITH ISSUED PERMITS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PAYMENT OF FINES AND PROPER CLEAN UP FOR AREAS IN VIOLATION.
- CONTRACTOR AND/OR DEVELOPER SHALL BE RESPONSIBLE FOR CONSTRUCTION AND MAINTENANCE OF EROSION AND SEDIMENTATION CONTROLS DURING CONSTRUCTION FOR PROTECTION OF ADJACENT PROPERTIES, ROADWAYS AND WATERWAYS AND SHALL BE MAINTAINED IN PLACE THROUGH FINAL JURISDICTIONAL INSPECTION & RELEASE OF SITE.
- CONTRACTOR SHALL INSTALL/CONSTRUCT ALL NECESSARY SEDIMENT/SILT CONTROL FENCING AND PROTECTIVE MEASURES WITHIN THE LIMITS OF SITE DISTURBANCE PRIOR TO CONSTRUCTION.
- NO SEDIMENT SHALL BE ALLOWED TO EXIT THE PROPERTY. THE CONTRACTOR IS RESPONSIBLE FOR TAKING ADEQUATE MEASURES FOR CONTROLLING EROSION. ADDITIONAL SEDIMENT CONTROL FENCING MAY BE REQUIRED IN ANY AREAS SUBJECT TO EROSION.
- THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING POSITIVE DRAINAGE ON THE SITE AT ALL TIMES WITH SILT AND EROSION CONTROL MEASURES MAINTAINED ON THE DOWNSTREAM SIDE OF SITE DRAINAGE. ANY DAMAGE TO ADJACENT PROPERTY AS A RESULT OF EROSION WILL BE CORRECTED AT THE CONTRACTORS EXPENSE.
- CONTRACTOR SHALL BE RESPONSIBLE FOR DAILY INSPECTIONS AND ANY REPAIRS OF ALL SEDIMENT CONTROL MEASURES INCLUDING SEDIMENT REMOVAL AS NECESSARY.
- CLEARING OF VEGETATION AND TREE REMOVAL SHALL BE ONLY AS PERMITTED AND BE HELD TO A MINIMUM ONLY TREES NECESSARY FOR CONSTRUCTION OF THE FACILITIES SHALL BE REMOVED.
- SEEDING SAND MULCHING AND/OR SOODING OF THE SITE WILL BE ACCOMPLISHED AS SOON AS POSSIBLE AFTER COMPLETION OF THE PROJECT FACILITIES AFFECTING LAND DISTURBANCE.
- CONTRACTOR SHALL PROVIDE ALL EROSION AND SEDIMENTATION CONTROL MEASURES AS REQUIRED BY LOCAL, COUNTY AND STATE CODES AND ORDINANCES TO PROTECT EMBANKMENTS FROM SOIL LOSS AND TO PREVENT ACCUMULATION OF SOIL AND SILT IN STREAMS AND DRAINAGE PATHS LEAVING THE CONSTRUCTION AREA. THIS MAY INCLUDE SUCH MEASURES AS SILT FENCES, STRAW BALE SEDIMENT BARRIERS, AND CHECK DAMS.
- RIP RAP OF SIZES INDICATED SHALL CONSIST OF CLEAN, HARD, SOUND, DURABLE, UNIFORM IN QUALITY STONE FREE OF ANY DETRIMENTAL QUANTITY OF SOFT, FRIABLE, THIN, ELONGATED OR LAMINATED PIECES, DISINTEGRATED MATERIAL, ORGANIC MATTER, OIL, ALKALI, OR OTHER DELETERIOUS SUBSTANCES.

STRUCTURAL STEEL NOTES

- ALL STEEL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE AISC MANUAL OF STEEL CONSTRUCTION. STEEL SECTIONS SHALL BE IN ACCORDANCE WITH ASTM AS INDICATED BELOW:
W-SHAPES: ASTM A992, 50 KSI
ANGLES, BARS CHANNELS: ASTM A36, 36 KSI
HSS SECTIONS: ASTM 500, 48 KSI
PIPE SECTIONS: ASTM A53-E, 35 KSI
- ALL EXTERIOR EXPOSED STEEL AND HARDWARE SHALL BE HOT DIPPED GALVANIZED.
- ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION". PAINTED SURFACES SHALL BE TOUCHED UP.
- NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" ASTM A 307 BOLTS UNLESS NOTED OTHERWISE.
- FIELD MODIFICATIONS ARE TO BE COATED WITH ZINC ENRICHED PAINT.

CONCRETE MASONRY NOTES

- CONCRETE MASONRY UNITS SHALL BE MEDIUM WEIGHT UNITS CONFORMING TO ASTM C90, GRADE N-1, (FM=1,500 PSI), MEDIUM WEIGHT (115 PCF).
- MORTAR SHALL BE TYPE "S" (MINIMUM 1,800 PSI AT 28 DAYS).
- GROUT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.
- ALL CELLS CONTAINING REINFORCING STEEL OR EMBEDDED ITEMS AND ALL CELLS IN RETAINING WALLS AND WALLS BELOW GRADE SHALL BE SOLID GROUTED.
- ALL HORIZONTAL REINFORCEMENT SHALL BE PLACED IN BOND BEAM OR UNTEL BEAM UNITS.
- WHEN GROUTING IS STOPPED FOR ONE HOUR OR LONGER, HORIZONTAL CONSTRUCTION JOINTS SHALL BE FORMED BY STOPPING THE GROUT POUR 1-1/2" BELOW TOP OF THE UPPERMOST UNIT.
- ALL BOND BEAM BLOCK SHALL BE "DEEP CUT" UNITS.
- PROVIDE INSPECTION AND CLEAN-OUT HOLES AT BASE OF VERTICAL CELLS HAVING GROUT LIFTS IN EXCESS OF 4'-0" OF HEIGHT.
- ALL GROUT SHALL BE CONSOLIDATED WITH A MECHANICAL VIBRATOR.
- CEMENT SHALL BE AS SPECIFIED FOR CONCRETE.
- REINFORCING BARS - SEE NOTES UNDER "STRUCTURAL CONCRETE NOTES" FOR REQUIREMENTS.
- PROVIDE ONE BAR DIAMETER (A MINIMUM OF 1/2") GROUT BETWEEN MAIN REINFORCING AND MASONRY UNITS.
- LOW LIFT CONSTRUCTION, MAXIMUM GROUT POUR HEIGHT IS 4 FEET.
- HIGH LIFT GROUTED CONSTRUCTION MAY BE USED IN CONFORMANCE WITH PROJECT SPECIFICATIONS AND SECTION 2104.6.1 OF U.B.C.
- ALL CELLS IN CONCRETE BLOCKS SHALL BE FILLED SOLID WITH GROUT, EXCEPT AS NOTED IN THE DRAWINGS OR SPECIFICATIONS.
- CELLS SHALL BE IN VERTICAL ALIGNMENT, DOWELS IN FOOTINGS SHALL BE SET TO ALIGN WITH CORES CONTAINING REINFORCING STEEL.
- REFER TO ARCHITECTURAL DRAWINGS FOR SURFACE AND HEIGHT OF UNITS, LAYING PATTERN AND JOINT TYPE.
- SAND SHALL BE CLEAN, SHARP AND WELL GRADED, FREE FROM INJURIOUS AMOUNTS OF DUST, LUMPS, SHALE, ALKALI OR ORGANIC MATERIAL.
- BRICK SHALL CONFORM TO ASTM C-62 AND SHALL BE GRADE MW OR BETTER.

STRUCTURAL CONCRETE NOTES

- ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301-05, ACI 318-05 AND THE SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
- ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH $f_c = 3,000$ PSI AT 28 DAYS UNLESS NOTED OTHERWISE.
- REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES CLASS "B" AND ALL HOOKS SHALL BE STANDARD UNLESS NOTED OTHERWISE.
- THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL, UNLESS SHOWN OTHERWISE ON DRAWINGS:
CONCRETE CAST AGAINST EARTH..... 3 IN.
CONCRETE EXPOSED TO EARTH OR WEATHER:
#8 AND LARGER.....2 IN.
#5 AND SMALLER & WWF.....1 1/2 IN.
CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
SLAB AND WALL.....3/4 IN.
BEAMS AND COLUMNS.....1 1/2 IN.
- A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE U.N.O. IN ACCORDANCE WITH ACI 301 SECTION 4.2.4
- HOLES TO RECEIVE EXPANSION/WEDGE ANCHORS SHALL BE 1/8" LARGER IN DIAMETER THAN THE ANCHOR BOLT, DOWEL OR ROD AND SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. LOCATE AND AVOID CUTTING EXISTING REBAR WHEN DRILLING HOLES IN ELEVATED CONCRETE SLABS.
- USE AND INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR SHALL BE PER ICBO & MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURES.

WEATHERPROOFING NOTES

STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES

- WEATHERPROOFING CONNECTORS AND GROUND KITS:
 - ALL CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED USING BUTYL RUBBER WEATHERPROOFING AND TAPE. THIS INSTALLATION MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION OR AS SHOWN ON THE CONSTRUCTION DRAWINGS (WHICHEVER IS GREATER). IF NO DIRECTION IS PROVIDED, WEATHERPROOFING MUST BE DONE PER THE FOLLOWING INSTRUCTIONS.
 - THE COAXIAL CABLE CONNECTION OR GROUND KIT CAN BE ENCOMPASSED INTO COLD SHRINK AND COMPLETELY WRAPPED WITH 2 INCH WIDE ELECTRICAL TAPE OVERLAPPING EACH ROW BY APPROXIMATELY 1/2" AND EXTENDING PAST THE CONNECTION BY TWO INCHES AS DISCUSSED BELOW; OR
 - THE COAXIAL CABLE CONNECTION OR GROUND KIT CAN BE WRAPPED WITH LAYERS OF ELECTRICAL/BUTYL RUBBER/ELECTRICAL TAPE AS DISCUSSED BELOW; OR
 - THE COAXIAL CABLE CONNECTION OR GROUND KIT CAN BE WRAPPED WITH TWO LAYERS OF 1.5 INCH WIDE SELF-AMALGAMATING TAPE COVERED WITH TWO LAYERS OF ELECTRICAL TAPE AS DISCUSSED BELOW.
 - COLD SHRINK INSTALLATION PROCEDURE:
 - REQUIRED MATERIAL: COLD SHRINK TUBE, SPACERS AS NEEDED, BLACK ELECTRICAL TAPE-2 INCHES WIDE
 - REQUIRED TOOLS: KNIFE AND TAPE MEASURE
STEP 1: THOROUGHLY CLEAN AND DRY THE SURFACE OF COAXIAL CABLE AND CONNECTOR TO REMOVE ALL GREASE AND DIRT. MARK THE MAIN FEED (LARGER DIAMETER) COAXIAL CABLE AT LEAST TWO INCHES ABOVE THE CONNECTION AS THE SPECIFIED START DIMENSION FOR THE COLD SHRINK.
STEP 2: SLIDE THE COLD SHRINK TUBE OVER THE PRE-CONNECTORIZED END OF THE LARGER DIAMETER COAXIAL CABLE PRIOR TO MATING CONNECTOR INTERFACES. MAKE THE CONNECTION.
STEP 3: REMOVE WAX PAPER FROM A SPACER HALF AND PRESS ONTO COAXIAL CABLE DIRECTLY BEHIND THE CONNECTOR. REMOVE THE WAX PAPER FROM THE OTHER SPACER HALF AND ALIGN THE TWO SPACER HALVES WITH ADHESIVE PORTIONS FACING EACH OTHER. PRESS THE SPACER HALVES TOGETHER. THE SPACER WILL BE PLACED NEXT TO THE CONNECTOR ON THE SMALLER DIAMETER COAXIAL CABLE SIDE.
STEP 4: SLIDE THE COLD SHRINK TUBE OVER THE CONNECTION TO THE SPECIFIED START DIMENSION MARK. HOLD THE COLD SHRINK TUBE AND COAXIAL CABLE IN ONE HAND SO THAT THE EDGE OF COLD SHRINK TUBE IS IN LINE WITH THE MARK.
STEP 5: WITH YOUR FREE HAND, BEGIN REMOVING COLD SHRINK TUBE CORE. THE CORE WILL BE REMOVED BY UNWINDING IN A COUNTERCLOCKWISE DIRECTION WHILE LIGHTLY PULLING THE ATTACHED CORD AWAY FROM THE TUBE.
STEP 6: USE BOTH HANDS TO CONTINUE THE UNWINDING PROCESS AS THE COLD SHRINK TUBE BEGINS TO COLLAPSE INTO POSITION. CONTINUE THE UNWINDING PROCESS UNTIL THE CORE IS COMPLETELY REMOVED AND THE COLD SHRINK TUBE IS INSTALLED.
STEP 7: EXCESS COLD SHRINK TUBE EXTENDING TWO INCHES BEYOND THE SPACER HALVES CAN BE REMOVED OR LEFT IN PLACE. EXCESS COLD SHRINK TUBE CAN BE CAREFULLY CUT OFF WITH A KNIFE.
STEP 8: WRAP OVER THE COLD SHRINK TUBE WITH ONE LAYER OF BLACK ELECTRICAL TAPE 2 INCH WIDE OVERLAPPING EACH ROW BY 1/2 INCH. THIS TOP LAYER MUST BE WRAPPED USING A SHINGLED EFFECT. THE LAYER SHALL BE WRAPPED SO THAT THE ENDS ARE IN THE UPWARD DIRECTION CREATING A SHINGLED EFFECT WITH THE TAPE SO WATER WILL BE REPELLED AND NOT ALLOWED TO COLLECT AND POOL. THIS TOP LAYER OF ELECTRICAL TAPE MUST EXTEND TWO INCHES (THE TAPE WIDTH) PAST THE COLD SHRINK TUBE ONTO THE UNDERLYING CABLE. TAPE SHALL BE WRAPPED SO THAT NO VOIDS OR AIR PACKETS ARE PRESENT. TAPE SHALL BE CUT WITH A SHARP KNIFE.
- BUTYL RUBBER TAPE INSTALLATION PROCEDURE:
 - REQUIRED MATERIAL: BLACK ELECTRICAL TAPE-2 INCH WIDE AND BUTYL RUBBER TAPE 2 TO 3 INCHES WIDE.
 - REQUIRED TOOLS: KNIFE OR SCISSORS.
STEP 1: THOROUGHLY CLEAN AND DRY THE SURFACE OF COAXIAL CABLE AND CONNECTOR TO REMOVE ALL GREASE AND DIRT. WRAP CONNECTOR/GROUND KIT WITH TWO LAYERS OF BLACK ELECTRICAL TAPE-2 INCH WIDE OVERLAPPING EACH ROW BY APPROXIMATELY 1/2 INCH. THESE LAYERS OF TAPE MUST BE WRAPPED TIGHT ENOUGH SO THAT NO VOIDS OR AIR PACKETS ARE PRESENT AND MUST EXTEND ONE INCH PAST THE CONNECTOR/GROUND KIT ON EACH SIDE. TWO ROWS SHALL BE APPLIED, ONE IN EACH DIRECTION, WITH THE TOP ROW SHINGLED TO PROMOTE WATER RUNOFF.
STEP 2: WRAP CONNECTOR/GROUND KIT WITH ONE LAYER OF BUTYL RUBBER TAPE (2 TO 3 INCHES WIDE) OVER THE BLACK ELECTRICAL TAPE OVERLAPPING EACH ROW BY APPROXIMATELY 1/2 INCH. THE BUTYL RUBBER TAPE MUST EXTEND 2 TO 3 INCHES (THE TAPE WIDTH) PAST THE ELECTRICAL TAPE AND COME IN GOOD CONTACT WITH THE UNDERLYING CABLE ON CONNECTORS, WHEN WEATHERPROOFING FROM THE MAIN LINE TO THE JUMPER, BUILD UP THIS AREA WITH EXTRA BUTYL RUBBER TAPE TO INSURE A SMOOTH TRANSITION FREE OF VOIDS AND AIR PACKETS DOWN TO THE SMALLER DIAMETER CABLE.
STEP 3: WRAP CONNECTOR/GROUND KIT WITH TWO LAYERS OF BLACK ELECTRICAL TAPE 2 INCH WIDE OVERLAPPING EACH ROW BY 1 INCH. THESE LAST TWO LAYERS MUST BE WRAPPED USING A SHINGLED EFFECT. THE TOP LAYER SHALL BE WRAPPED SO THAT THE ENDS ARE IN THE UPWARD DIRECTION CREATING A SHINGLED EFFECT WITH THE TAPE SO WATER WILL BE REPELLED AND NOT ALLOWED TO COLLECT AND POOL. THESE TOP LAYERS OF ELECTRICAL TAPE MUST EXTEND TWO INCHES (THE TAPE WIDTH) PAST THE BUTYL RUBBER TAPE ONTO THE UNDERLYING CABLE.
ALL LAYERS OF TAPE SHALL BE WRAPPED SO THAT NO VOIDS OR AIR PACKETS ARE PRESENT. THE LAST WRAP OF TAPE SHALL NOT BE PULLED OR STRETCHED. ALL TAPE SHALL BE CUT WITH A SHARP KNIFE OR SCISSORS.
- SELF-AMALGAMATING TAPE INSTALLATION PROCEDURE:
 - REQUIRED MATERIAL: SELF-AMALGAMATING TAPE -1.5 INCHES WIDE AND BLACK ELECTRICAL TAPE - 2 INCHES WIDE.
 - REQUIRED TOOLS: KNIFE OR SCISSORS.
STEP 1: THOROUGHLY CLEAN AND DRY THE SURFACE OF COAXIAL CABLE AND CONNECTOR TO REMOVE ALL GREASE AND DIRT.
STEP 2: START WRAPPING SELF-AMALGAMATING TAPE ON THE CABLE AT LEAST 2 INCHES FROM THE CONNECTOR/GROUND KIT. MAKE SURE TAPE IS STRETCHED TIGHT DURING THIS APPLICATION.
STEP 3: WHILE STRETCHING TAPE, MAKE ONE WRAP OF THE TAPE AROUND THE CABLE, MAKING SURE THE TAPE IS WRAPPED ONTO ITSELF. THE TAPE WILL ONLY ADHERE TO ITSELF.
STEP 4: CONTINUE WRAPPING THE CABLE AND CONNECTOR/GROUND KIT USING HALF OVERLAP (0.75 INCH WIDE) LAYERS.
STEP 5: WRAP OVER AND PAST THE CONNECTOR/GROUND KIT AT LEAST 2 INCHES.
STEP 6: TO TERMINATE THE SELF-AMALGAMATING TAPE, WRAP THE TAPE AT LEAST ONE FULL ROUND OVER THE CABLE STRETCHING THE TAPE TIGHT. CUT THE TAPE USING KNIFE OR SCISSORS AND APPLY THE LOOSE END TO THE UNDERLYING SELF-AMALGAMATING TAPE USING THUMB PRESSURE.
STEP 7: TWO ROWS OF SELF-AMALGAMATING TAPE SHALL BE APPLIED IN THIS MANNER, IN ALTERNATING DIRECTIONS. THE TOP LAYER SHALL BE WRAPPED SO THAT THE ENDS ARE IN AN UPWARD DIRECTION CREATING A SHINGLED EFFECT WITH THE TAPE SO WATER WILL BE REPELLED.
STEP 8: WRAP OVER SELF-AMALGAMATING TAPE WITH TWO LAYERS OF BLACK ELECTRICAL TAPE- 2 INCH WIDE OVERLAPPING EACH ROW BY 1 INCH. THESE TOP TWO LAYERS MUST ALSO BE WRAPPED USING A SHINGLED EFFECT. THE LAYERS SHALL BE WRAPPED SO THAT THE ENDS ARE IN THE UPWARD DIRECTION CREATING A SHINGLED EFFECT WITH THE TAPE SO WATER WILL BE REPELLED AND NOT ALLOWED TO COLLECT AND POOL. THESE TOP LAYERS OF ELECTRICAL TAPE MUST EXTEND TWO INCHES (THE TAPE WIDTH) PAST THE SELF-AMALGAMATING TAPE ONTO THE UNDERLYING CABLE. ALL LAYERS OF TAPE SHALL BE WRAPPED SO THAT NO VOIDS OR AIR PACKETS ARE PRESENT. THE LAST WRAP OF TAPE SHALL NOT BE PULLED OR STRETCHED. ALL TAPE SHALL BE CUT WITH A SHARP KNIFE OR SCISSORS.



GENERAL DYNAMICS WIRELESS SERVICES

REV	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	10-29-12	Final Drawings	JRV	DSB
2	10-30-12	Minor Corrections	JRV	DSB
3	10-22-12	ISSUED FOR CONSTRUCTION	JRV	DSB

BENCHMARK SERVICES, INC.
PO Box 5 318 North Main Street
Huntingburg, Indiana 47542
Phone: (812) 683-3049

BUN # 875287

LICENSURE

Ralph M. Wallem

PROJECT INFORMATION
NETWORK VISION MMBS LAUNCH DUBLIN FIRE STATION
C803XC053
7673 AVERY ROAD
DUBLIN, OH 43017
FRANKLIN COUNTY

JOB NO: 2012-101-Benchmark Ohio Cell Towers

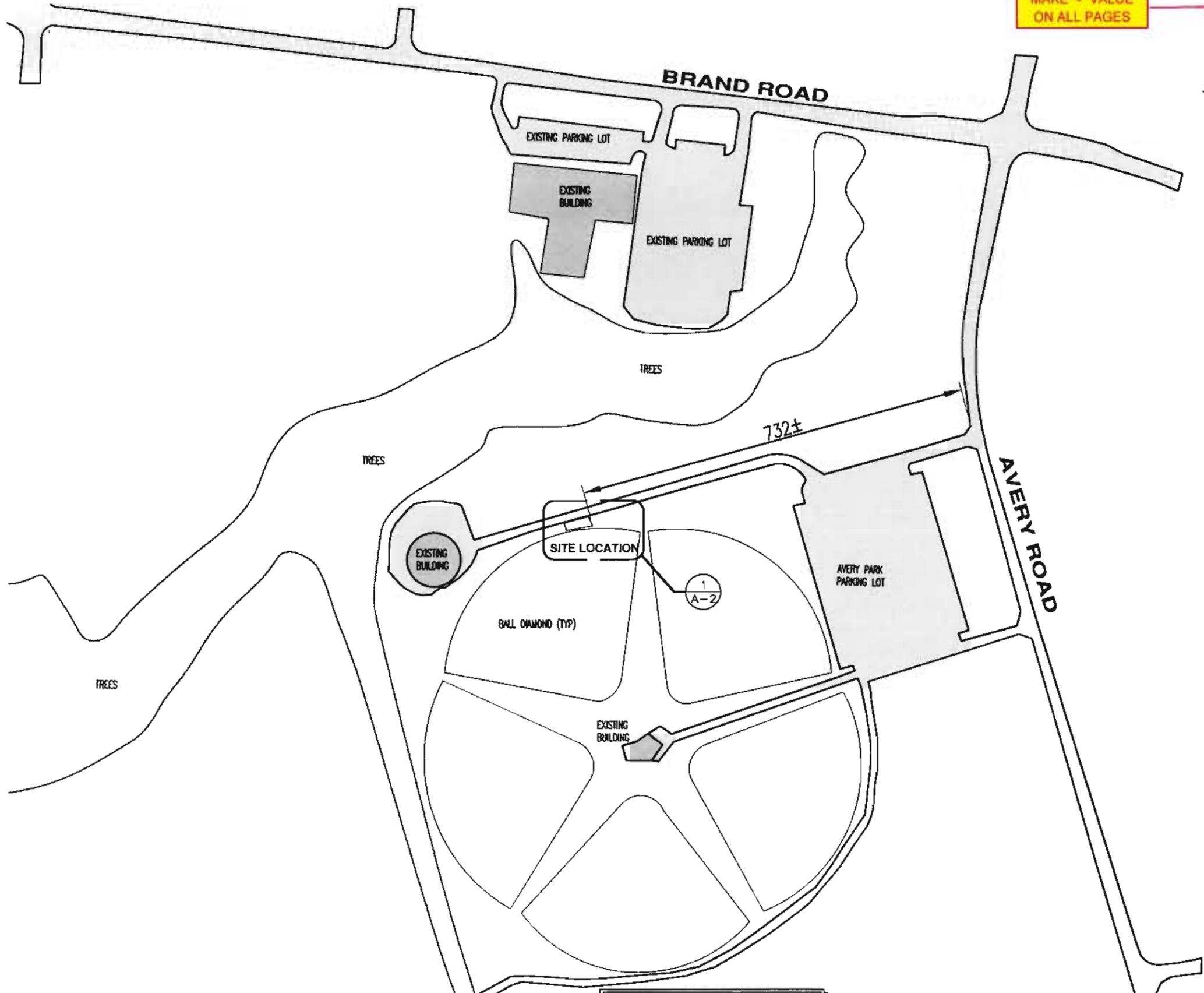
DRAWN BY	CHECKED BY	DATE
JRV	DSB	10-29-12

GENERAL NOTES

SHEET NUMBER	REV
N-2	2

ALL INFORMATION CONTAINED ON THIS SET OF CONSTRUCTION DOCUMENTS IS PROPRIETARY TO BENCHMARK SERVICES, INC. ANY USE OR REPRODUCTION OF THIS INFORMATION WITHOUT THE WRITTEN PERMISSION OF BENCHMARK SERVICES, INC. IS STRICTLY PROHIBITED.

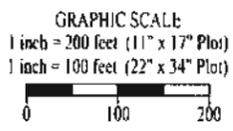
THE INFORMATION CONTAINED IN THIS SET OF CONSTRUCTION DOCUMENTS IS PROPRIETARY OF SPRINT. ANY USE OF THIS INFORMATION OTHER THAN THAT WHICH RELATES TO SPRINT'S WIRELESS SERVICES IS STRICTLY PROHIBITED.



MAKE 1/8" VALUE ON ALL PAGES



GENERAL NOTES
 THIS IS NOT A SITE SURVEY.
 ALL PROPERTY BOUNDARIES, ORIENTATION OF TRUE NORTH AND STREET HALF-WIDTHS HAVE BEEN OBTAINED FROM TAX PARCEL MAPS, GIS DATA AND/OR AERIAL PHOTOGRAPHY. THEY ARE APPROXIMATE.



GENERAL DYNAMICS WIRELESS SERVICES

REV	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	10-29-12	FINAL REVISIONS	JRV	DSB
2	10-30-12	MSL REVISIONS	JRV	DSB
3	10-29-12	ISSUED FOR CONSTRUCTION	JRV	DSB

BENCHMARK SERVICES, INC.
 PO Box 5 318 North Main Street
 Huntingburg, Indiana 47542
 Phone: (812) 683-3049

CROWN CASTLE
 BUN # 875287

LICENSURE

Ralph M. Wallem

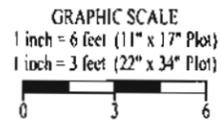
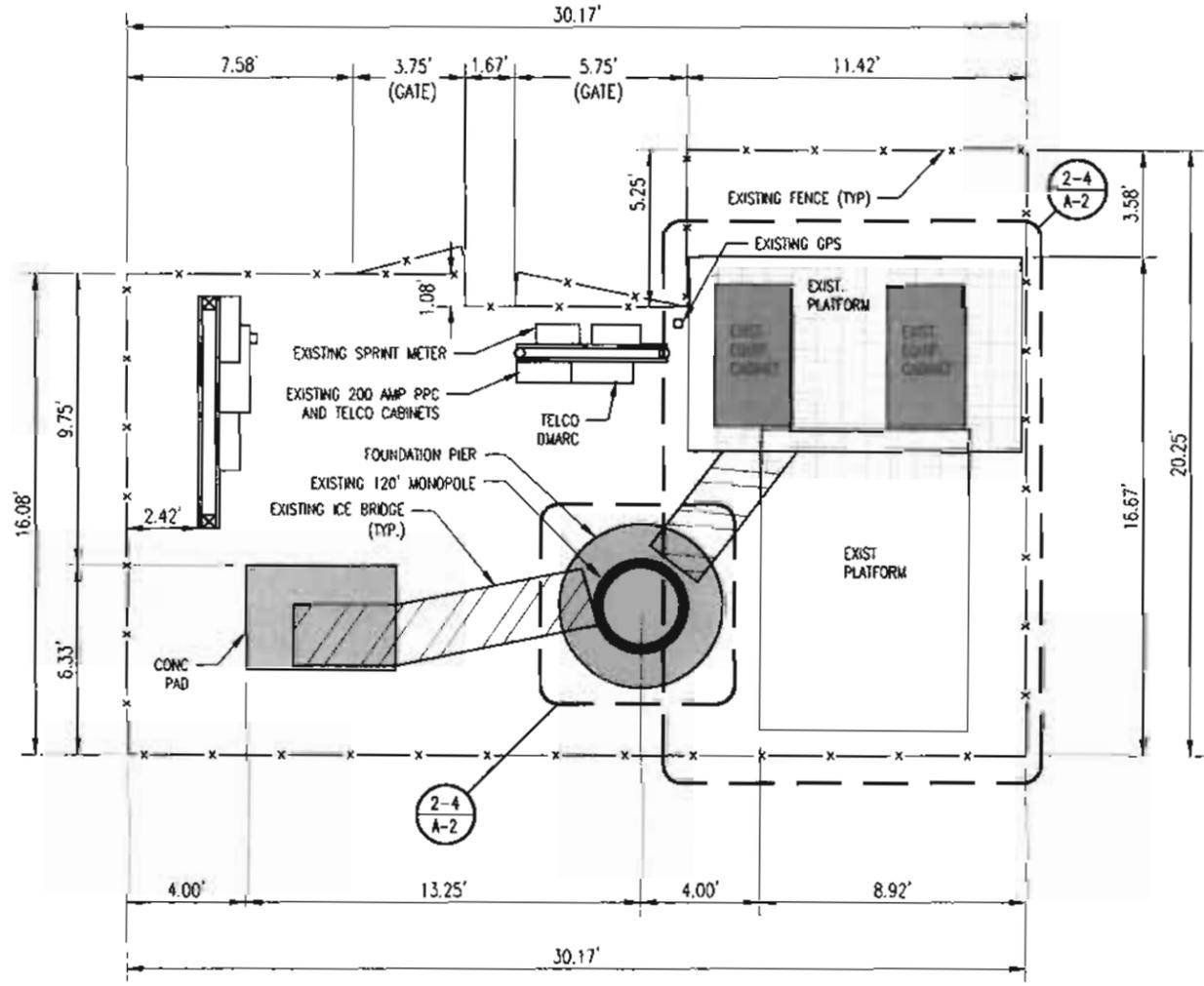
PROJECT INFORMATION
NETWORK VISION MMBS LAUNCH
DUBLIN FIRE STATION
 CB03XC053
 7673 AVERY ROAD
 DUBLIN, OH 43017
 FRANKLIN COUNTY

JOB NO
2012-101-Benchmark Ohio Cell Towers

DRAWN BY JRV	CHECKED BY DSB	DATE 10-29-12
-----------------	-------------------	------------------

SHEET TITLE
OVERALL SITE PLAN

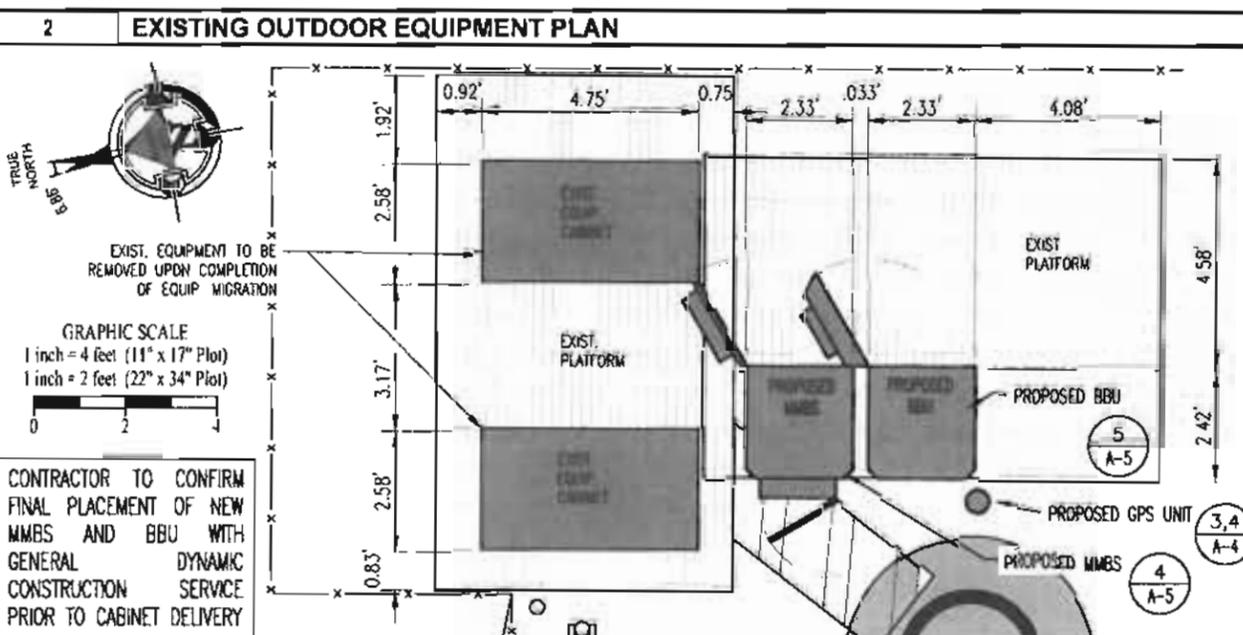
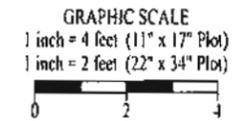
SHEET NUMBER	REV
A-1	2



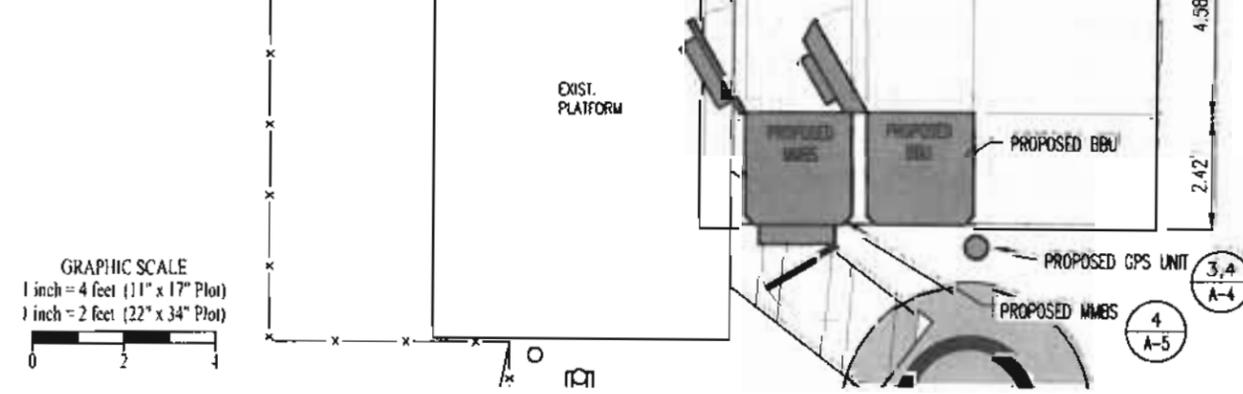
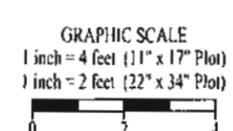
NOTE
STRUCTURAL ANALYSIS MUST BE PERFORMED ON ALL ROOFTOPS, FLAGPOLES AND TOWER SITES BEFORE INSTALLATION OF NEW ANTENNAS NEW RRUS & NEW CABINETS/TEMPORARY PLATFORM STRUCTURAL ANALYSIS PROVIDED BY GENERAL DYNAMICS

EXISTING ITEMS TO BE REMOVED	
CDMA ANTENNA	0
EQUIP CABINETS	2
BBU CABINET	0
MICROWAVE CABINET	0
COAX CABLE	0

1 COMPOUND PLAN - EXISTING



2 EXISTING OUTDOOR EQUIPMENT PLAN



4 FINAL OUTDOOR EQUIPMENT PLAN



GENERAL DYNAMICS WIRELESS SERVICES

REV	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	10-29-12	ISSUED FOR CONSTRUCTION	JRV	DSB
2	10-30-12	W/SC REVISIONS	JRV	DSB
3	10-30-12	FINAL REVISIONS	JRV	DSB

BENCHMARK SERVICES, INC.
 PO Box 5 318 North Main Street
 Huntingburg, Indiana 47542
 Phone: (812) 683-3049

CROWN CASTLE
 BUN # 875287

STATE OF OHIO
 REGISTERED PROFESSIONAL ENGINEER
 RALPH M. WALLEM
 E-67208

Ralph M. Wallem

PROJECT INFORMATION:
 NETWORK VISION MMBS LAUNCH
 DUBLIN FIRE STATION
 CB03XC053
 7673 AVERY ROAD
 DUBLIN, OH 43017
 FRANKLIN COUNTY

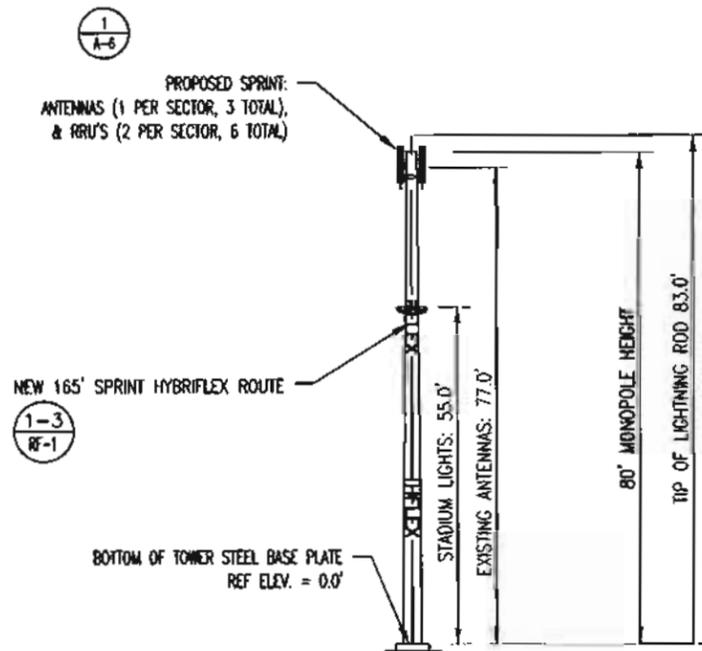
JOB NO
 2012-101-Benchmark Ohio Cell Towers

DRAWN BY: JRV CHECKED BY: DSB DATE: 10-29-12

SHEET TITLE
 COMPOUND & EQUIPMENT PLANS

SHEET NUMBER: A-2 REV: 2

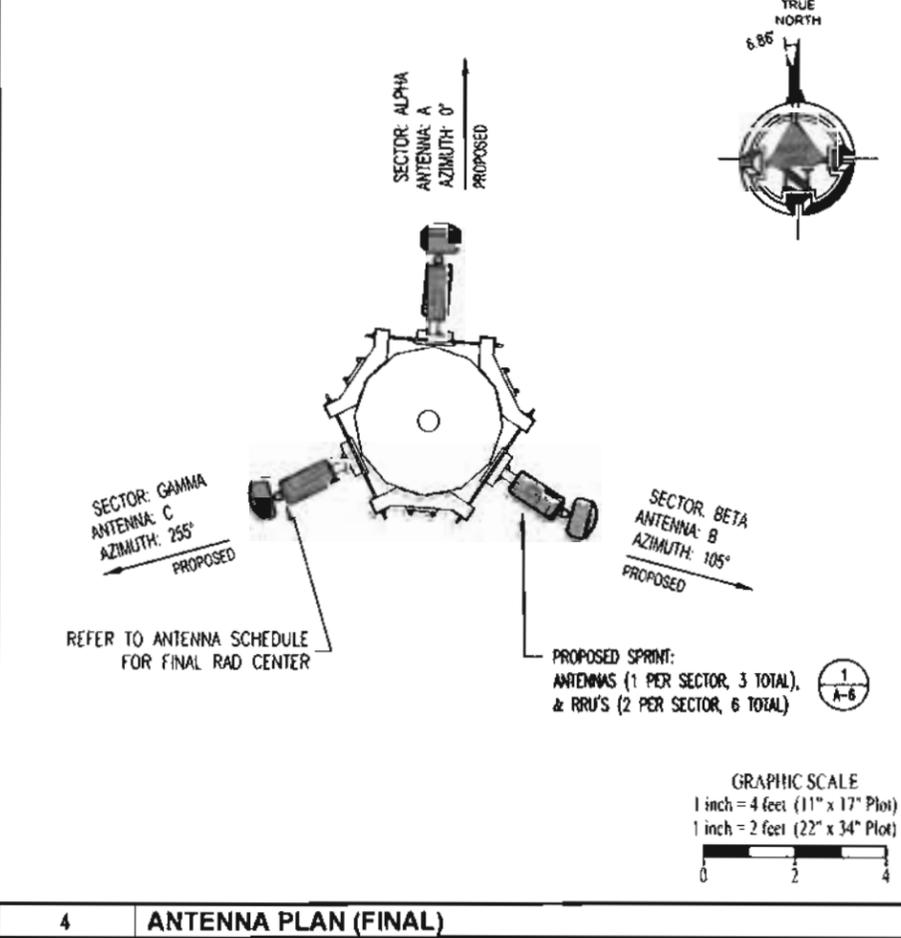
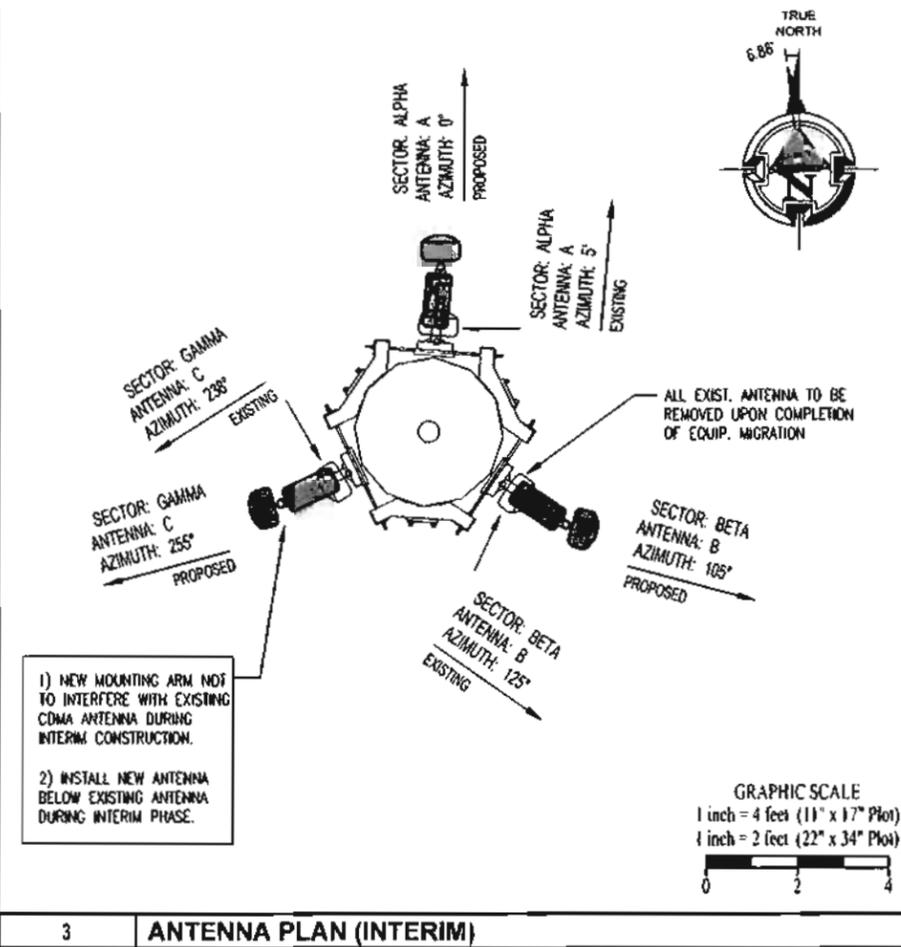
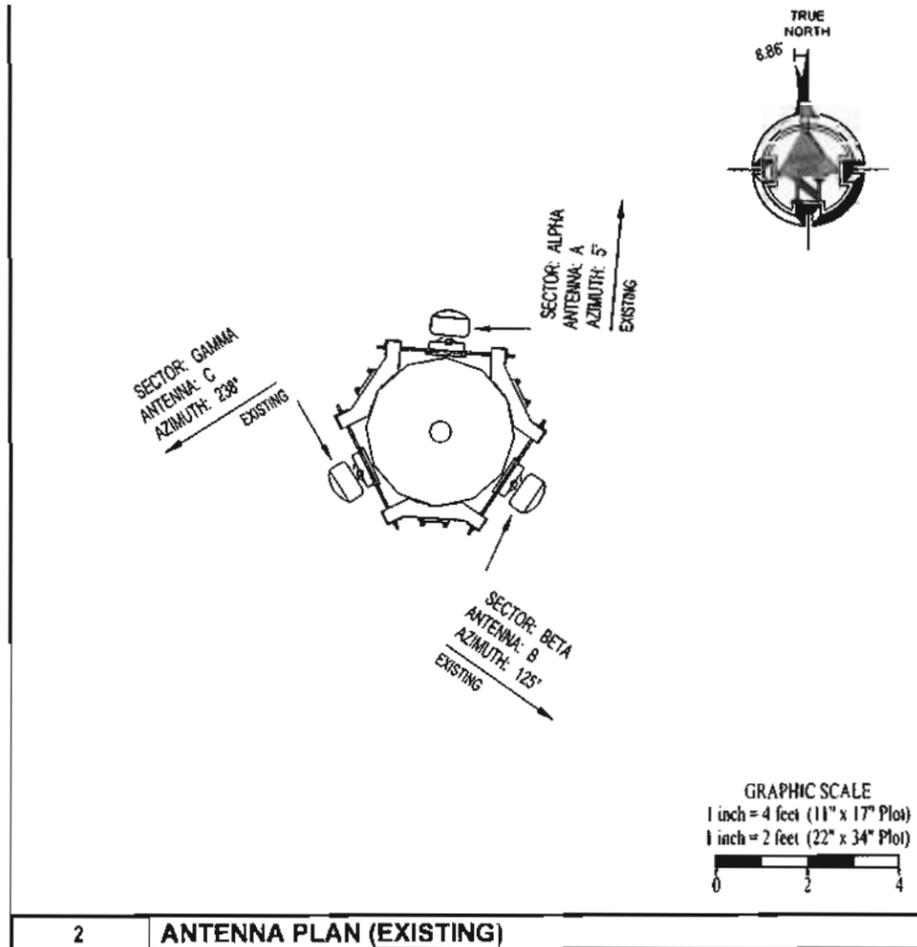
THE INFORMATION CONTAINED IN THIS SET OF DRAWINGS IS THE PROPERTY OF GENERAL DYNAMICS. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREON. ANY USE IN DISOBEYANCE OF THESE TERMS SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO GENERAL DYNAMICS.



RRU / HYBRID CABLE SCHEDULE									
SECTOR	RRU MODEL	RRU FREQUENCY	HYBRID CABLE LENGTH	HYBRID CABLE DIAMETER	JUMPER SIZE	JUMPER LENGTH	RET LENGTH	RET CABLE MANUFACTURER	RET CABLE MODEL NUMBER
ALPHA	(1) RRH-C2A	800MHz	165'	1"	1/2"	6'	9.8'	SAMSUNG HFC	RET AISGV.1
	(1) RRH-P4	1900MHz	165'	1"	1/2"	6'	9.8'	SAMSUNG HFC	RET AISGV.1
BETA	(1) RRH-C2A	800MHz	165'	1"	1/2"	6'	9.8'	SAMSUNG HFC	RET AISGV.1
	(1) RRH-P4	1900MHz	165'	1"	1/2"	6'	9.8'	SAMSUNG HFC	RET AISGV.1
GAMMA	(1) RRH-C2A	800MHz	165'	1"	1/2"	6'	9.8'	SAMSUNG HFC	RET AISGV.1
	(1) RRH-P4	1900MHz	165'	1"	1/2"	6'	9.8'	SAMSUNG HFC	RET AISGV.1

ANTENNA SCHEDULE									
SECTOR	ANTENNA FREQUENCY	ANTENNA MFR.	ANTENNA MODEL	ANTENNA QUANTITY	AZIMUTH	RAD CENTER	ANT. SIZE	ELECT TILT	MECH TILT
ALPHA	800/1900 MHz	KMHW	ET-X-TS-70-15-62-18-IR-RD	1 (PER SECTOR)	0°	77'-0"	6'-0"	0° (800 MHz) -1° (1900 MHz)	0° (800 MHz) 0° (1900 MHz)
BETA	800/1900 MHz	KMHW	ET-X-TS-70-15-62-18-IR-RD	1 (PER SECTOR)	105°	77'-0"	6'-0"	-5° (800 MHz) -4° (1900 MHz)	0° (800 MHz) 0° (1900 MHz)
GAMMA	800/1900 MHz	COMMSCOPE	SBOH-1090B	1 (PER SECTOR)	255°	77'-0"	6'-0"	-5° (800 MHz) -4° (1900 MHz)	0° (800 MHz) 0° (1900 MHz)

- NOTES:**
- STRUCTURAL ANALYSIS MUST BE PERFORMED ON ALL ROOFTOPS, FLAGPOLES AND TOWER SITES BEFORE INSTALLATION OF NEW ANTENNAS, NEW RRRs, & NEW CABINETS/TEMPORARY PLATFORM. STRUCTURAL ANALYSIS PROVIDED BY GENERAL DYNAMICS.
 - EXISTING ANTENNAS ARE CDMA UNLESS NOTED OTHERWISE.
 - NEW SPRINT ANTENNAS INCLUDE RESPECTIVE RRRs WHICH SHALL BE MOUNTED ON THE PIPE BEHIND THE ANTENNA SIMILAR TO THAT SHOWN ON DETAIL 1, SHEET A-6.
 - FIELD VERIFY EXISTING AZIMUTH BEFORE RELOCATING THE ANTENNA, IF REQUIRED. PRIOR APPROVAL FROM SPRINT TO BE GRANTED BEFORE RELOCATION OF ANTENNAS.
 - ALL AZIMUTHS ARE TO BE ESTABLISHED CLOCKWISE FROM THE TRUE NORTH HEADING. CONTRACTOR SHALL VERIFY NEW ANTENNA RAD CENTER AND ORIENTATIONS WITH SPRINT PCS PRIOR TO INSTALLATION OF ANTENNAS. PRIOR TO ATTACHING ANTENNAS AND MOUNTING SECTIONS, EXISTING TOWER AND TOWER FOUNDATION MUST BE ANALYZED BY A LICENSED STRUCTURAL ENGINEER TO VERIFY TOWER IS CAPABLE OF SUPPORTING THE NEW LOADS. REFER TO STRUCTURAL ANALYSIS BY OTHERS. CONTRACTOR SHALL REFER TO TOWER STRUCTURAL CALCULATIONS FOR ADDITIONAL LOADS. NO ERECTION OF MODIFICATION OF TOWER SHALL BE MADE WITHOUT APPROVAL OF STRUCTURAL ENGINEER.
 - BASE STATION EQUIPMENT NOT SHOWN FOR CLARITY.
 - FINAL ANTENNA CONFIGURATION SHOWN ON THIS PLAN. SEE ANTENNA PLAN SHEETS FOR EXISTING AND TEMPORARY INTERIM CONFIGURATION.
 - EXISTING TOWER INVENTORY PROVIDED BY OTHERS.
 - ALL PROPOSED ANTENNA, RRU, AND CABLING WORK SHALL NOT COMMENCE UNTIL A SIGNED AND SEALED STRUCTURAL TOWER/POLE, SPRINT PLATFORM AND FOUNDATION REPORT IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES MATCHING THE DESIGN DEPICTED ON THESE DRAWINGS HAS BEEN PROVIDED.



GENERAL DYNAMICS WIRELESS SERVICES

REV	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	10/29/12	FINAL REVISIONS	JRV	OSB
2	10/29/12	ISSUE REVISIONS	JRV	OSB
3	10/29/12	FOR CONSTRUCTION	JRV	OSB

BENCHMARK SERVICES, INC.
 PO Box 5 318 North Main Street
 Huntingburg, Indiana 47542
 Phone: (812) 683-3049

CROWN CASTLE
 BUN # 875287

LICENSURE:

STATE OF OHIO
 RALPH M. WALLEM
 E-67208
 REGISTERED PROFESSIONAL ENGINEER

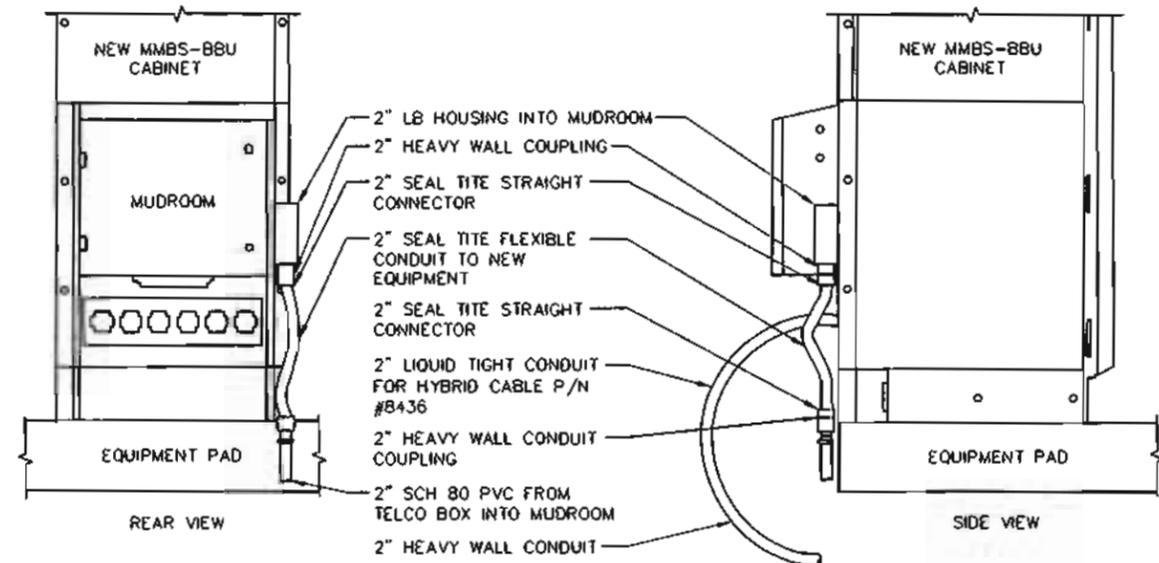
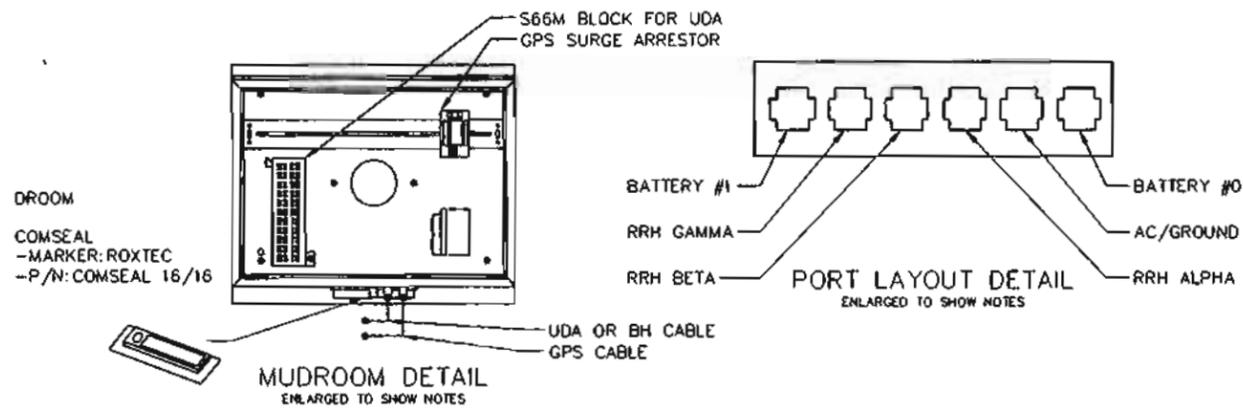
PROJECT INFORMATION
NETWORK VISION MMBS LAUNCH DUBLIN FIRE STATION
 CB03XC053
 7673 AVERY ROAD
 DUBLIN, OH 43017
 FRANKLIN COUNTY

JOB NO:
2012-101-Benchmark Ohio Cell Towers

DRAWN BY: JRV
 CHECKED BY: OSB
 DATE: 10-29-12

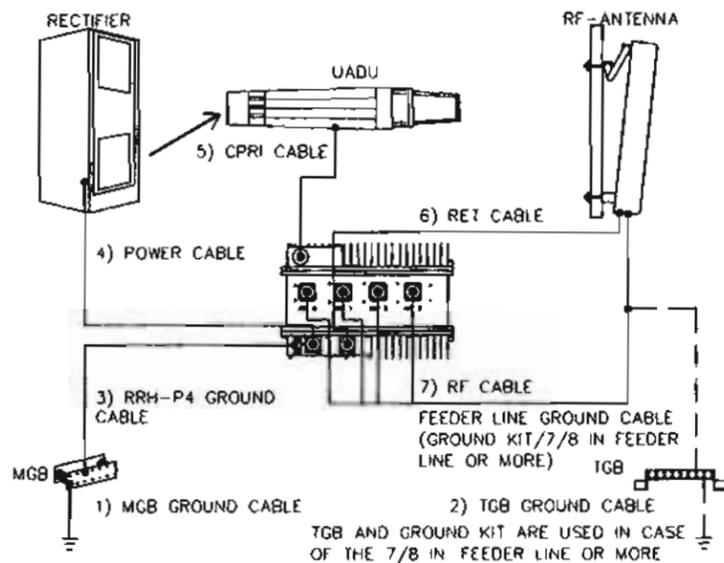
SHEET TITLE
ELEVATION & ANTENNA PLANS (ALL SECTORS)

SHEET NUMBER: **A-3** REV: **2**

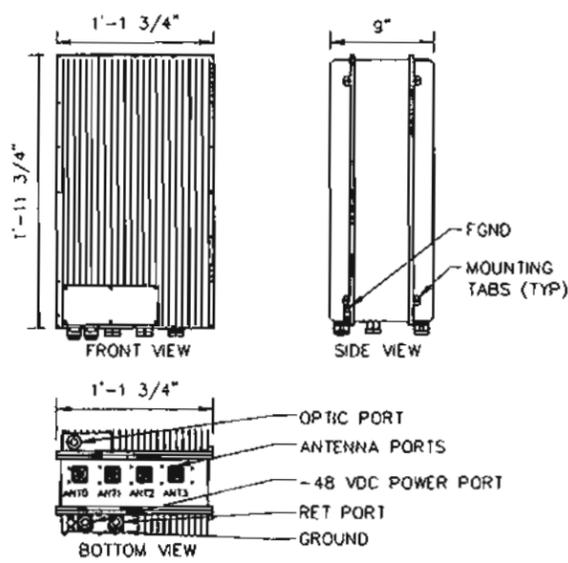


1 HYBRID AND TELCO LINE SUPPORT DETAILS

SCALE: NTS

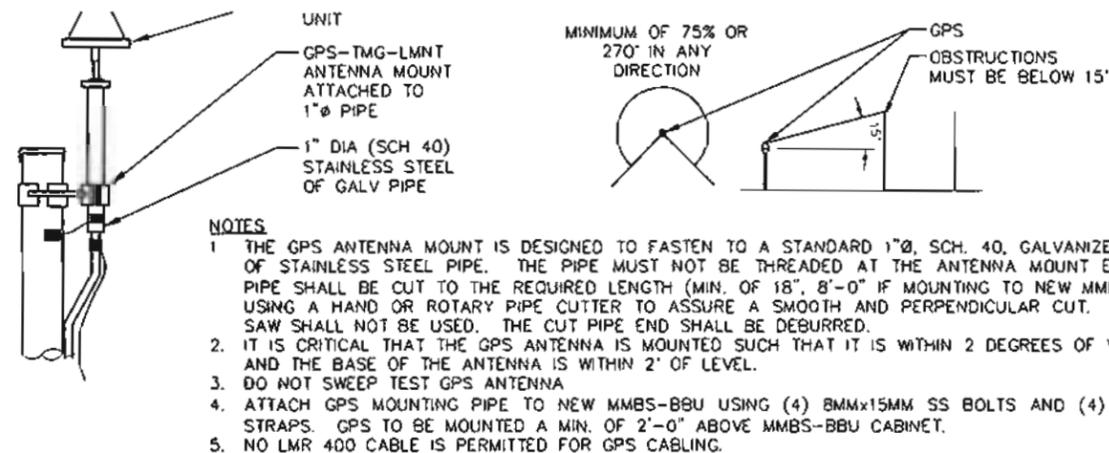


4 SAMSUNG MMBS WIRING DIAGRAM



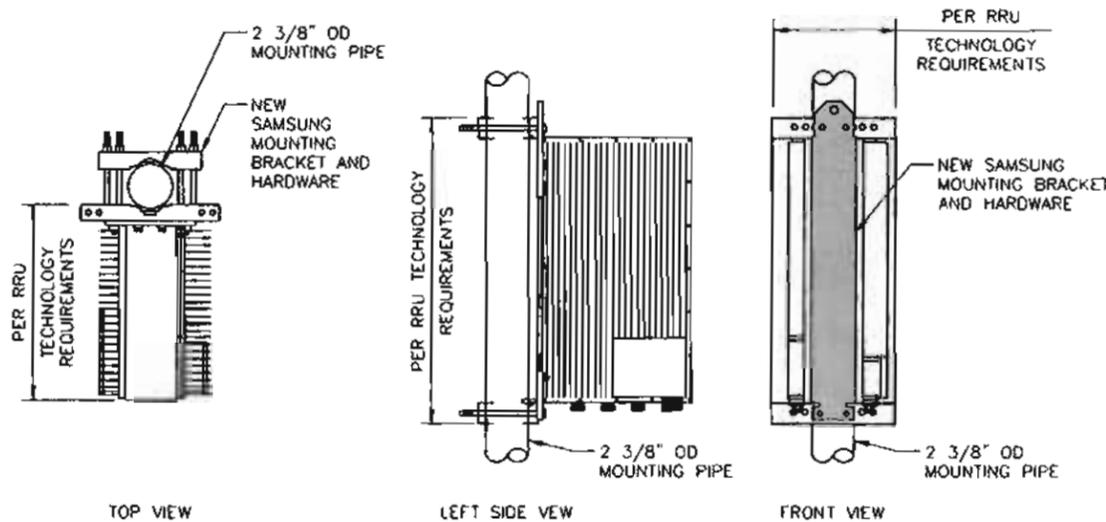
5 1900 MHz RRR-P4 MECHANICAL SPECIFICATIONS

SCALE: NTS



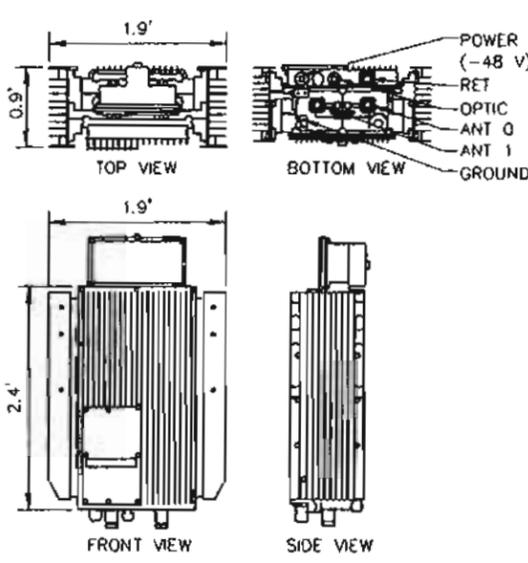
2 GPS UNIT PIPE MOUNT & REQUIREMENTS

SCALE: NTS



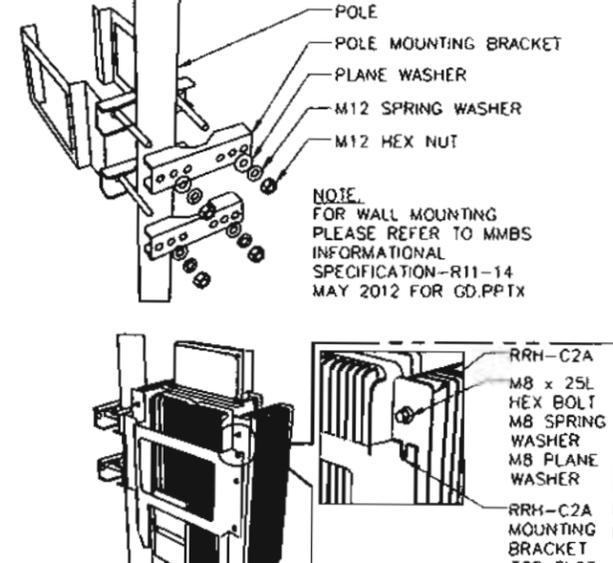
3 RRU POLE INSTALLATION DETAIL

SCALE: NTS



6 800 MHz RRR-C2A

SCALE: NTS



7 800 MHz RRR 2ND GEN POLE MOUNT

SCALE: NTS



GENERAL DYNAMICS WIRELESS SERVICES

REV	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	10-29-12	FINAL REVISION	JRV	DSB
2	10-30-12	MISS. REVISION	JRV	DSB
3	10-29-12	TRACK FOR CONSTRUCTION	JRV	DSB

BENCHMARK SERVICES, INC.
PO Box 5 318 North Main Street
Huntingburg, Indiana 47542
Phone: (812) 683-3049

CROWN CASTLE
BUN # 875287

STATE OF OHIO
RALPH M. WALLEM
E-67208
REGISTERED PROFESSIONAL ENGINEER
Ralph M. Wallem

PROJECT INFORMATION
NETWORK VISION MMBS LAUNCH DUBLIN FIRE STATION
CB03XC053
7673 AVERY ROAD
DUBLIN, OH 43017
FRANKLIN COUNTY

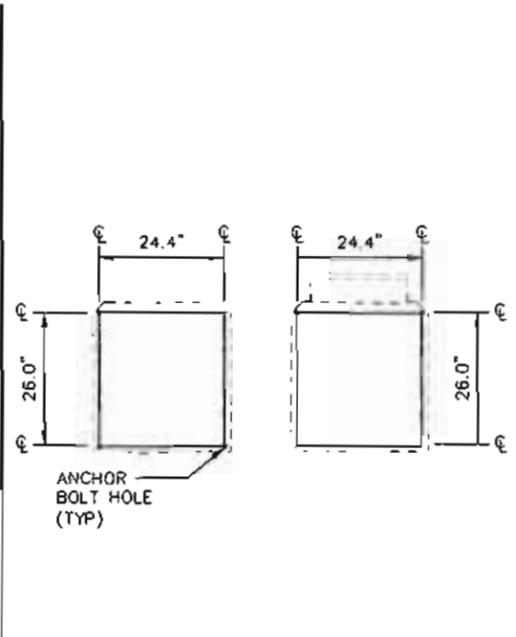
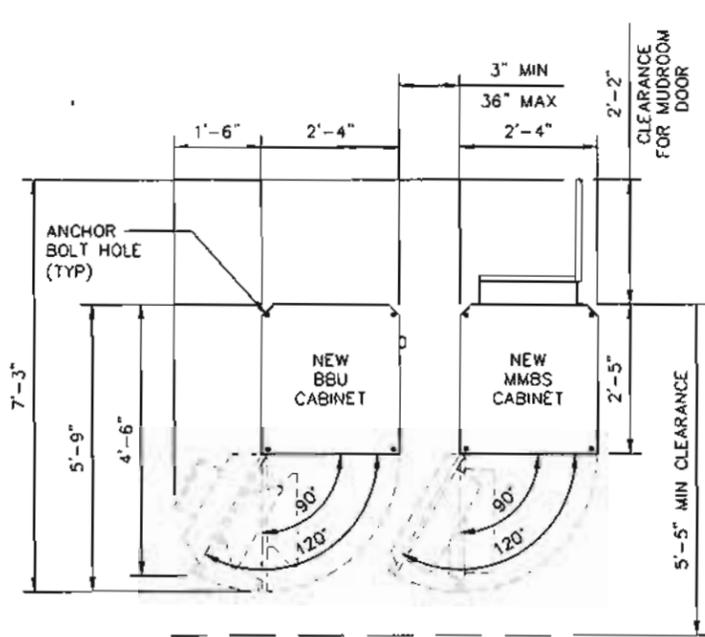
JOB NO: 2012-101-Benchmark Ohio Cell Towers

DRAWN BY: JRV	CHECKED BY: DSB	DATE: 10-29-12
---------------	-----------------	----------------

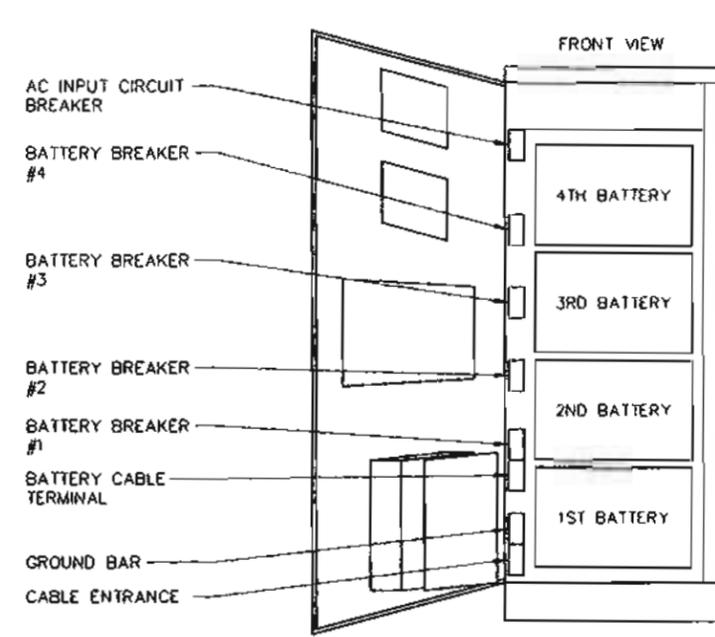
SHEET TITLE: **EQUIPMENT DETAILS**

SHEET NUMBER: **A-4**

REV: **2**



ITEM	SPECIFICATIONS
CAPACITY	MAX 4 BATTERY STRINGS
COOLING	AIR-CONDITIONER/COOLING WITH FAN FOR EMERGENCY MODE (MCLEAN T20 HVAC)
SOUND LEVEL	65BA @1.5m
SIZE	71(H) x 41.25(D) x 27.6(W) INCH 1800(H) x 1048(D) x 700(W) mm
CABINET WEIGHT	370 LBS
PER BATTERY STRING WEIGHT	529 LBS
BATTERY	NARADA 190AH (12NDT190) AGM TYPE (VRLA)
AC POWER	220VAC, 3.5AMP TYP 14.4AMP STARTING
DC POWER	10A MAX @48VDC



1 OUTDOOR MMBS & BBU TYPICAL LAYOUT

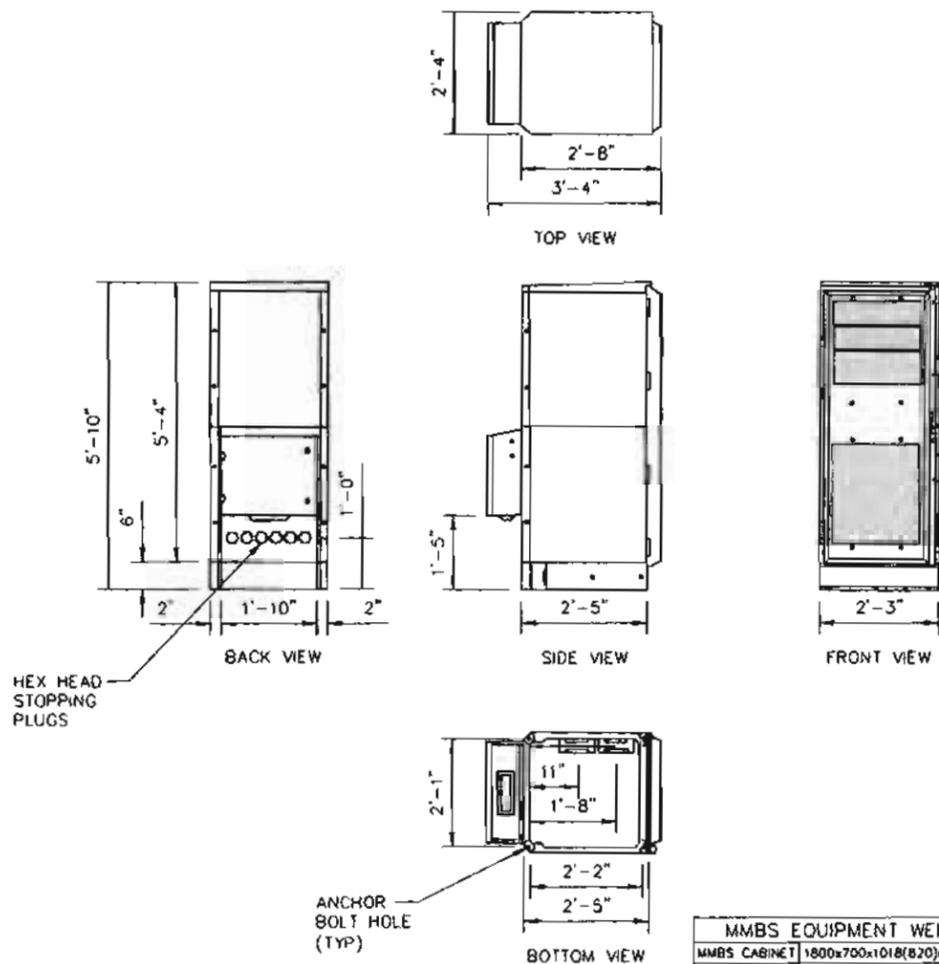
SCALE: NTS

2 ANCHOR BOLT LAYOUT

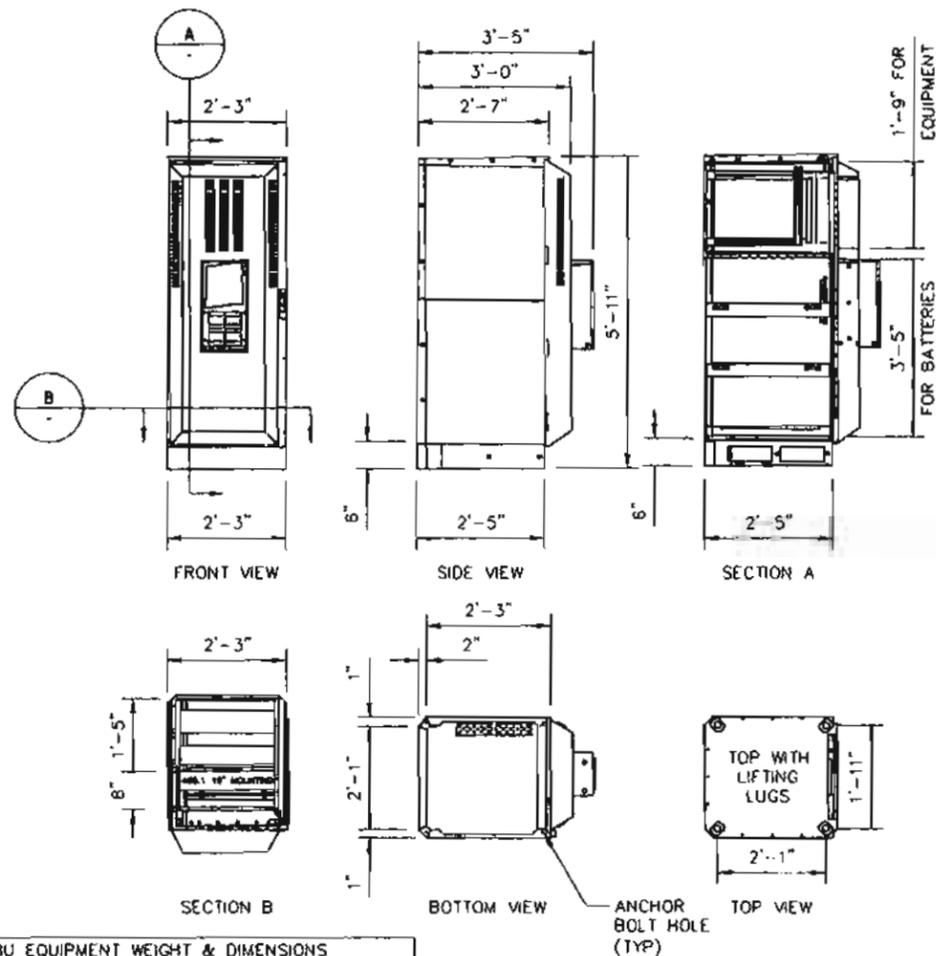
SCALE: NTS

3 BBU CABINET

SCALE: NTS



MMBS EQUIPMENT WEIGHT & DIMENSIONS	
MMBS CABINET	1800x700x1018(820)mm/70.8in x 29.5in x 40.1(37.0)in
MMBS CABINET	251kg (553lbs) W/O DU SHELF 302kg W/4 DU SHELF



BBU EQUIPMENT WEIGHT & DIMENSIONS	
BBU CABINET	1800x700x1018(820)mm/70.8in x 29.5in x 40.1(37.0)in
BBU CABINET	168kg (370lbs) W/O BATTERY 1136kg WITH BATTERY

4 MMBS MECHANICAL SPECIFICATIONS

SCALE: NTS

5 BBU MECHANICAL SPECIFICATIONS

SCALE: NTS

Sprint

SAMSUNG

GENERAL DYNAMICS WIRELESS SERVICES

REV	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	10/12	FINAL REVISIONS	JRV	DSB
2	10/30/12	MISC REVISIONS	JRV	DSB
3	10/22/12	ISSUED FOR CONSTRUCTION	JRV	DSB

BENCHMARK SERVICES, INC.
PO Box 5 318 North Main Street
Huntingburg, Indiana 47542
Phone: (812) 883-3049

CROWN CASTLE
BUN # 875287

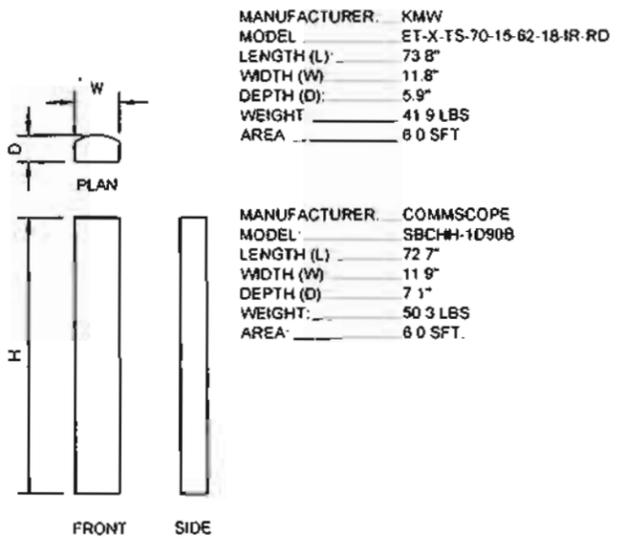
LICENSURE
STATE OF OHIO
RALPH M. WALLEM
E-67208
REGISTERED PROFESSIONAL ENGINEER
Ralph M. Wallem

PROJECT INFORMATION
NETWORK VISION MMBS LAUNCH
DUBLIN FIRE STATION
CB03XC053
7873 AVERY ROAD
DUBLIN, OH 43017
FRANKLIN COUNTY

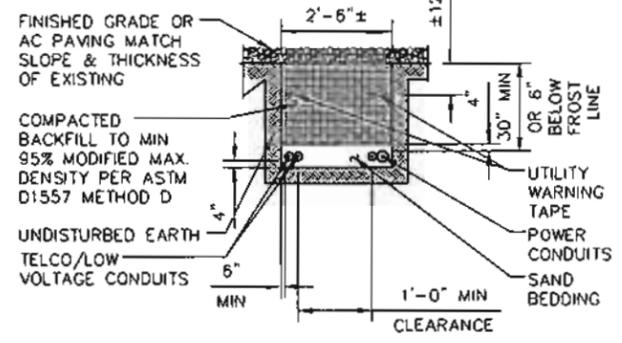
JOB NO.
2012-101-Benchmark Ohio Cell Towers
DRAWN BY: JRV
CHECKED BY: DSB
DATE: 10-29-12

SHEET TITLE
EQUIPMENT DETAILS
OUTDOOR SPECIFICATIONS

SHEET NUMBER: A-5
REV: 2



- NOTES**
- MULTIPLE CONDUITS CAN BE PLACED IN THE SAME TRENCH AS LONG AS A MINIMUM SEPARATION PER THE LOCAL UTILITY COMPANIES IS MAINTAINED. IN ALL CASES THE MINIMUM CENTER TO CENTER SPACING BETWEEN CONDUITS IS 1'-0" (NOT REQUIRED FOR COAX).
 - 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.
 - IF SAW CUT IS NEEDED, OVER CUT BOTH SIDES OF TRENCH BY MINIMUM OF 6" TO AVOID DEPRESSION IN THE FUTURE.



GENERAL DYNAMICS WIRELESS SERVICES

REV	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	10-29-12	FINAL REVISIONS	JRV	OSB
2	10-30-12	ISSUE REVISIONS	JRV	OSB
3	10-22-12	ISSUED FOR CONSTRUCTION	JRV	OSB

BENCHMARK SERVICES, INC.
 PO Box 5 318 North Main Street
 Huntingburg, Indiana 47542
 Phone: (812) 683-3049

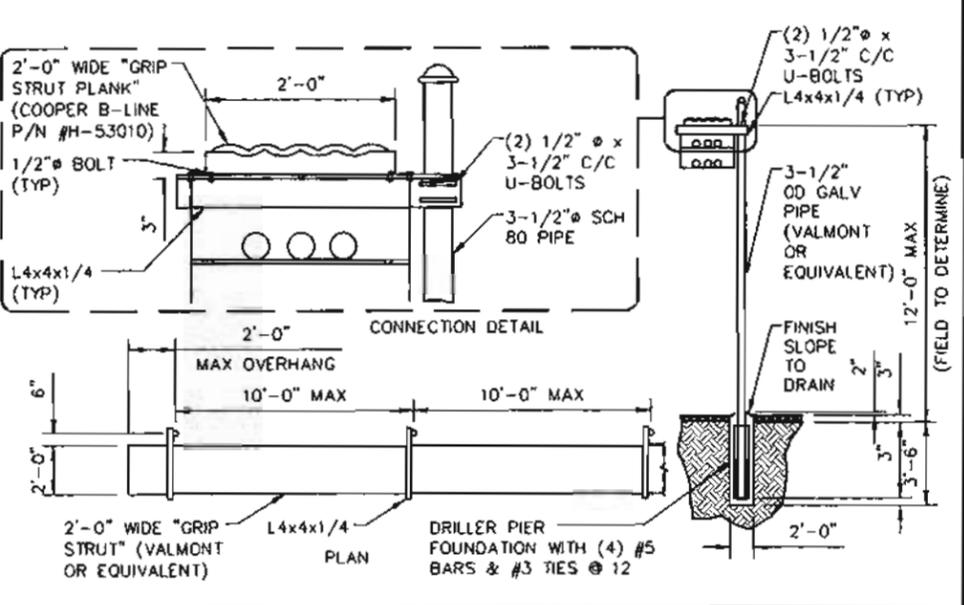
CROWN CASTLE
 BUN # 875287

1 ANTENNA SPECIFICATIONS - 800/1900 MHz
 SCALE: NTS

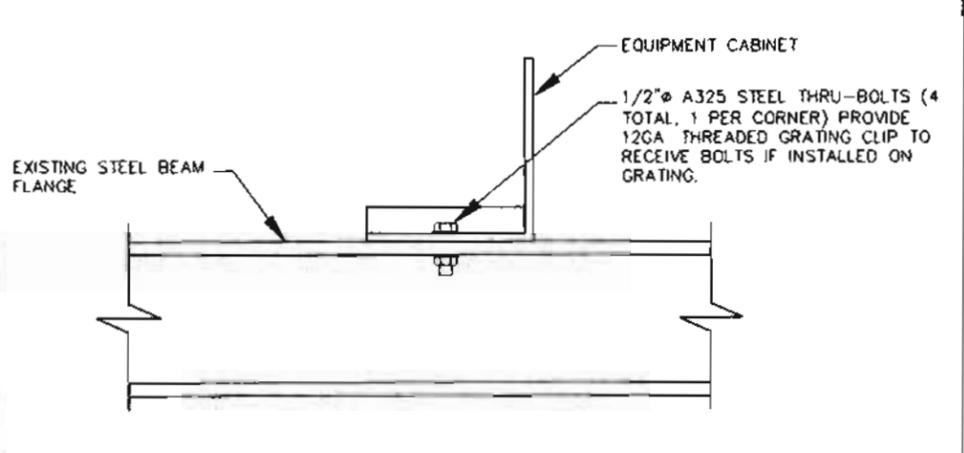
2 NOT USED
 SCALE: NTS

3 NOT USED
 SCALE: NTS

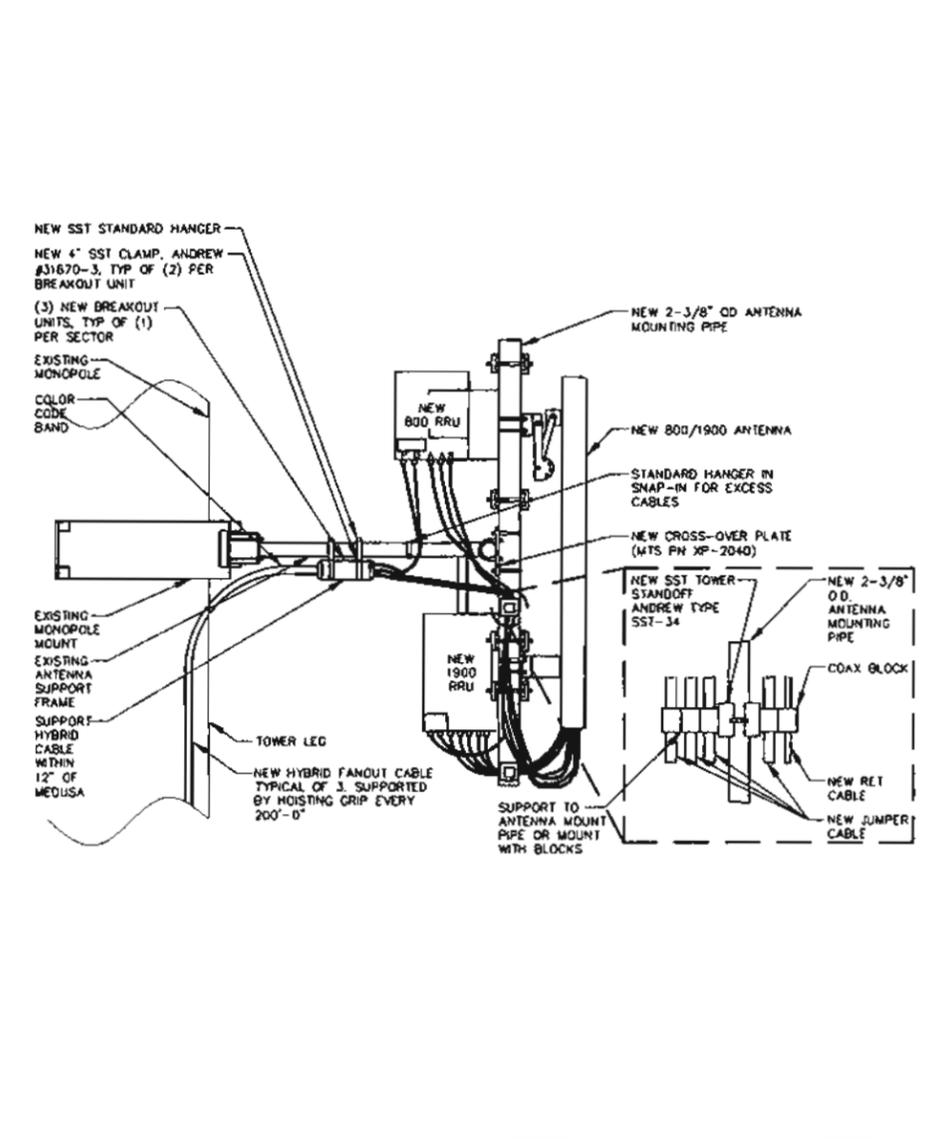
4 UTILITY TRENCH DETAIL
 SCALE: NTS



5 ICE BRIDGE DETAIL
 SCALE: NTS



5 CABINET ANCHOR DETAIL
 SCALE: NTS



7 TYPICAL BOOM & STANDOFF DETAIL 1900 ANTENNA DETAIL
 SCALE: NTS

LICENSURE

STATE OF OHIO

RALPH M. WALLEM

E-67208

REGISTERED PROFESSIONAL ENGINEER

Ralph M. Wallem

PROJECT INFORMATION

NETWORK VISION MMBS LAUNCH

DUBLIN FIRE STATION

CB03XC053

7673 AVERY ROAD
 DUBLIN, OH 43017
 FRANKLIN COUNTY

JOB NO
 2012-101-Benchmark Ohio Cell Towers

DRAWN BY JRV **CHECKED BY** OSB **DATE** 10-29-12

SHEET TITLE
 EQUIPMENT DETAILS

SHEET NUMBER A-6 **REV** 2

8 NOT USED
 SCALE: NTS

THIS DOCUMENT IS THE PROPERTY OF BENCHMARK SERVICES, INC. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREIN. IT IS NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF BENCHMARK SERVICES, INC.

SECTOR	FIRST RING	SECOND RING	THIRD RING
A	GREEN	NO TAPE	NO TAPE
B	GREEN	GREEN	NO TAPE
G	GREEN	GREEN	GREEN

FREQUENCY COLOR CODE	FIRST RING	SECOND RING
800 MHz	YELLOW	GREEN
1900 MHz	YELLOW	RED

FREQUENCY	ANTENNA PORT	RRU PORT	CABLE COLOR
800 MHz	RET	RET	N/A
	800 MHz +45°	ANT 1	WHITE
	800 MHz -45°	ANT 0	BLUE
1900 MHz	PCS1 -45°	ANT 0	BLUE
	PCS1 +45°	ANT 1	WHITE
	PCS2 -45°	ANT 2	GREEN
	PCS2 +45°	ANT 3	BROWN
	RET	RET	RED

SUPPLIER	TYPE	SAMSUNG FIBEROPTICS					ASIA TAI			
		LENGTH (FT)	TOTAL WEIGHT (KG)	WEIGHT/LF (LBS)	(KG)	(LBS)	TOTAL WEIGHT (KG)	WEIGHT/LF (LBS)	(KG)	(LBS)
TYPE 1	60	13	28	0.2	0.5	19	41	0.3	0.7	
	75	16	35	0.2	0.5	22	49	0.3	0.7	
	90	19	42	0.2	0.5	26	57	0.3	0.7	
	105	30	66	0.3	0.6	29	65	0.3	0.7	
	120	34	75	0.3	0.6	33	73	0.3	0.7	
TYPE 2	135	38	85	0.3	0.6	46	101	0.3	0.7	
	150	43	94	0.3	0.6	51	112	0.3	0.7	
	165	47	104	0.3	0.6	55	122	0.3	0.7	
	180	69	151	0.4	0.8	72	160	0.3	0.7	
	195	75	164	0.4	0.8	78	173	0.3	0.7	
TYPE 3	210	80	177	0.4	0.8	85	187	0.3	0.7	
	225	89	196	0.4	0.9	102	224	0.3	0.7	
TYPE 4	240	95	209	0.4	0.9	109	239	0.3	0.7	
	255	101	222	0.4	0.9	115	254	0.3	0.7	
TYPE 5	270	133	293	0.5	1.1	122	270	0.3	0.7	
	285	141	310	0.5	1.1	152	335	0.3	0.7	
	300	148	326	0.5	1.1	160	353	0.3	0.7	
	315	155	342	0.5	1.1	168	371	0.3	0.7	
	330	163	359	0.5	1.1	176	388	0.3	0.7	

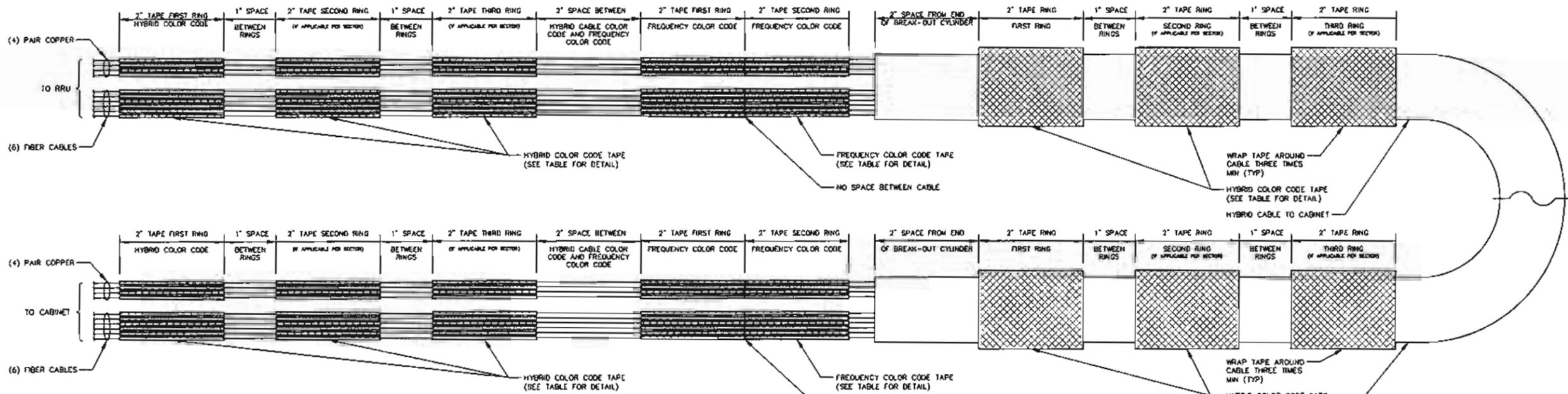
	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6	TYPE 7
TOTAL LENGTH	~114'-9.95"	~180'-5.35"	~213'-3.05"	~262'-5.60"	~328'-1"	~420'-0"	~550'-0"
HYBRID POWER CABLE CONFIGURATION	AWG 10 1 PAIR, AWG 12 3 PAIR	AWG 8 1 PAIR, AWG 10 3 PAIR	AWG 6 1 PAIR, AWG 8 1 PAIR, AWG 10 2 PAIR	AWG 6 1 PAIR, AWG 8 3 PAIR	AWG 4 1 PAIR, AWG 6 1 PAIR, AWG 8 2 PAIR	AWG 4 1 PAIR, AWG 6 3 PAIR	AWG 2 1 PAIR, AWG 4 3 PAIR
CABLE DIAMETER	0.98"	1.06"	1.18"	1.18"/1.25"	1.25"	1.56"	1.69"
BENDING RADIUS	11.81"	12.99"	15.35"	17.71"	17.71"	18.00"/30.00"	21.00"/35.00"
OPTIC CABLE	LC/PC-to-LC/PC, SINGLE MODE						
DU CABINET (POWER CABLE TERMINAL MAX SIZE AWG 4)	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE						
RRU POWER CABLE SPEC	AWG 8, 0.57"~0.60" AWG 10, 0.45"~0.48"					8 AWG CABLES 4 PAIRS	
NON USE POWER AND OPTIC CABLE PROTECTION	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE		2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE

SUPPLIER	TYPE	TESSCO	
		LENGTH (FT)	TOTAL WEIGHT (LBS)
TYPE 6	1	0.73	1.6
	1000	732	1613
	420	402	887
TYPE 7	1	1	2.2
	1000	1006	2218
	550	553	1220

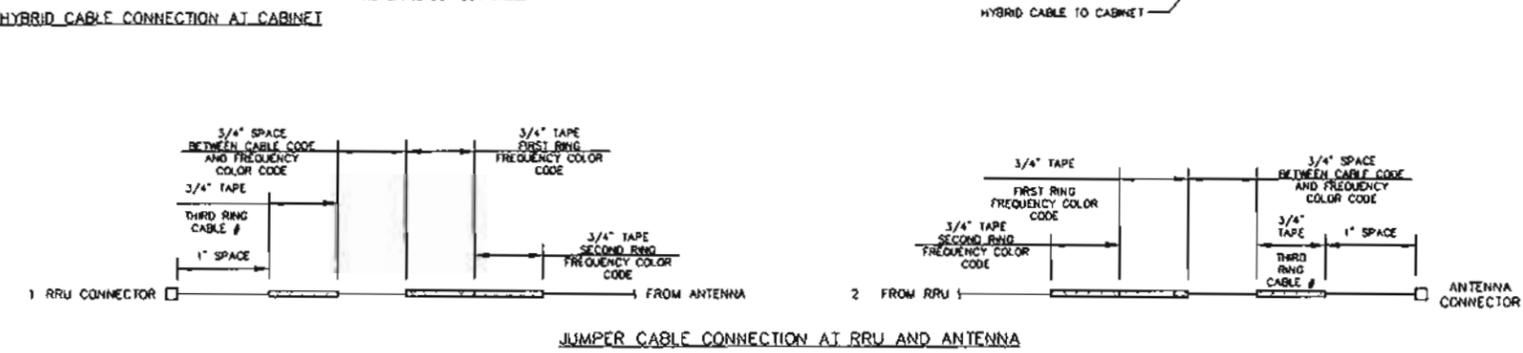
SEE TS200 SPRINT ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS FOR LATEST COLOR CODE REQUIREMENTS

1 HYBRID AND JUMPER CABLES COLOR CODING

2 HYBRID CABLE TYPE



- NOTE:**
- ALL CABLES SHALL BE MARKED AT THE TOP AND BOTTOM WITH 2" COLORED TAPE OR STENCIL TAG. COLOR TAPE SHALL BE OBTAINED FROM GRAYBAR ELECTRIC.
 - THE FIRST RING SHALL BE CLOSEST TO THE END OF THE CABLE AND SPACED APPROXIMATELY 2" FROM AN END CONNECTOR, WEATHERPROOFING, OR BREAK-OUT CYLINDER, WITH 1" SPACE BETWEEN EACH RING.
 - THE HYBRID CABLE COLOR SHALL BE APPLIED IN ACCORDANCE WITH THE "TYPICAL HYBRID CABLE COLOR CODE" TABLE ABOVE FOR THE RESPECTIVE SECTOR.
 - INDIVIDUAL POWER PAIRS AND FIBER CABLES SHALL BE LABELED WITH BOTH THE HYBRID CABLE COLOR FOR THE RESPECTIVE SECTOR AND A FREQUENCY COLOR CODE IN ACCORDANCE WITH THE "FREQUENCY COLOR CODE FOR PAIRS AND FIBER CABLES OF HYBRID CABLE" TABLE ABOVE.
 - A 2" GAP SHALL SEPARATE THE HYBRID CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE.
 - THE 2" COLOR RINGS FOR THE FREQUENCY CODE SHALL BE PLACED NEXT TO EACH OTHER WITH NO SPACES.
 - THE 2" COLORED TAPE(S) SHALL EACH BE WRAPPED A MINIMUM OF 3 TIMES AROUND THE HYBRID CABLE OR INDIVIDUAL CABLES, AND THE TAPE SHALL BE KEPT IN THE SAME LOCATION AS MUCH AS POSSIBLE.
 - COLOR BAND ON JUMPERS SHALL BE 2" WIDE WITH A 2" SPACE.



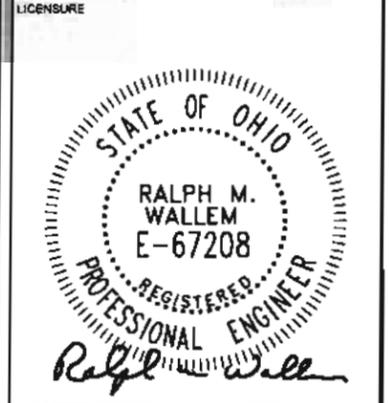
3 HYBRID CABLE COLOR SCHEME DETAIL



GENERAL DYNAMICS WIRELESS SERVICES

REV	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	12-13	FINAL REVISIONS	JRV	DSB
2	10-30-12	MISS. REVISIONS	JRV	DSB
3	10-22-12	ISSUED FOR CONSTRUCTION	JRV	DSB

BENCHMARK SERVICES, INC.
PO Box 5 318 North Main Street
Huntingburg, Indiana 47542
Phone: (812) 683-3049



PROJECT INFORMATION
**NETWORK VISION MMBS LAUNCH
DUBLIN FIRE STATION**
CB03XC053
7873 AVERY ROAD
DUBLIN, OH 43017
FRANKLIN COUNTY

JOB NO
2012-101-Benchmark Ohio Cell Towers
DRAWN BY: JRV
CHECKED BY: DSB
DATE: 10-29-12

SHEET TITLE
**ANTENNA AND CABLE
COLOR CODING DETAILS**

SHEET NUMBER: RF-1
REV: 2

ELECTRICAL NOTES

- ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH CURRENT NATIONAL ELECTRICAL CODES AND ALL LOCAL AND STATE CODE, LAWS, AND ORDINANCES PROVIDE ALL COMPONENTS AND WIRING SIZES AS REQUIRED TO MEET NEC STANDARDS.
- CONTRACTOR SHALL COORDINATE WITH LOCAL POWER COMPANY FOR REQUIREMENTS OF POWER SERVICE LINE TO THE METER BASE, WHEN REQUIRED POWER SERVICE REQUIREMENT IS COMMERCIAL, AC NOMINAL 120/208 VOLT OR 120/240 VOLT, SINGLE PHASE WITH 200 AMP RATING.
- CONTRACTOR SHALL COORDINATE WITH LOCAL TELEPHONE COMPANY FOR SERVICE LINE REQUIREMENTS TO TERMINATE AT THE PPC CABINET.
- CONTRACTOR SHALL FURNISH AND INSTALL ELECTRIC METER BASE AND 200A DISCONNECT SWITCH PER SITE PLAN DETAIL DRAWINGS AND PER LOCAL UTILITY COMPANIES SPECIFICATION, WHEN REQUIRED THE METER BASE SHOULD BE LOCATED IN A MANNER WHERE ACCESSIBLE BY THE LOCAL POWER COMPANY.
- LOCAL POWER COMPANY SHALL PROVIDE 200 AMP ELECTRIC METER CONTRACTOR SHALL COORDINATE INSTALLATION OF METER WITH LOCAL POWER COMPANY
- UNDERGROUND POWER AND TELCO SERVICE LINES SHALL BE ROUTED IN A COMMON TRENCH. ALL UNDERGROUND CONDUIT SHALL BE PVC SCHEDULE 40 AND CONDUIT EXPOSED ABOVE GROUND SHALL BE GALVANIZED RIGID STEEL TUBING UNLESS OTHERWISE INDICATED.
- ALL TELCO CONDUIT LINES SHALL BE 4" SCH. 40 PVC CONDUIT UNLESS OTHERWISE INDICATED. THE TELCO CONDUIT FROM THE PPC SHALL BE ROUTED AND TERMINATED AT DESIGNATED TELCO DEMARCATION OR 2-FEET OUTSIDE FENCED AREA, NEAR UTILITY POLE (IN FENCED AREA), OR END CAP OFF AND PROVIDE MARKER STAKE PAINTED BRIGHT ORANGE WITH DESIGNATION FOR TELCO SERVICE.
- CONDUITS INSTALLED AT PCS EQUIPMENT ENDS PRIOR TO THE EQUIPMENT INSTALLATION SHALL BE STUBBED AND CAPPED AT 6" ABOVE GRADE OR PLATFORM. IF SERVICE LINES CAN'T BE INSTALLED INITIALLY, PROVIDE NYLON PULL CORD IN CONDUITS.
- THE SPRINT CABINET, INCLUDING 200 AMP LOAD PANEL AND TELCO PANEL, SHALL BE PROVIDED BY OWNER AND INSTALLED BY THE CONTRACTOR. CONTRACTOR IS TO INSTALL BREAKER(S) NOT PROVIDED BY MANUFACTURER. SEE PANEL SCHEDULE ON THIS SHEET FOR BREAKER REQUIREMENTS.
- LOCATION OF ELECTRIC METER AND DISCONNECT SWITCH TO BE PROVIDED BY GENERAL CONTRACTOR.
- #2 WIRE TO BE UTILIZED IN ELECTRIC SERVICE RUNS EXCEEDING 100'.
- CONTRACTOR SHALL INSPECT THE EXISTING CONDITIONS PRIOR TO SUBMITTING BID ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTORS FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED
- LOCATION OF EQUIPMENT, CONDUIT AND DEVICES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND SHALL BE COORDINATED WITH FIELD CONDITIONS PRIOR TO ROUGH-IN
- THE CONDUIT RUNS AS SHOWN ON THE PLANS ARE APPROXIMATE EXACT LOCATION AND ROUTING SHALL BE PER EXISTING FIELD CONDITIONS

ELECTRICAL NOTES (CON'T)

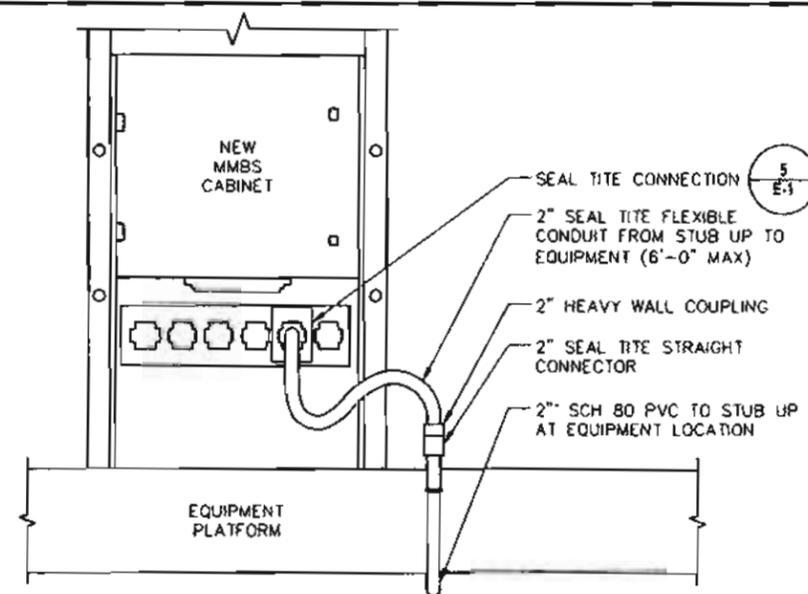
- ALL CONDUITS SHALL BE MET WITH BENDS MADE IN ACCORDANCE WITH NEC TABLE 346-10. NO RIGHT ANGLE DEVICE OTHER THAN STANDARD CONDUIT ELBOWS WITH 12" MINIMUM INSIDE SWEEPS FOR ALL CONDUITS 2" OR LARGER.
- ALL CONDUIT TERMINATIONS SHALL BE PROVIDED WITH PLASTIC THROAT INSULATING GROUNDING BUSHINGS.
- ALL WIRE SHALL BE "TYPE THWN, SOLID, ANNEALED COPPER UP TO SIZE 1/10 AWG (18 AND LARGER SHALL BE CONCENTRIC STRANDED) 75 DEGREE C. (187 DEGREES F). 98" CONDUCTIVITY MINIMUM #12
- ALL WIRES SHALL BE TAGGED AT ALL PULL BOXES, J-BOXES, EQUIPMENT BOXES AND CABINETS WITH APPROVED PLASTIC TAGS, ACTION CRAFT, BRADY, OR APPROVED EQUAL.
- ALL NEW MATERIAL SHALL HAVE A UL LABEL
- CONDUIT ROUGH-IN SHALL BE COORDINATED WITH THE MECHANICAL EQUIPMENT TO AVOID LOCATION TO CONFLICTS. VERIFY WITH MECHANICAL CONTRACTOR AND COMPLY AS REQUIRED.
- ALL PANEL DIRECTORIES SHALL BE TYPEWRITTEN NOT HAND WRITTEN.
- INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS PER THE SPECIFICATIONS AND NEC THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULLBOXES, AND ALL DISCONNECT SWITCHES, STARTERS, AND EQUIPMENT CABINETS.
- THE CONTRACTOR SHALL PREPARE AS-BUILT DRAWINGS, DOCUMENT ANY AND ALL WIRING AND EQUIPMENT CONDITIONS AND CHANGES WHILE COMPLETING THIS CONTRACT. SUBMIT AT SUBSTANTIAL COMPLETION
- ALL DISCONNECT SWITCHES AND OTHER CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED PHENOLIC NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS INSTALLED ON, AND PANEL FIELD LOCATION'S FED FROM (NO EXCEPTIONS.) PROVIDE SAMPLE FOR CONSTRUCTION MANAGER'S APPROVAL
- ALL ELECTRICAL DEVICES AND INSTALLATIONS OF THE DEVICES SHALL COMPLY WITH (ADA) AMERICANS WITH DISABILITIES ACT AS ADOPTED BY THE APPLICABLE STATE.
- PROVIDE CORE DRILLING AS NECESSARY FOR PENETRATIONS OR RISERS THROUGH BUILDING. DO NOT PENETRATE STRUCTURAL MEMBERS WITHOUT CONSTRUCTION MANAGERS APPROVAL. SLEEVES AND/OR PENETRATIONS IN FIRE RATED CONSTRUCTION SHALL BE PACKED WITH FIRE RATED MATERIAL WHICH SHALL MAINTAIN THE FIRE RATING OF THE WALL OR STRUCTURE. FILL FOR FLOOR PENETRATIONS SHALL PREVENT PASSAGE OF WATER, SMOKE, FIRE AND FUMES. ALL MATERIAL SHALL BE UL APPROVED FOR THIS PURPOSE
- ELECTRICAL CHARACTERISTICS OF ALL EQUIPMENT (NEW AND EXISTING) SHALL BE FIELD VERIFIED WITH THE OWNER'S REPRESENTATIVE AND EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN OF CONDUIT AND WIRE. ALL EQUIPMENT SHALL BE PROPERLY CONNECTED ACCORDING TO THE NAMEPLATE DATA FURNISHED ON THE EQUIPMENT (THE DESIGN OF THESE PLANS ARE BASED UPON BEST AVAILABLE INFORMATION AT THE TIME OF DESIGN AND SOME EQUIPMENT CHARACTERISTICS MAY VARY FROM DESIGN AS SHOWN ON THESE DRAWINGS).
- LOCATION OF ALL OUTLET, BOXES, ETC., AND THE TYPE OF CONNECTION (PLUG OR DIRECT) SHALL BE CONFIRMED WITH THE OWNER'S REPRESENTATIVE PRIOR TO ROUGH-IN.

VOLTAGE:	240V/120	PHASE:	1
MAIN BREAKER:	100 AMP	BUSS RATING:	100 AMPS
MOUNT:	SURFACE	NEUTRAL BAR:	YES
ENCLOSURE TYPE:	NEMA 3R	N TO GROUND BOND:	TBD
PANEL STATUS:	EXISTING	INTERNAL TVSS:	TBD
		WIRE:	3
		A/C:	TBD
		GROUND BAR:	TBD

CKT	LOAD DESCRIPTION	BREAKER AMPS	BREAKER POLES	BREAKER STATUS	BREAKER STATUS	BREAKER POLES	BREAKER AMPS	LOAD DESCRIPTION	CKT
1	SAMSUNG MMBS	100	1	NEW	NEW	2	15	SAMSUNG BBU	2
3	SAMSUNG MMBS	100	1	NEW	NEW	2	15	SAMSUNG BBU	4
5	FAN	20	1	ON	ON	1	10	LIGHT	6
7	BTS	60	2	ON	ON	2	60	BTS	8
9	N/A	N/A	N/A	ON	ON	1	15	TELCO	10
11	AC SURGE	100	2	ON	ON	2	100	AC SURGE	12

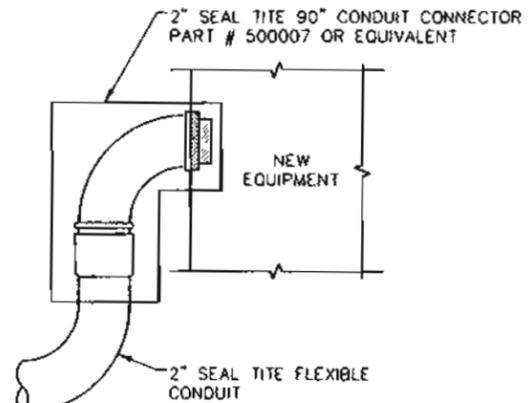
NOTES
GENERAL CONTRACTOR TO CHECK REQUIREMENTS WITH LOCAL POWER COMPANY AND JURISDICTION. ADDITIONAL SUB PANEL OFF THE PPC CABINET MIGHT BE REQUIRED TO FEED NEW NETWORK VISION EQUIPMENT.

3 PANEL SCHEDULE



4 TYPICAL EQUIPMENT POWER CONDUIT CONNECTIONS

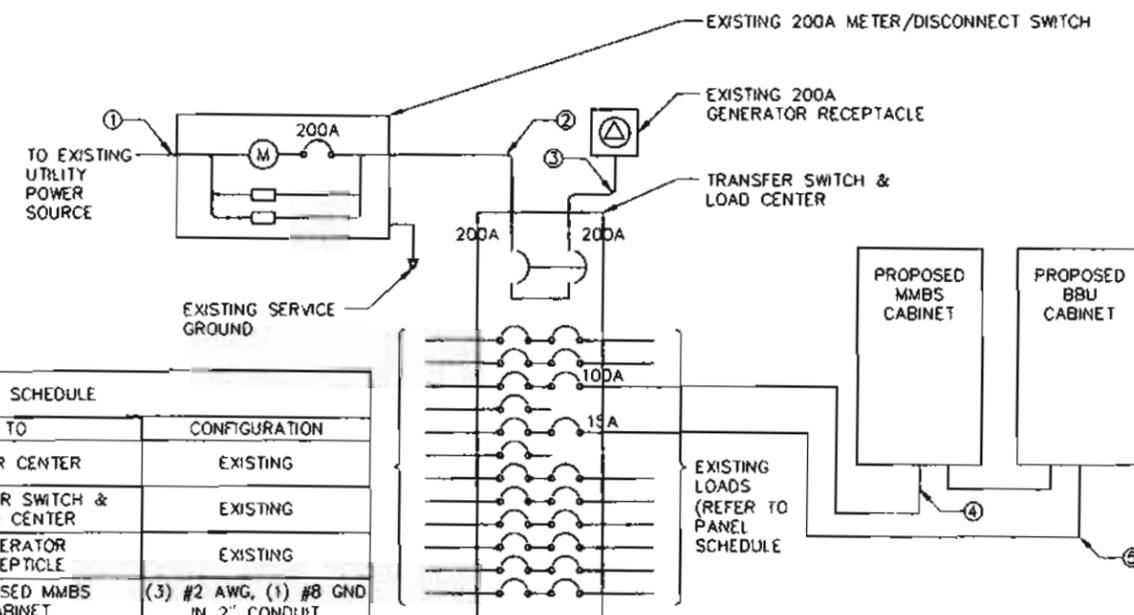
SCALE: NTS



5 SEAL TITE CONDUIT CONNECTION

SCALE: NTS

1 ELECTRICAL NOTES



CIRCUIT SCHEDULE			
NO	FROM	TO	CONFIGURATION
1	SOURCE	METER CENTER	EXISTING
2	METER/DSC	TRANSFER SWITCH & LOAD CENTER	EXISTING
3	TRANSFER SWITCH & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING
4	TRANSFER & LOAD CENTER SUB-PANEL	PROPOSED MMBS CABINET	(3) #2 AWG, (1) #8 GND IN 2" CONDUIT
5	TRANSFER & LOAD CENTER SUB-PANEL	PROPOSED BBU CABINET	(3) #10 AWG, (1) #10 GND IN 1" CONDUIT

2 ELECTRICAL ONE-LINE DIAGRAM



GENERAL DYNAMICS WIRELESS SERVICES

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	1-23-13	FINAL REVISIONS	JRV	DSB
2	10-30-12	MISC REVISIONS	JRV	DSB
3	10-22-12	ISSUED FOR CONSTRUCTION	JRV	DSB

BENCHMARK SERVICES, INC.
PO Box 5 318 North Main Street
Huntingburg, Indiana 47542
Phone: (812) 683-3049

CROWN CASTLE
BUN # 875287

LICENSEE

STATE OF OHIO
RALPH M. WALLEM
E-67208
REGISTERED PROFESSIONAL ENGINEER
Ralph M. Wallem

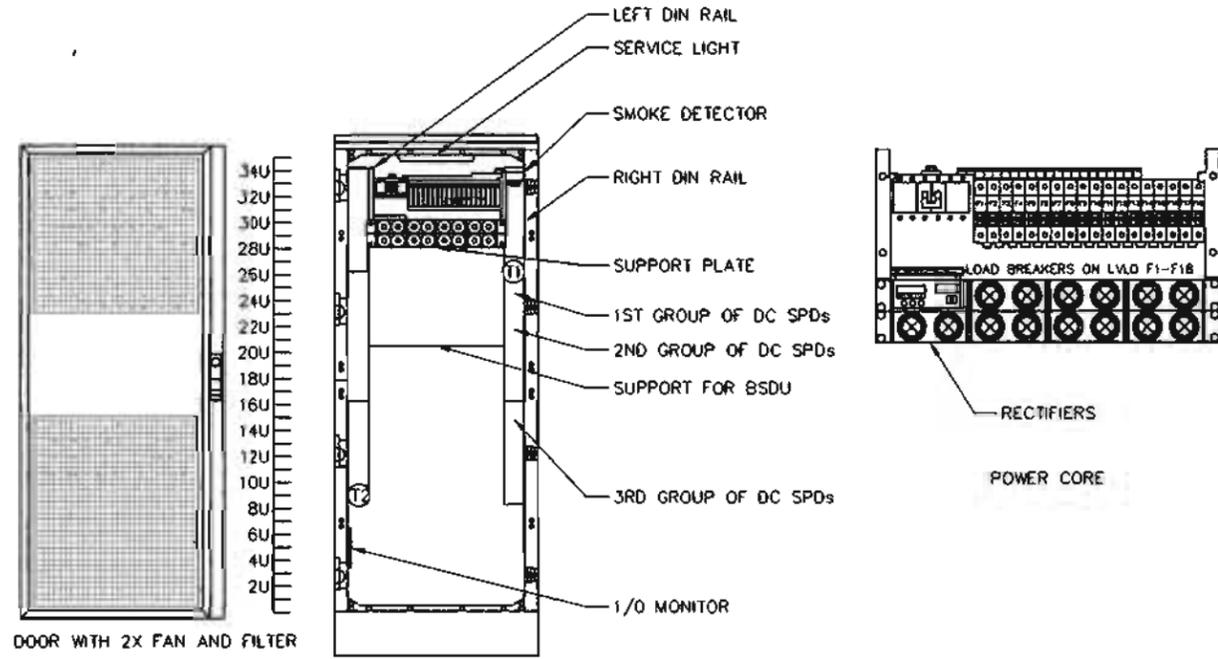
PROJECT INFORMATION
NETWORK VISION MMBS LAUNCH
DUBLIN FIRE STATION
CB03XC053
7673 AVERY ROAD
DUBLIN OH 43017
FRANKLIN COUNTY

JOB NO
2012-101-Benchmark Ohio Cell Towers

DRAWN BY: JRV
CHECKED BY: DSB
DATE: 10-29-12

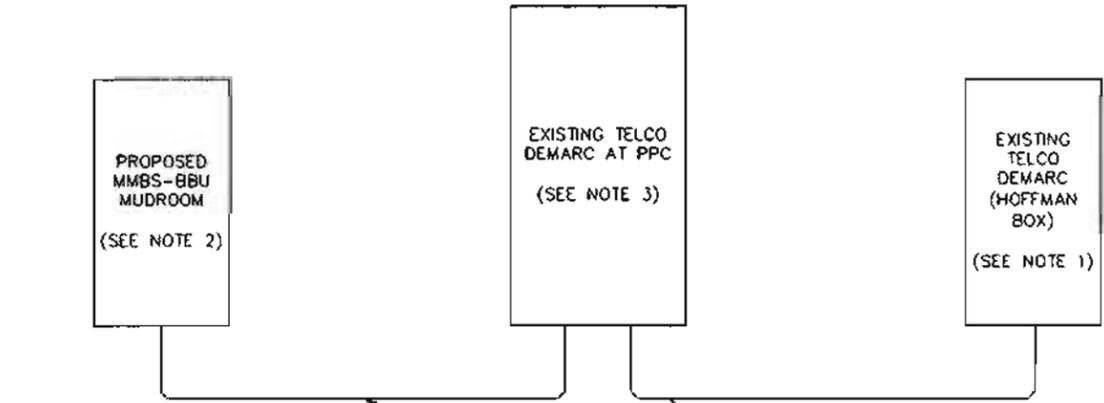
SHEET TITLE
ANTENNA AND CABLE COLOR CODING DETAILS

SHEET NUMBER: **E-1**
REV: **2**



1 OUTDOOR MMBS-BBU ELECTRICAL DETAILS

SCALE: NTS

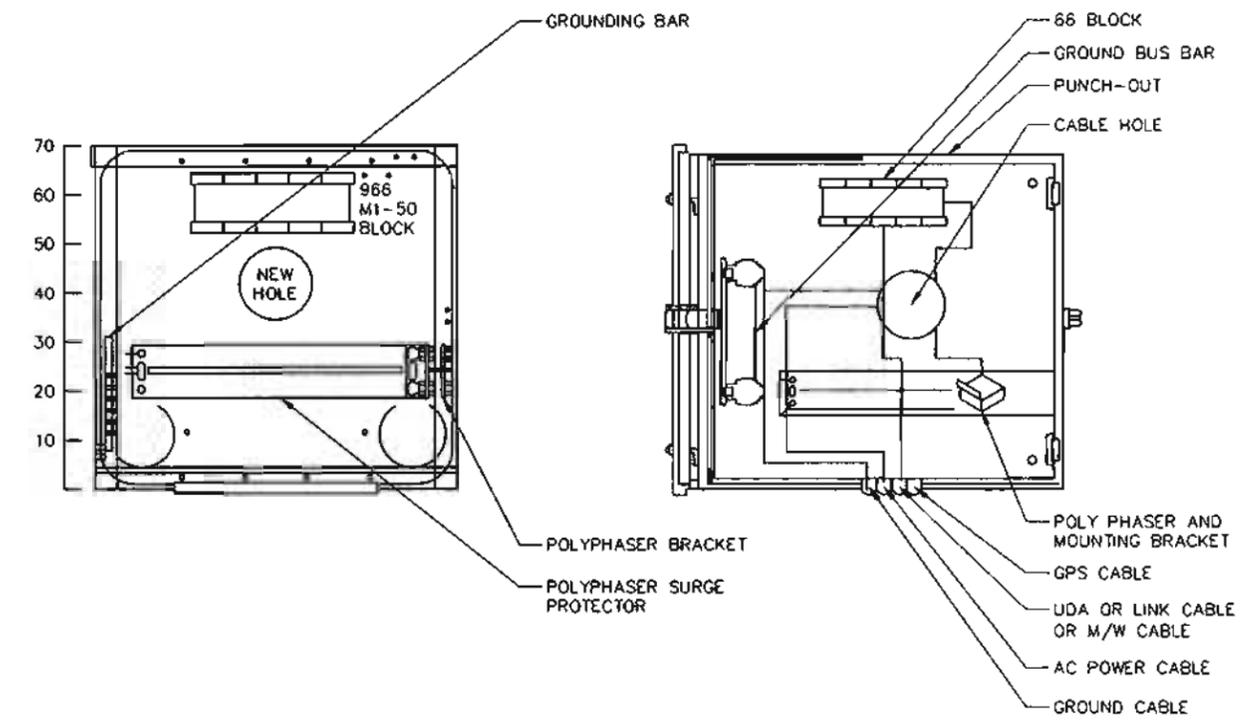


NOTES:

- CONTRACTOR TO INSTALL NEW 66 BLOCK IN EXISTING HOFFMAN BOX AT SITES MAIN TELCO DEMARC.
- CONTRACTOR SHALL INSTALL RJ-45 ENDS ON ALL (6) RUNS OF CAT5E INTO MMBS-BBU MUDROOM.
- CONTRACTOR TO INSTALL NEW 66 BLOCK IN EXISTING TELCO BOX NEXT TO EXISTING PPC CABINET.

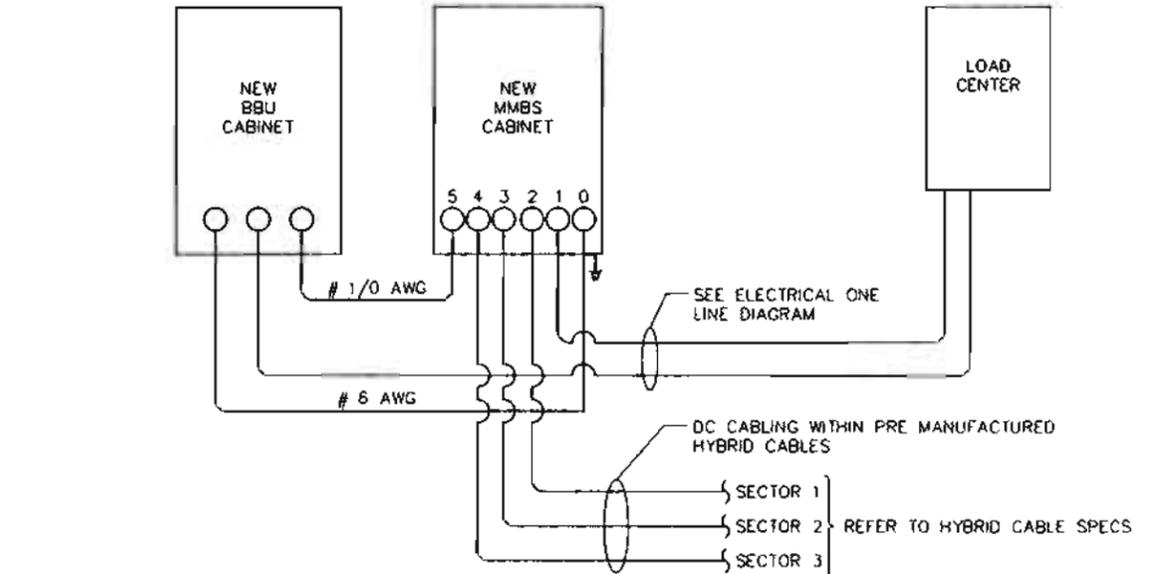
3 TELCO RISER DETAIL

SCALE: NTS



2 MUDROOM ELECTRICAL DETAIL

SCALE: NTS



DC POWER ELECTRICAL NOTES:

MINIMUM CABLE LENGTH BETWEEN THE OU AND BATTERY IS 70MM (2.75 in)
 MAXIMUM CABLE LENGTH DISTANCE IS 900MM (35.43 in).
 WEATHER PROOFING SHALL INCORPORATE PPC WEATHERPROOFING TAPE KIT, COLD SHRINK SHALL NOT BE USED.
 ROUTE DC CONDUCTORS IN CONDUITS TO NEW MMBS CABINET 48VDC POWER DISTRIBUTION PANEL TO AND FROM NEW BBU CABINET.
 -48 VDC CABLES BETWEEN NEW MMBS CABINET & RRU'S ARE FACTORY ASSEMBLED AND EQUIPPED WITH ONE PRE-TERMINATED END
 ALL FIELD INSTALLED DC CABLING SHALL BE TYPE RHM/RHW AND SHALL BE UL THERMOSET INSULATED.

MMBS PORT LAYOUT	
CONDUIT #	USAGE
0	BATTERY
1	AC/GROUND
2	RRU SECTOR 1
3	RRU SECTOR 2
4	RRU SECTOR 3
5	BATTERY

4 DC POWER DIAGRAM



GENERAL DYNAMICS WIRELESS SERVICES

REV	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
2	11-29-12	FINAL REVISIONS	JRV	DSB
1	10-30-12	MISC. REVISIONS	JRV	DSB
0	10-22-12	ISSUED FOR CONSTRUCTION	JRV	DSB

BENCHMARK SERVICES, INC.
 PO Box 5 318 North Main Street
 Huntingburg, Indiana 47542
 Phone: (812) 683-3049



LICENSURE

Ralph M. Wallem

PROJECT INFORMATION
 NETWORK VISION MMBS LAUNCH
DUBLIN FIRE STATION
 CB03XC053
 7873 AVERY ROAD
 DUBLIN, OH 43017
 FRANKLIN COUNTY

JOB NO
2012-101-Benchmark Ohio Cell Towers

DRAWN BY: JRV
 CHECKED BY: DSB
 DATE: 10-29-12

SHEET TITLE
OUTDOOR ELECTRICAL DETAILS

SHEET NUMBER: **E-2** REV: **2**

ALL INFORMATION CONTAINED HEREIN IS THE PROPERTY OF GENERAL DYNAMICS WIRELESS SERVICES. NO PART OF THIS DOCUMENT IS TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.

GENERAL GROUNDING NOTES:

1. ALL DETAILS ARE SHOWN IN GENERAL TERMS. ACTUAL INSTALLATION AND CONSTRUCTION MAY VARY DUE TO SITE SPECIFIC CONDITIONS.
2. GROUND ALL ANTENNA BASES, FRAMES, CABLE RUNS, AND OTHER METALLIC COMPONENTS USING GROUND WIRES AND CONNECT TO SURFACE MOUNTED BUS BARS. FOLLOW ANTENNA AND BTS MANUFACTURERS PRACTICES FOR GROUNDING REQUIREMENTS. GROUND COAX SHIELD AT BOTH ENDS AND EXIT FROM TOWER OR POLE USING MFR'S PRACTICES.
3. ALL GROUND CONNECTIONS SHALL BE EXOTHERMIC. ALL WIRES SHALL BE COPPER THHN/THWN. ALL GROUND WIRE SHALL BE GREEN INSULATED WIRE ABOVE GROUND.
4. CONTRACTOR TO VERIFY AND TEST GROUND TO SOURCE. GROUNDING AND OTHER OPERATIONAL TESTING WILL BE WITNESSED BY SPRINT WIRELESS, LLC. REPRESENTATIVE.
5. REFER TO DIVISION 16 GENERAL ELECTRIC, GENERAL ELECTRICAL PROVISION AND COMPLY WITH ALL REQUIREMENTS OF GROUNDING STANDARDS.
6. ELECTRICAL CONTRACTOR TO PROVIDE DETAILED DESIGN OF GROUNDING SYSTEM PER SPRINT STANDARD GROUNDING METHOD, AND RECEIVE APPROVAL OF DESIGN BY AUTHORIZED SPRINT MOBILITY REPRESENTATIVE, PRIOR TO INSTALLATION OF GROUNDING SYSTEM. PHOTO DOCUMENT ALL EXOTHERMIC AND GROUND RING NOTIFICATION CONSTRUCTION MANAGER IF THERE ARE ANY DIFFICULTIES INSTALLING GROUNDING SYSTEM DUE TO SITE SOIL CONDITIONS.
7. NOTIFY CONSTRUCTION MANAGER IF THERE ARE ANY DIFFICULTIES INSTALLING GROUNDING SYSTEM DUE TO SITE SOIL CONDITIONS.
8. ALL EXISTING GROUND BARS, WIRES & CONNECTIONS SHALL BE FIELD VERIFIED. ANY DEFICIENT ITEMS SHALL BE REPLACED AS REQUIRED TO ACHIEVE ADEQUATE GROUNDING REQUIRED BY SPRINT.

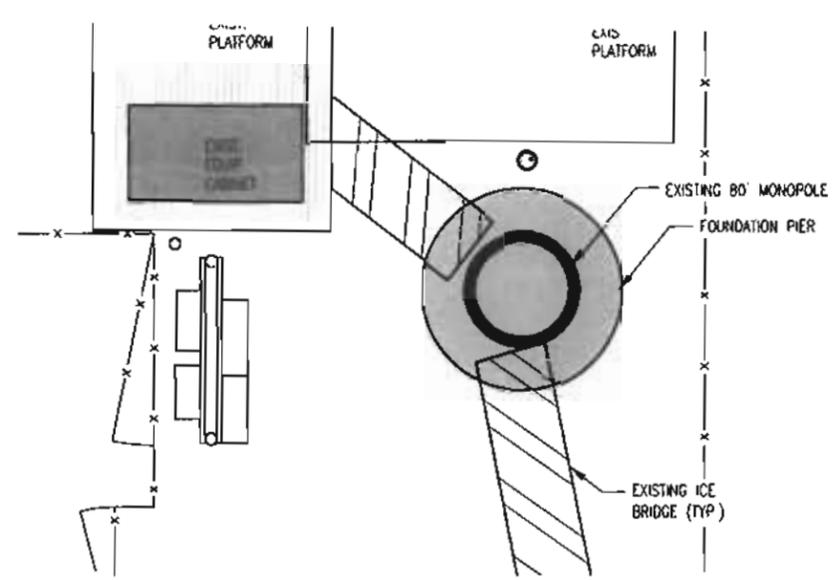
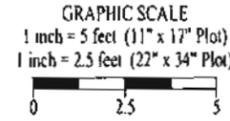
GROUNDING NOTES:

1. EXOTHERMIC WELDS (2). 2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUNDING BAR. ROUTE CONDUCTORS TO BURIED GROUNDING RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. EC SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "N", "I") WITH 1" HIGH LETTERS.
3. ALL HARDWARE 18-8 STAINLESS STEEL, INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING. ALL HARDWARE SHALL BE STAINLESS STEEL 3/8 INCH DIAMETER OR LARGER.
4. FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
5. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUNDING BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION ON ALL GROUNDING TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
6. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION, AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
7. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
8. WEATHERPROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
9. SUPPLIED AND INSTALLED BY CONTRACTOR.
10. WHEN THE SCOPE OF WORK REQUIRES THE ADDITION OF A GROUNDING BAR TO AN EXISTING TOWER, THE SUBCONTRACTOR SHALL OBTAIN APPROVAL FROM THE TOWER OWNER PRIOR TO MOUNTING THE GROUNDING BAR TO THE TOWER.
11. EXTEND TWO (2) 2 AWG TINNED CU CONDUCTOR FROM BURIED GROUNDING RING AND CONNECT TO THE PROPOSED TOWER. FOLLOW MANUFACTURERS RECOMMENDATIONS FOR GROUNDING CONNECTIONS TO THE TOWER. (APPLICABLE TO NEW TOWERS ONLY)
12. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION, AND CONNECTION ORIENTATION. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUNDING BARS AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
13. EXPOSED GROUND WIRES TO BE NON METALLIC LIQUID TIGHT.
14. CONTRACTOR TO REPLACE ALL MISSING GROUND BARS AND GROUNDING CONNECTIONS AS REQUIRED

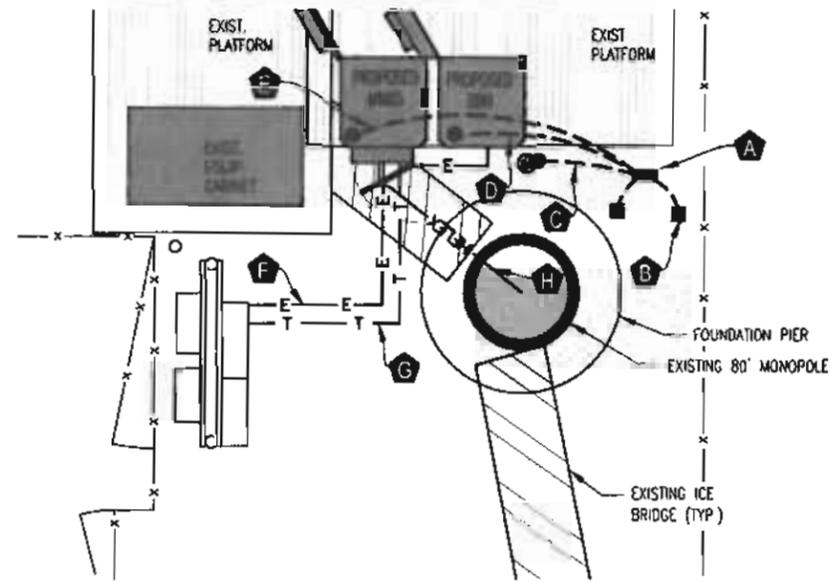
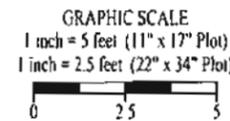
PROPOSED CONSTRUCTION LEGEND

- A. EXISTING MASTER GROUND BAR
- B. EXISTING MASTER GROUND BAR CONNECTED TO EXISTING GROUND RING (TYP.)
- C. CONNECT PROPOSED GPS UNIT TO EXISTING MASTER GROUND BAR
- D. CONNECT PROPOSED BBU UNIT TO EXISTING MASTER GROUND BAR
- E. CONNECT PROPOSED MMBS UNIT TO EXISTING MASTER GROUND BAR
- F. PROPOSED ELECTRICAL CONDUIT
- G. PROPOSED TELCO CONDUIT
- H. PROPOSED HYBRIFLEX ROUTE

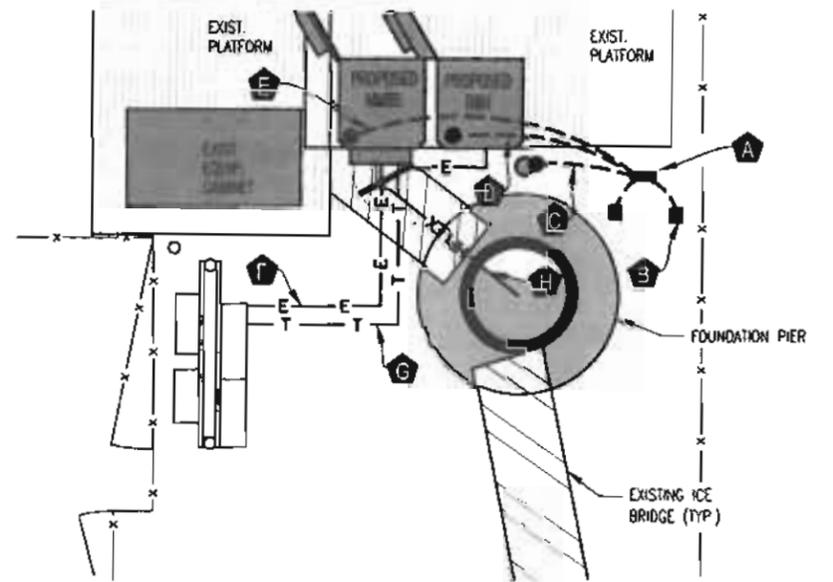
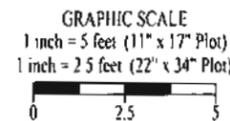
- EXOTHERMIC CONNECTION
- MECHANICAL CONNECTION
- ANTENNA GROUND BAR
- MASTER GROUND BAR



1 EQUIPMENT GROUND & ROUTING PLAN (EXISTING)



2 EQUIPMENT GROUND & ROUTING PLAN (INTERIM)



3 EQUIPMENT GROUND & ROUTING PLAN (FINAL)

1 COMPOUND PLAN - EXISTING

Sprint

SAMSUNG

GENERAL DYNAMICS WIRELESS SERVICES

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	1-29-12	FINAL REVISIONS	JRV	DSB
2	10-30-12	MISC REV. 1-43	JRV	DSB
3	10-29-12	ISSUED FOR CONSTRUCTION	JRV	DSB

BENCHMARK SERVICES, INC.
PO Box 5 318 North Main Street
Huntingburg, Indiana 47542
Phone: (812) 683-3049

CROWN CASTLE
BUN # 875287

LICENSURE

STATE OF OHIO
REGISTERED PROFESSIONAL ENGINEER
RALPH M. WALLEM
E-67208
Ralph M. Wallem

PROJECT INFORMATION
**NETWORK VISION MMBS LAUNCH
DUBLIN FIRE STATION**
CB03XC053
7873 AVERY ROAD
DUBLIN, OH 43017
FRANKLIN COUNTY

JOB NO
2012-101-Benchmark Ohio Cell Towers
DRAWN BY: JRV
CHECKED BY: DSB
DATE: 10-29-12

SHEET TITLE
GROUNDING AND ROUTING PLANS

SHEET NUMBER: **E-3** REV: **2**

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	1-25-12	FINAL REVISIONS	JRV	DSB
2	10-30-12	WDC REVISIONS	JRV	DSB
3	10-22-12	ISSUED FOR CONSTRUCTION	JRV	DSB

BENCHMARK SERVICES, INC.
 PO Box 5 318 North Main Street
 Huntingburg, Indiana 47542
 Phone: (812) 683-3049

CROWN CASTLE
 BUN # 875287

LICENSURE

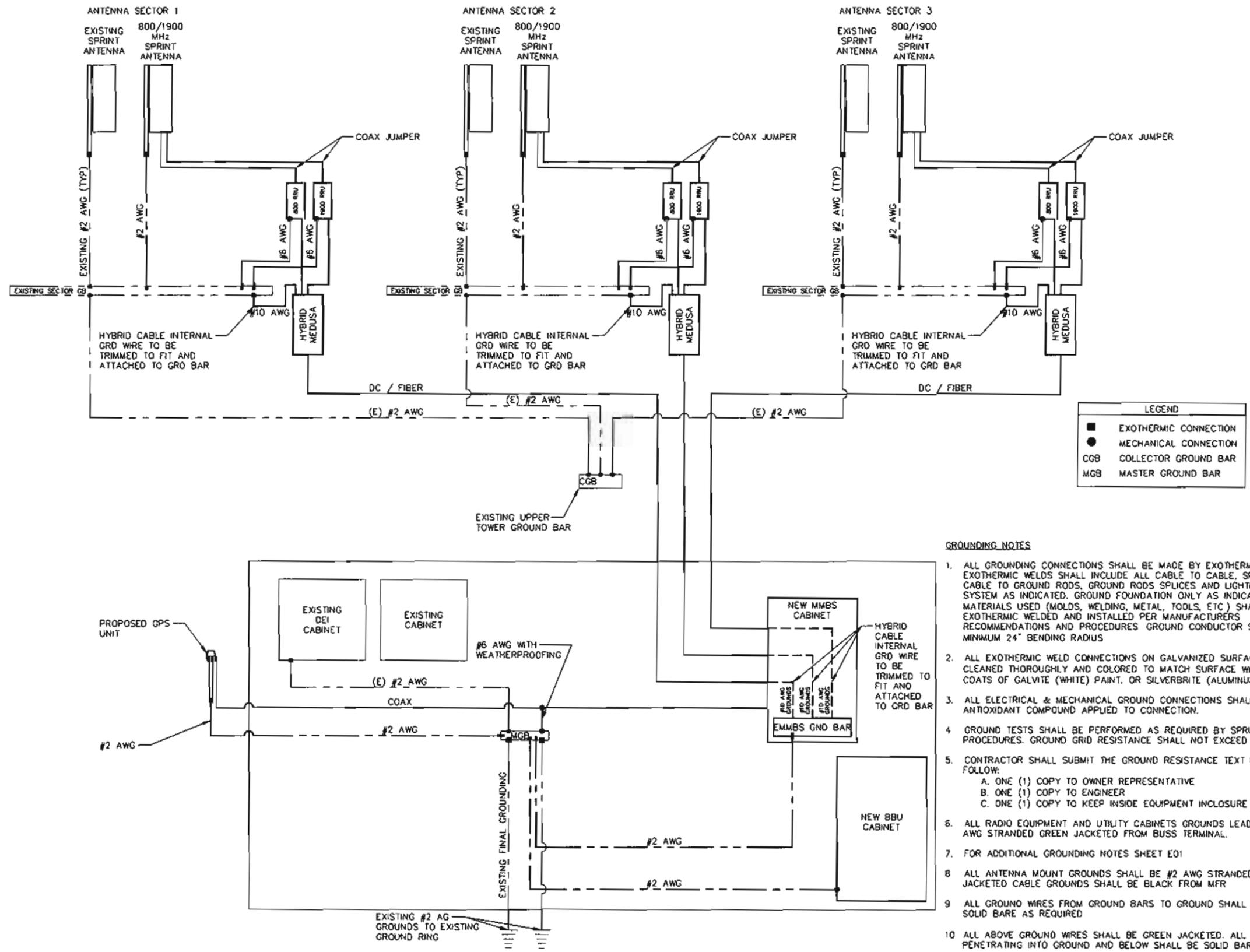
STATE OF OHIO
 RALPH M. WALLEM
 E-67208
 REGISTERED PROFESSIONAL ENGINEER
Ralph M. Wallem

PROJECT INFORMATION
**NETWORK VISION MMBS LAUNCH
 DUBLIN FIRE STATION**
 CB03XC053
 7673 AVERY ROAD
 DUBLIN, OH 43017
 FRANKLIN COUNTY

JOB NO
2012-101-Benchmark Ohio Cell Towers
 DRAWN BY: JRV
 CHECKED BY: DSB
 DATE: 10-29-12

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER: **E-4** REV: **2**



LEGEND

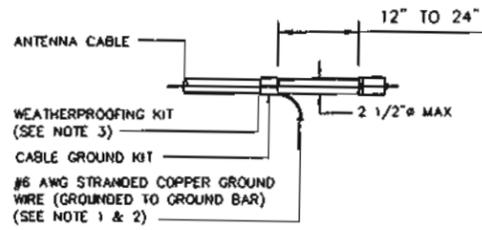
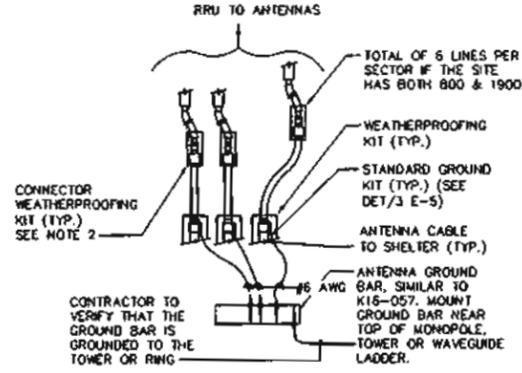
- EXOTHERMIC CONNECTION
- MECHANICAL CONNECTION
- CGB COLLECTOR GROUND BAR
- MGB MASTER GROUND BAR

GROUNDING NOTES

1. ALL GROUNDING CONNECTIONS SHALL BE MADE BY EXOTHERMIC WELDS. EXOTHERMIC WELDS SHALL INCLUDE ALL CABLE TO CABLE, SPLICES, ETC. ALL CABLE TO GROUND RODS, GROUND RODS SPLICES AND LIGHTING PROTECTIONS SYSTEM AS INDICATED. GROUND FOUNDATION ONLY AS INDICATED BY PM. ALL MATERIALS USED (MOLDS, WELDING, METAL, TOOLS, ETC) SHALL BE EXOTHERMIC WELDED AND INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND PROCEDURES. GROUND CONDUCTOR SHALL HAVE A MINIMUM 24" BENDING RADIUS.
2. ALL EXOTHERMIC WELD CONNECTIONS ON GALVANIZED SURFACES SHALL BE CLEANED THOROUGHLY AND COLORED TO MATCH SURFACE WITH (2) TWO COATS OF GALVITE (WHITE) PAINT, OR SILVERBRITE (ALUMINUM).
3. ALL ELECTRICAL & MECHANICAL GROUND CONNECTIONS SHALL HAVE ANTIOXIDANT COMPOUND APPLIED TO CONNECTION.
4. GROUND TESTS SHALL BE PERFORMED AS REQUIRED BY SPRINT STANDARD PROCEDURES. GROUND GRID RESISTANCE SHALL NOT EXCEED 5-OHMS.
5. CONTRACTOR SHALL SUBMIT THE GROUND RESISTANCE TEXT REPORT AS FOLLOW:
 - A. ONE (1) COPY TO OWNER REPRESENTATIVE
 - B. ONE (1) COPY TO ENGINEER
 - C. ONE (1) COPY TO KEEP INSIDE EQUIPMENT INCLOSURE
6. ALL RADIO EQUIPMENT AND UTILITY CABINETS GROUNDS LEADS TO BE #2 AWG STRANDED GREEN JACKETED FROM BUSS TERMINAL.
7. FOR ADDITIONAL GROUNDING NOTES SHEET E01
8. ALL ANTENNA MOUNT GROUNDS SHALL BE #2 AWG STRANDED GREEN JACKETED CABLE GROUNDS SHALL BE BLACK FROM MFR
9. ALL GROUND WIRES FROM GROUND BARS TO GROUND SHALL BE #2 AWG SOLID BARE AS REQUIRED
10. ALL ABOVE GROUND WIRES SHALL BE GREEN JACKETED. ALL GROUND WIRE'S PENETRATING INTO GROUND AND BELOW SHALL BE SOLID BARE

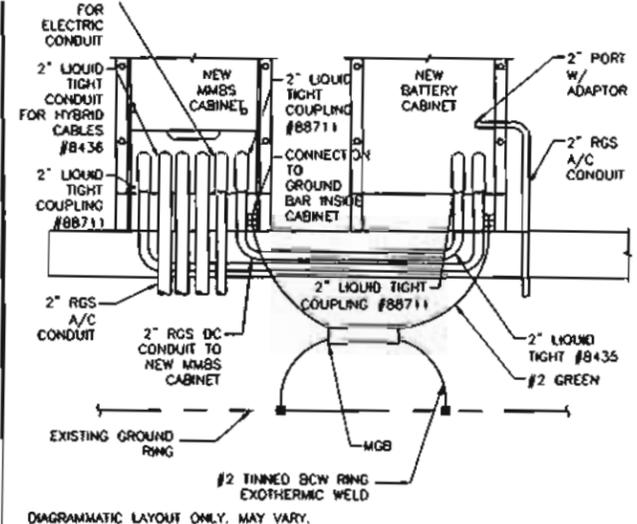
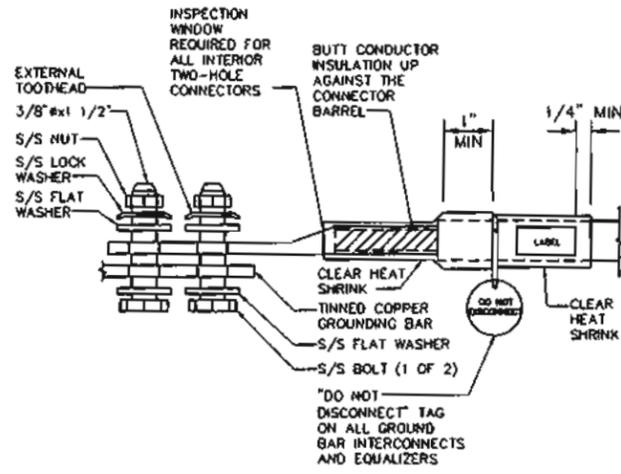
ALL INFORMATION CONTAINED HEREIN IS PROPRIETARY TO SPRINT. ANY USE, REPRODUCTION, OR OTHER PLAGIARISM THAT RELATES TO SPRINT SERVICES IS STRICTLY PROHIBITED.

- NOTES:
- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR
 - WEATHER PROOFING SHALL BE ANDREWS (TYPE & PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.)



CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

- NOTES:
- DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR
 - GROUNING KIT SHALL BE ANDREW SUREGROUND TYPE KIT WITH TWO-HOLE LUG.
 - WEATHER PROOFING SHALL INCORPORATE PPC WEATHERPROOFING TAPE KIT, COLD SHRINK SHALL NOT BE USED.



1 TYP COAX GROUNDING

2 CABLE GROUNDING

3 TWO HOLE LUG

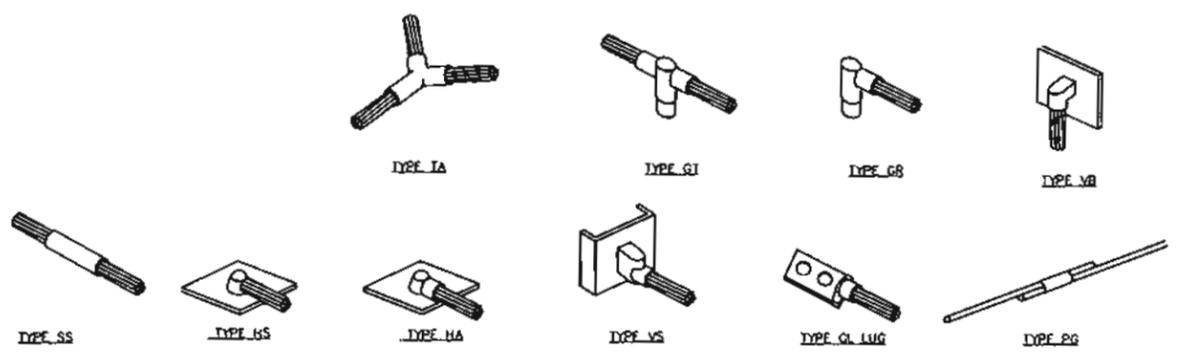
4 CABINET GROUNDING SCHEMATIC

SCALE: NTS

SCALE: NTS

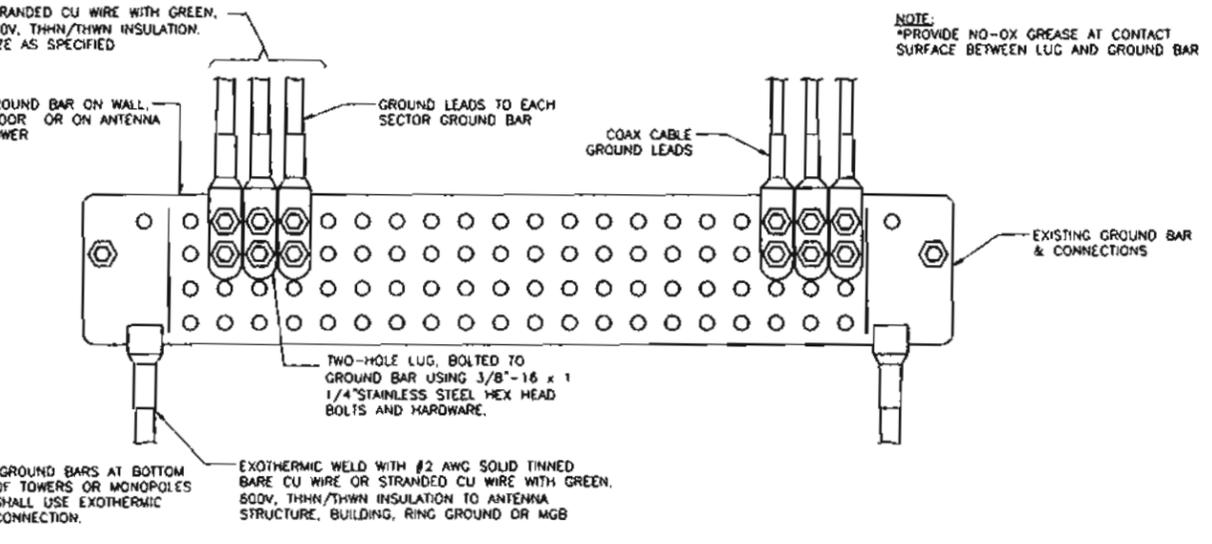
SCALE: NTS

SCALE: NTS



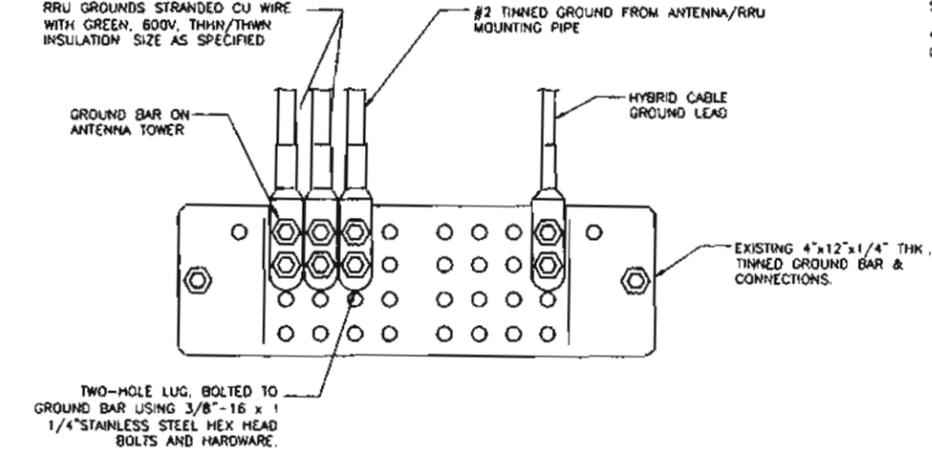
5 TYPICAL EXOTHERMIC WELD CONNECTIONS

SCALE: NTS



7 TOWER MASTER GROUND BAR CONNECTIONS

SCALE: NTS



6 SECTOR GROUND BAR CONNECTIONS

SCALE: NTS



GENERAL DYNAMICS WIRELESS SERVICES

REV	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
1	1-23-12	Final Design	JRV	DSB
2	10-30-12	REV REVISIONS	JRV	DSB
3	10-22-12	REV FOR CONSTRUCTION	JRV	DSB

BENCHMARK SERVICES, INC.
 PO Box 5 318 North Main Street
 Huntingburg, Indiana 47542
 Phone: (812) 683-3049

CROWN CASTLE
 BUN # 875287

STATE OF OHIO
 RALPH M. WALLEM
 E-67208
 REGISTERED PROFESSIONAL ENGINEER

Ralph M. Wallem

PROJECT INFORMATION
NETWORK VISION MMBS LAUNCH DUBLIN FIRE STATION
 CB03XC053
 7673 AVERY ROAD
 DUBLIN, OH 43017
 FRANKLIN COUNTY

JOB NO
 2012-101-Benchmark Ohio Cell Towers

DRAWN BY: JRV
 CHECKED BY: DSB
 DATE: 10-29-12

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER: **E-5**
 REV: **2**

THE INFORMATION CONTAINED HEREIN IS THE PROPERTY OF BENCHMARK SERVICES, INC. AND IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED. ANY USE OR DISCLOSURE OF THIS INFORMATION FOR ANY OTHER PROJECT OR SITE WITHOUT THE WRITTEN PERMISSION OF BENCHMARK SERVICES, INC. IS STRICTLY PROHIBITED.