



## ARLINGTON COUNTY, VIRGINIA

**County Board Agenda Item  
Meeting of March 13, 2010**

**DATE:** March 2, 2010

**SUBJECT:** U-3244-10-1 USE PERMIT for public utility/telecommunications for one (1) microwave/dish antenna located at 4241 Columbia Pike (RPC #22-034-100 through -143).

**Applicant:**

Clearwire Wireless Broadband

**By:**

Adam Knubel

Clearwire Wireless Broadband

7380 Coca Cola Drive, Suite 106

Hanover, Maryland 21076

**C.M. RECOMMENDATION:**

Approve the use permit for addition of one (1) dish antenna to an existing telecommunications facility subject to the conditions of the staff report.

**ISSUES:** The applicant is requesting a use permit to install one (1) dish antenna at an existing telecommunications facility on the roof of a multifamily, condominium building, and no issues have been identified.

**SUMMARY:** The applicant, Clearwire Wireless Broadband, is requesting a use permit for the addition of one (1) microwave dish antenna to an existing telecommunications facility on the roof of the Tanglewood Condominiums. The one (1) dish antenna is proposed to be mounted lower than the height of the penthouse of the building, and will not create additional visual impact. The proposal is consistent with the *Interim Guidelines for Telecommunications Facilities on County-Owned Property* (Telecommunications Guidelines), which is used as a guide on privately owned property and encourages the placement of antennas on existing structures. The Barcroft and Douglas Park Civic Associations have been contacted. At the date of this report, staff has not received any responses. Therefore, staff recommends that the use permit be approved subject to the conditions of the staff report.

**BACKGROUND:** The applicant is proposing to mount one (1) additional dish antenna to an existing telecommunications facility on the roof of the Tanglewood Condominiums. The site is

County Manager: BMD/GA

Staff: Marco Antonio Rivero, DCPHD, Planning Division

PLA-5521

located at 4241 Columbia Pike, and is described as follows:

Site: The site is bound on the south by Columbia Pike, on the east by South George Mason Drive, and on the west by South Taylor Street. The site consists of a residential multifamily building.

Zoning: The site is zoned “RA8-18” Apartment Dwelling Districts.

Land Use: The site is designated on the General Land Use Plan (GLUP) as “Low-Medium” Residential (16-36 units/acre).

Neighborhood: The site is located within the Barcroft and Douglas Park Civic Associations. The civic associations have been contacted. At the date of this report, no issues have been raised by the civic associations or citizens about the use permit request.

**DISCUSSION:** The applicant, Clearwire Wireless Broadband, is requesting a use permit for the placement of one (1) dish antenna on the roof of the Tanglewood Condominiums. The roof of the subject multifamily building contains an existing telecommunications facility consisting of a number of panel, microwave dish, and GPS antennas. The applicant’s revised proposal includes mounting one (1) dish antenna on the north facing side of an existing rooftop penthouse, at a height of 70’ from grade. The new dish antenna would be no taller than the existing penthouse structure. New antenna cable will be installed within the existing cable tray leading towards the existing equipment shelter, which is located adjacent to the building at grade. The subject microwave dish antenna measures approximately sixteen (16) inches in diameter.

The *Interim Guidelines for Placement of Telecommunications Facilities on County-Owned Property* (Telecommunications Guidelines), were used to evaluate the application. The Telecommunication Guidelines offer direction in the way of design, visual impact, and compliance with Federal Communications Commission (FCC) regulations, among other things. The Telecommunication Guidelines can be applied to telecommunication facilities on privately owned as well as County-owned property. The Telecommunications Guidelines encourage the location of new antennas on existing structures, as opposed to constructing a new pole. The proposed dish antenna meets these criteria. Attached are plans depicting the location and appearance for the proposed dish antenna.

The proposal will not have a visual impact on the surrounding residences. The penthouse on the subject building reaches a height of 72’ from grade, and the proposed antenna will not exceed that height at 70’ from grade. The proposed dish antenna will face the parking lot of the building. A site visit confirmed that the proposed dish antenna location will not be visible from the residences adjacent to the parking lot, perpendicular to South Taylor Street or from Columbia Pike. Moreover, the applicant indicates that all cables will be hidden under an existing covered cable tray leading from the existing equipment shelter to the rooftop antennas. The existing telecommunications facility will continue to be unmanned, and no ground space will be used in association with this proposal.

**CONCLUSION:** Staff supports the applicant’s proposal because it is consistent with the

Telecommunications Guidelines and it will not create an additional visual impact. The Barcroft and Douglas Park Civic Associations have been contacted, but at the date of this report, staff has not received any responses. Therefore, staff recommends that the use permit for Clearwire Wireless Broadband for the placement of one (1) microwave dish antenna to an existing telecommunications facility at 4241 Columbia Pike be approved subject to the following conditions.

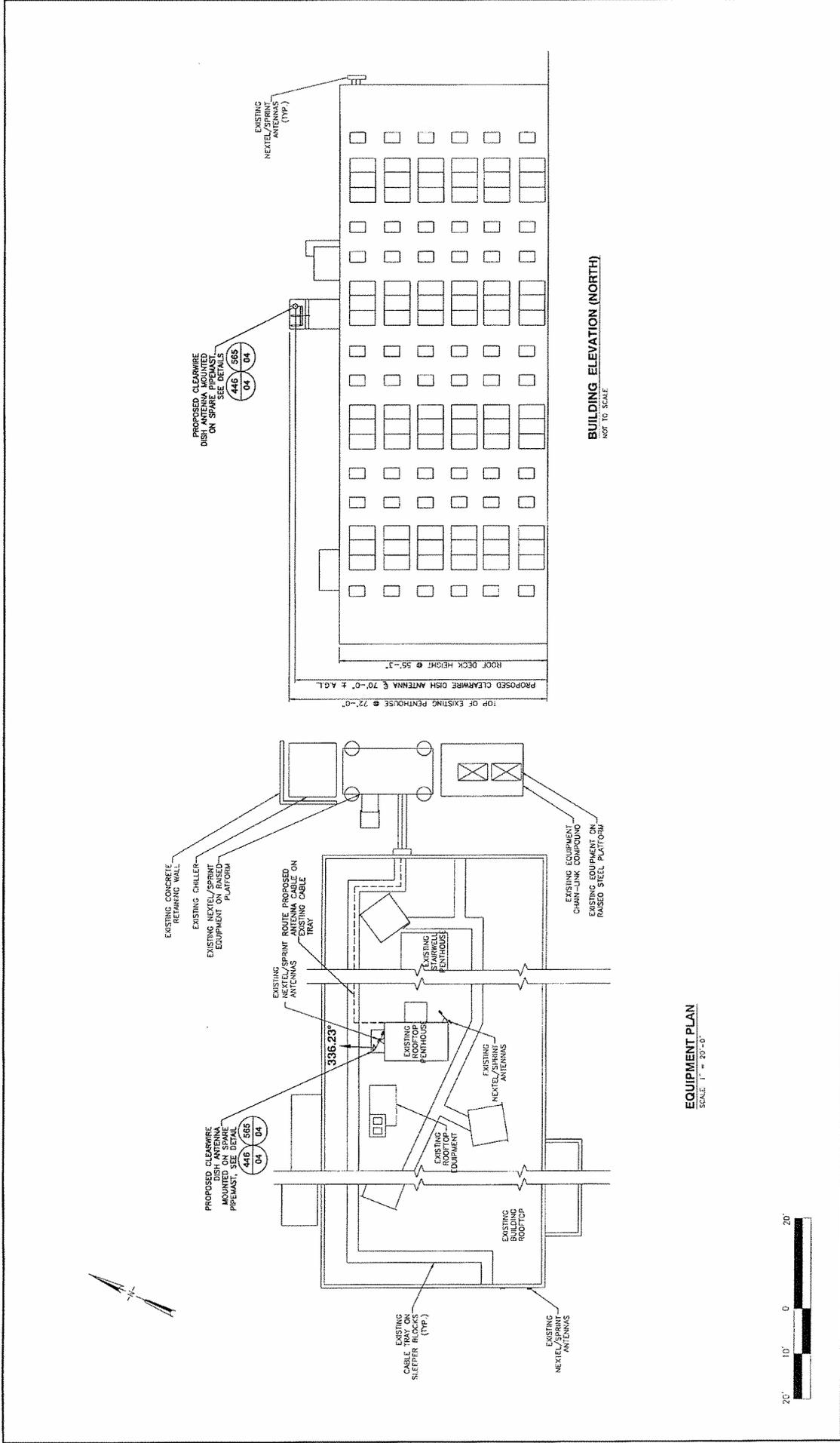
Conditions:

1. The applicant agrees that the one (1) Clearwire dish antenna on the existing building at 4241 Columbia Pike will be installed as shown on plans dated September 1, 2009. Any additional antennas on the site will require a use permit amendment.
2. The applicant shall identify a community liaison who shall be available to address any concerns regarding the facility operation. The name and telephone number of the liaison shall be provided to the Barcroft and the Douglas Park Civic Associations and the Zoning Administrator.
3. The applicant agrees that the antenna shall be removed within ninety (90) days after any cessation of use.

PREVIOUS COUNTY BOARD ACTIONS:

There are no previous County Board actions on this property.





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**clearwire**  
wireless broadband

SITE NAME: BARCROFT WA54XC487  
SITE NUMBER: DC-WSH5486  
455 W. WILSON AVE.  
ARLINGTON, VA

NO.	DATE	ISSUED FOR REVIEW	REV.	BY	CHK-APP'D	DRAWN BY:	DATE	
1	9-21-09	REVISED						
SCALE: AS SHOWN							DESIGNED BY:	
PROJECT: CLEARWIRE							DATE:	02
DRAWING TITLE: EQUIPMENT LAYOUT PLAN AND TOWER ELEVATION							REV.	0

11.17.09 3:32

**NOTES:**

- ACTUAL LENGTHS SHALL BE DETERMINED PER SITE CONDITION BY SUBCONTRACTOR.
- THE DESIGN IS BASED ON RF DATA SHEETS, SIGNED AND APPROVED.
- RADIO SIGNAL CABLE AND RACEWAY SHALL COMPLY WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC, NFPA 70), CHAPTER 8.
- ALL SPICED MATERIAL FOR EACH LOCATION (E.G., OUTDOORS, WINDORS, SECURED, INDOORS-UNOCCUPIED, PLENUMS, RISER SHAFTS, ETC.) SHALL BE APPROVED, LISTED, OR LABELED AS REQUIRED BY THE NEC.
- RADIO SIGNAL CABLE SHALL BE SUPPORTED AT MINIMUM OF EVERY THREE (3) FEET EXCEPT INSIDE MONOPOLES OR LATTICE TOWERS WHERE CABLE AND CONNECTOR MANUFACTURERS SUPPORT RECOMMENDATIONS SHALL BE FOLLOWED. MANUFACTURER RECOMMENDED CABLE SUPPORT ACCESSORIES SHALL BE USED.
- DRIP LOOPS SHALL BE PROVIDED ON ALL OUTSIDE CABLES. CABLES SHALL BE SLOPED AWAY FROM THE TOWER AND/OR OUTDOOR CABINETS TO PREVENT WATER FROM ENTERING THROUGH THE CONJUNCTION CABLE PORT.
- FEEDER LINE AND JUMPER CONNECTORS SHALL BE 7/16 OHM CABLE CONNECTORS THAT MEET #68 STANDARDS.
- 7/16 OHM CONNECTORS REQUIRE NO ADDITIONAL WEATHER PROOFING IN INDOOR APPLICATIONS IF THE FOLLOWING PROCEDURE IS FOLLOWED: WEATHER PROOFING IS REQUIRED AND THE FOLLOWING PROCEDURE SHOULD BE FOLLOWED: WEATHER PROOFING IS REQUIRED AND APPLY A "COURTESY" WRAP OF ONE LAYER OF 7MIL THICK VINYL ELECTRICAL TAPE EXTENDING APPROXIMATELY ONE (1) INCH ON EACH SIDE OF THE COAX CABLE/ CONNECTOR JUNCTION. USING APPROXIMATELY 5 INCHES FROM THE CONNECTOR AND WRAP 2 INCHES TOWARD THE CONNECTOR. THEN REVERSE THE TAPE SO THAT THE STICKY SIDE IS UP. TAPE OVER THE CONNECTOR OR SURGE WITH THE STICKY SIDE DOWN FOR ANOTHER INCH OR TWO. ADD THE BUILT RUBBER AND FINISH WITH A FINAL LAYER OF TAPE.
- SUBCONTRACTOR SHALL PAINT ANTENNAS WHEN REQUIRED BY THE LANDLORD OR AUTHORITY HAVING JURISDICTION IN ACCORDANCE WITH ANTENNA MANUFACTURERS' SURFACE PREPARATION AND PAINTING REQUIREMENTS.
- CABLE SHIELDS, AND TOWER CONDUITS SHALL BE GROUNDED AT THE TOP OF THE TOWER, WITHIN 10 FEET OF THEIR CONNECTORS, AND AT THE BOTTOM OF THE TOWER ABOUT 6 INCHES FROM THE BOTTOM OF THE TOWER. ALL TOWER CONDUITS SHALL BE GROUNDED TO THE TOWER. TOWERS THAT ARE BETWEEN 100 FEET AND 200 FEET HIGH, AND AT INTERVALS OF 100 FEET OR LESS ON TOWERS THAT ARE HIGHER THAN 200 FEET.
- APPROVED GROUNDING KITS, WHICH INCLUDE GROUNDING STRAPS, SHALL BE USED TO GROUND THE CONJUNCTION CABLE SHIELDS, AND CONDUITS. THE GROUNDING STRAPS FOR THE KITS AT THE CONJUNCTION SHALL BE USED TO GROUND THE CABLE SHIELDS AND CONDUITS. ALL GROUNDING STRAPS ARE BONDED DIRECTLY TO GROUND BAR USING EXTERNAL OR COMPRESSION CONNECTIONS.
- ALL RADIO SIGNAL CABLE SHALL BE LABELED PER MARKET REQUIREMENTS
- ANTENNA FEED LINE SYSTEM SWEEP TESTING SHALL BE PERFORMED AND REPORTED IN ACCORDANCE WITH CARRIER REQUIREMENTS. SUBCONTRACTOR WILL NOT ACCEPT A RADIO SIGNAL CABLE INSTALLATION UNLESS SWEEP TESTING IS COMPLETED. THE SWEEP SHALL ALSO BE A THIRD COPY OF THE SWEEPS LEFT AT SITE UPON COMPLETION OF SWEEP TEST.

**RF NOTES:**

DETAIL 630 03

**NOTES:**

- ALL STEEL WORK SHALL BE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND IN ACCORDANCE WITH ASTM A36 UNLESS OTHERWISE NOTED.
- ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AWS. WELD FILLET WELD SIZES ARE NOT SHOWN. PROVIDE MINIMUM SIZE PER TABLE J2.4 IN THE AWS "MANUAL" OF STEEL CONSTRUCTION. PAINTED SURFACES SHALL BE TOUCHED UP.
- BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4") CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
- NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE MANUFACTURER'S STANDARD SADDLE CLAMPS & SCREWS (GALVANIZED).
- INSTALLATION OF CONCRETE EXPANSION JOINTS: JOINTS SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDATION PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR INSPECTION. REQUIRED BY GOVERNING CODES. SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS.
- ALL METAL WORK SHALL BE GALVANIZED IN ACCORDANCE WITH SPECIFICATION ASTM A123. ALL SHOP WELDED MEMBERS SHALL BE GALVANIZED AFTER FABRICATION.

**STRUCTURAL STEEL NOTES:**

DETAIL 620 03

**NOTES:**

- SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
- ALL EXISTING ACTIVE SERVICES, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH ENCOUNTERED IN THE WORK SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK SHALL BE RELOCATED AS DIRECTED BY THE SUBCONTRACTOR. ALL EXISTING UTILITIES SHALL BE PROTECTED BY THE SUBCONTRACTOR. WHEN EXCAVATING OR DRILLING SURROUND OR NEAR UTILITIES, SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A FALL PROTECTION (B) CONFINED SPACE (C) ELECTRICAL SAFETY (C) TRAINING AND EXCAVATION.
- ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
- IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
- ALL EXISTING INACTIVE SERVICE, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH ENCOUNTERED IN THE WORK SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONNECTED FROM THE WORK. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE WORK. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
- SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION.
- THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BITS EQUIPMENT AND TOWER AREAS.
- NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
- THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
- THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED IN THE PROJECT SPECIFICATIONS.
- SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN COMPLIANCE WITH THE LOCAL REGULATIONS FOR EROSION AND SEDIMENT CONTROL.
- SUBCONTRACTOR TO PROVIDE COMBINATION LOCKS PER CARRIER SPECIFICATIONS.

**SITE WORK GENERAL NOTES:**

DETAIL 619 03

**NOTES:**

- FOR THE PURPOSES OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:  
SUBCONTRACTOR - CLEARWIRE BROADBAND (CONSTRUCTION)  
OWNER - ORIGINAL EQUIPMENT MANUFACTURER
- PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS INTENDED BY THE DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF OWNER.
- ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN ACCORDANCE WITH ALL APPROPRIATE CODES, REGULATIONS AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK.
- ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS. DRAWINGS PROVIDED HERE ARE NOT TO SCALE AND ARE INTENDED TO SHOW OUTLINE ONLY.
- UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- A LIST SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY OWNER. ITEMS NOT INCLUDED IN THE LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
- THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE OWNER.
- SUBCONTRACTOR SHALL DETERMINE ACTUAL BOLTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TEGD PLAN DRAWING.
- THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PRELIMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
- SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS CONJUNCTION CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
- SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

**GENERAL NOTES**

DETAIL 610 03

**NOTES:**

- ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, AND 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
- ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 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. SPICES SHALL BE CLASS 'B' AND ALL HOOPS SHALL BE STANDARD, UNLESS OTHERWISE SHOWN ON DRAWINGS.
- THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:  
CONCRETE CAST AGAINST EARTH.....3 IN.  
#6 AND LARGER REINFORCING WIRE.....2 IN.  
CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND.....3/4 IN.  
SLAB AND WALL.....1/2 IN.  
BEAMS AND COLUMNS.....3/4 IN.
- A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
- INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR ENGINEERING APPROVAL WHEN DRILLING HOLES IN CONCRETE. EXPANSION BRIS SHALL BE PROVIDED BY FURNISHER/PRODUCER OR APPROVED EQUAL.

**CONCRETE AND REINFORCING STEEL NOTES:**

DETAIL 621 03

**ABBREVIATIONS**

- ACL ABOVE GRADE LEVEL.
- BTS BASE TRANSDUCER STATION
- (C) EXISTING
- MIN MINIMUM
- N.T.S. NOT TO SCALE
- REF REFERENCE
- RF RADIO FREQUENCY
- T.B.O. TO BE DETERMINED
- T.B.R. TO BE RESOLVED
- TYPE TYPICAL
- REQ REQUIRED
- ECR EQUIPMENT GROUND RING
- AWG AMERICAN WIRE GAUGE
- NBB MASTER GROUND BUS
- EG EQUIPMENT GROUND
- BCW BARE COPPER WIRE
- GEN GENERATOR
- IGR INTERIOR GROUND RING (HALO)
- RBS RADIO BASE STATION

**SYMBOLS**

- 5/8" SOLID GROUND BUS BAR
- 3/4" SOLID NEUTRAL BUS BAR
- 2-POLE THERMAL-MAGNETIC CIRCUIT BREAKER
- SINGLE-POLE THERMAL-MAGNETIC CIRCUIT BREAKER
- CHEMICAL GROUND ROD
- GROUND ROD
- DISCONNECT SWITCH
- METER
- CADWELD TYPE CONNECTION
- COMPRESSION TYPE CONNECTION
- GROUNDING WIRE

ABBREVIATIONS & SYMBOLS 600 03



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**clearwire**  
wireless broadband

SITE NAME: BARCROFT WAXXC407  
SITE NUMBER: DC-WIS406  
4241 COLUMBIA PIKE  
ARLINGTON, VA

ISSUED FOR REVIEW	SUB. DATE	BY
REVISIONS	DATE	BY
DESIGNED BY:	DATE	BY:
SCALE:	AS SHOWN	

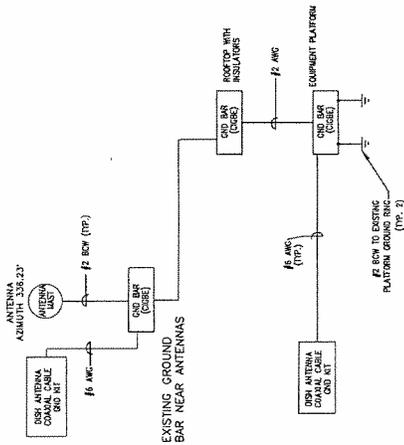
CLEARWIRE	
CONSTRUCTION NOTES	
DRAWING NUMBER	03
REV	0
REV	1
REV	2
REV	3
REV	4
REV	5
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REV	7
REV	8
REV	9
REV	10
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REV	19
REV	20



**GROUNDING NOTES**

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER BUSES) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING FOR ALL GROUNDING SYSTEMS. THE TESTING SHALL BE PERFORMED BY A QUALIFIED PERSONNEL AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE SUBCONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CABLE INSTALLATIONS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO THE EQUIPMENT.
6. EACH BTS SHALL BE DIRECTLY CONNECTED TO THE GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER DR LARGER.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED. BACK TO BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE #2 AWG SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. ALL BENDS SHALL BE MADE WITH 12" RADIUS OR LARGER. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS, EXCEPT FOR GROUND BAR CONNECTION FROM MGB TO OUTSIDE. EXTERIOR GROUND SHALL ALL BE CROWFIELD CONNECTIONS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL CONNECTIONS.
15. ALL EXTERIOR AND INTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
16. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
17. BOND ALL METALLIC OBJECTS WITHIN 6 FT OF MAIN GROUND WIRES WITH 1-#2 AWG TIN-PLATED COPPER GROUND CONDUCTOR.
18. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR SHALL BE GROUNDED TO THE GROUND RING. NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.

621  
05  
DETAIL



**SCHEMATIC DIAGRAM GROUNDING SYSTEM**

**ANTENNA GROUNDING:**

1. ANTENNA GROUNDS TO BE KEPT SEPARATE FROM EQUIPMENT GROUND.

**EQUIPMENT GROUNDING:**

1. THE EQUIPMENT GROUND SHALL BE COMPRISED OF SEVERAL COMPONENTS
  1. INTERIOR SITE SUPPORT CABINET (SSC) GROUND PLATE.
  2. CONNECTIONS FROM ALL SSC INTERNAL COMPONENTS TO SSC GROUND PLATE.
2. FROM THE SSC GROUND PLATE, EXTEND THE GROUND TO THE TELCO BOX GROUND PLATE.
3. CONNECT TELCO BOX GROUND PLATE TO EQUIPMENT GROUND RING.



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www.ccsos.com

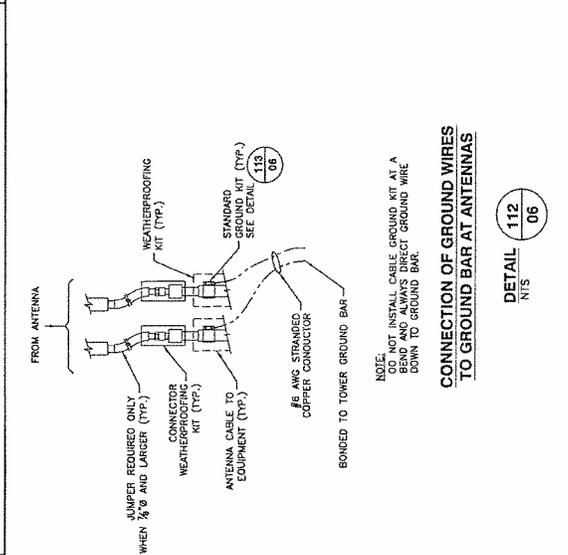
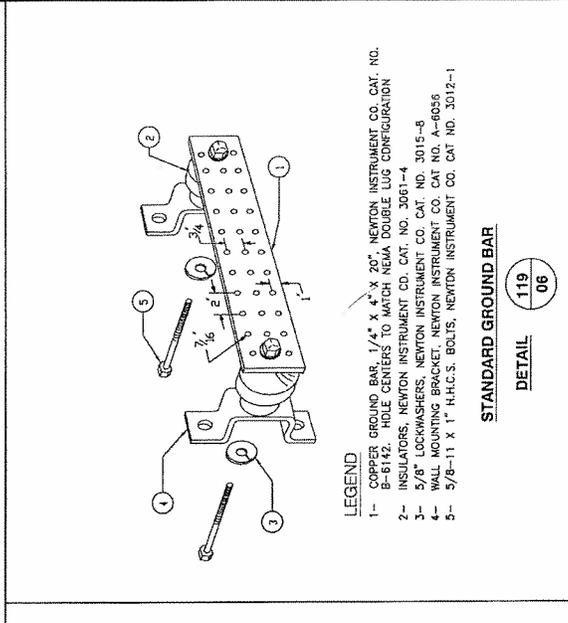
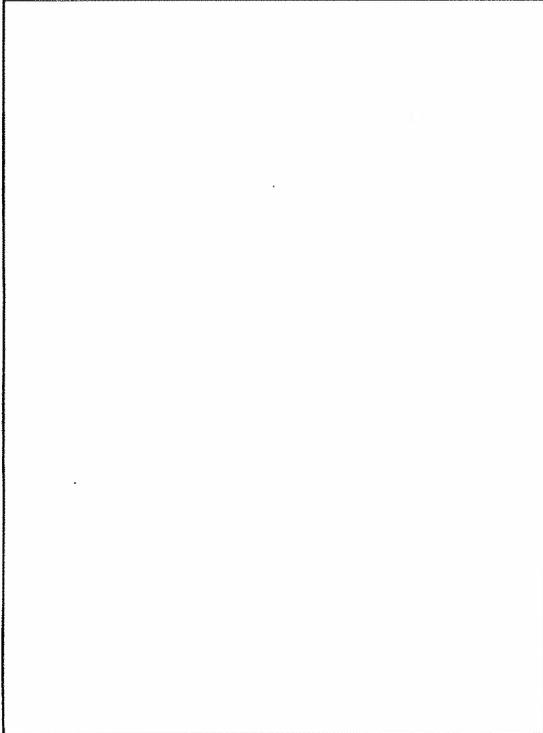
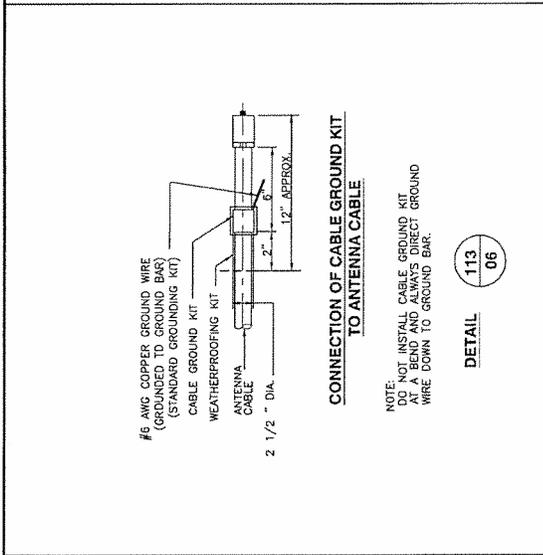
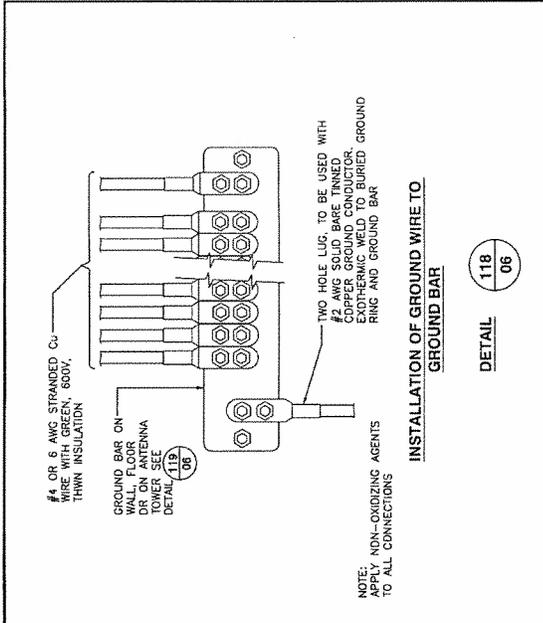
**clearwire**  
wireless broadband

SITE NAME: BARCROFT WA54XC487  
SITE NUMBER: DC-MSH5486  
42-10000000000000000000  
ARLINGTON, VA

NO.	DATE	ISSUED FOR REVIEW	SCALE	DESIGNED BY:	DRAWN BY:
1	10-01-06	REVISIONS	BY CHM/JPP/C		

GROUNDING NOTES & SCHEMATIC	
DRAWING NUMBER	05
REV	0

11 of 18 SHEETS



<p>SITE NAME: BARCROFT WASSXC487          SITE: WASSXC487          4241 COLUMBIA PIKE          ARLINGTON, VA</p>		<p>CLEARWIRE</p>	
<p>C&amp;S Engineers, Inc.          499 Col. Eileen Collins Blvd.          Syracuse, New York 13212          Phone: 315-455-2000          Fax: 315-455-9887          www.cscs.com</p>		<p>ISSUED FOR REVIEW          REVISIONS BY: C&amp;S/MP/PC          SCALE: AS SHOWN          DESIGNED BY:</p>	
<p>PROJECT: 045 - 10 46am          1/Project/045 - Clearwire Technology/PS&amp;C/DCX-Westington 2009/CAD3/035456/Construction/03 DWG</p>		<p>GROUNDING DETAILS          DRAWING NUMBER: DG          REV: 0</p>	

**clearwire**  
wireless broadband

SECTOR	COLOR CODE	AZIMUTH	RAD. CENTER	ELECTRICAL DOWNTILT	MECHANICAL DOWNTILT	ANTENNA NUMBER	ANTENNA TYPE (MODEL #)	ANTENNA PROVIDED BY	CABLE LENGTH (FT.)	ANTENNA CABLE	COAX PROVIDED BY
MICROWAVE	NOTE 4	336.23°	70'-0"	NA	NA	NA	VHLP1-23	ANDREW	220'-0"±	1/2"	CLEARWIRE

**NOTES:**

1. ALL MATERIALS ON THE ABOVE TABLE SHALL BE PROVIDED BY THE OWNER TO THE SUBCONTRACTOR FOR INSTALLATION.
2. SUBCONTRACTOR SHALL PROVIDE AS-BUILT CABLE LENGTHS AND PROVIDE ANTENNA SERIAL NUMBERS ON RED-LINED DRAWINGS.
3. ANTENNAS SHALL BE PROCURED AND INSTALLED WITH HEAVY DUTY CLAMPS SUPPLIED BY ANTENNA MANUFACTURER.
4. COLOR CODE COAXIAL CABLES PER CLEARWIRE STANDARDS.
5. VERIFY ALL DISK ANTENNA MODELS AND AZIMUTHS WITH CONSTRUCTION MANAGER AND RF ENGINEERS PRIOR TO CONSTRUCTION.

**C&S Engineers, Inc.**  
 499 Col. Eileen Collins Blvd.  
 Syracuse, New York 13212  
 Phone: 315-455-2000  
 Fax: 315-455-9667  
 www.csgcs.com



**SITE NAME: BARCROFT WA5XC487**  
**SITE NUMBER: DC-WSH5486**  
 4240 BURNING PINE  
 ARLINGTON, VA

**clearwire**  
 wireless broadband

NO.	DATE	ISSUED FOR REVIEW	SOL. DUB. RND.
1	9-01-09		BY CHW-MPP
SCALE: AS SHOWN		DESIGNED BY:	DRAWN BY:
		REVISED BY:	

CLEARWIRE	
ANTENNA AND CABLE SCHEDULE	
DRAWING NUMBER	07
REV	0

117302



**U-3244-10-1**  
**4241 Columbia Pike;**  
**RPC: 23-034-100 through -143**

Note: These maps are for property location assistance only.  
 They may not represent the latest survey and other information.



Not To Scale

