



DEVELOPMENT SERVICES DEPARTMENT
ENVIRONMENTAL COORDINATOR
450 110th Avenue NE, P.O. BOX 90012
BELLEVUE, WA 98009-9012

DETERMINATION OF NON-SIGNIFICANCE

PROPONENT: ClearWire

LOCATION OF PROPOSAL: City of Bellevue right-of-way, near 3724 116th Avenue NE.

DESCRIPTION OF PROPOSAL: Replace a 66-foot tall utility pole with an 81-foot tall glue-lam pole, with flush-mounted antennae at the top, a shelf-mounted cabinet near the base and the protection of existing trees to screen the installation from the residential properties located south and east of the site.

FILE NUMBERS:

The Environmental Coordinator of the City of Bellevue has determined that this proposal does not have a probable significant adverse impact upon the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(C). This decision was made after the Bellevue Environmental Coordinator reviewed the completed environmental checklist and information filed with the Land Use Division of the Development Services Department. This information is available to the public on request.

- There is no comment period for this DNS. There is a 14-day appeal period. Only persons who submitted written comments before the DNS was issued may appeal the decision. A written appeal must be filed in the City Clerk's office by 5:00 p.m. on _____.
- This DNS is issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on the DNS. There is a 14-day appeal period. Only persons who submitted written comments before the DNS was issued may appeal the decision. A written appeal must be filed in the City Clerk's Office by 5 p.m. on 12-30-2010.
- This DNS is issued under WAC 197-11-340(2) and is subject to a 14-day comment period from the date below. Comments must be submitted by 5 p.m. on _____. This DNS is also subject to appeal. A written appeal must be filed in the City Clerk's Office by 5 p.m. on _____.

This DNS may be withdrawn at any time if the proposal is modified so that it is likely to have significant adverse environmental impacts; if there is significant new information indicating, or on, a proposals probable significant adverse environmental impacts (unless a non-exempt license has been issued if the proposal is a private project); or if the DNS was procured by misrepresentation or lack of material disclosure.

Carol Westlund
Environmental Coordinator

12-16-2010
Date

OTHERS TO RECEIVE THIS DOCUMENT:

State Department of Fish and Wildlife
State Department of Ecology,
Army Corps of Engineers
Attorney General
Muckleshoot Indian Tribe



City of Bellevue
Department of Planning & Community Development
Land Use Division Staff Report

Proposal Name: ClearWire, WA-SEA0491-C

Proposal Address: City of Bellevue right-of-way, near 3724 116th Avenue NE.

Proposal Description: Replace a 66-foot tall utility pole with an 81-foot tall glue-lam pole, with flush-mounted antennae at the top, a shelf-mounted cabinet near the base, and the protection of existing trees to screen the installation from the residential properties located south and east of the site.

File Number: 09-131032-LA

Planner: Kenneth A.Thiem, Senior Planner

Applicant: ClearWire

Decisions Included: Administrative Conditional Use Permit Approval (Process II, Land Use Code 20.30E)

State Environmental Policy Act Threshold Determination: Determination of Non-Significance (DNS)

Carol V. Helland

Carol V. Helland, Environmental Coordinator

Director's Decision: **Approval with Conditions**
Michael A. Brennan, Director
Development Services Department

By: *Carol V. Helland*

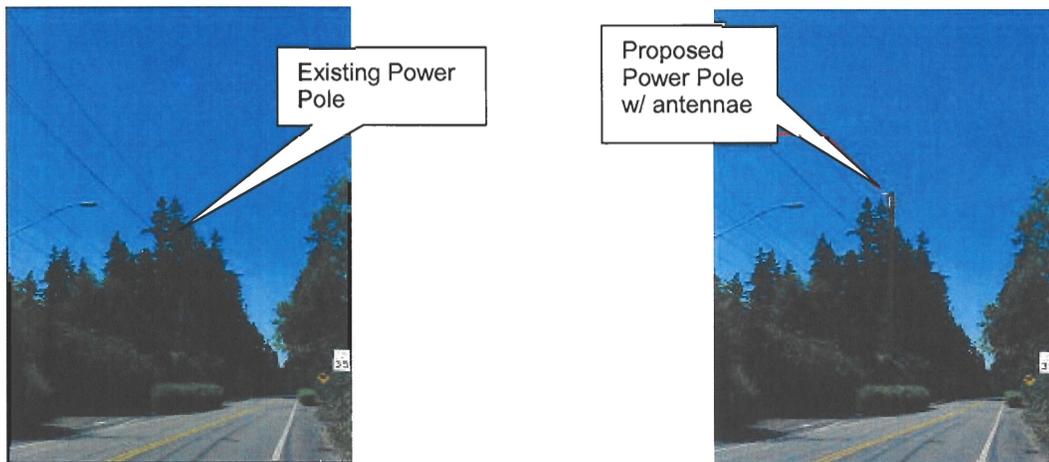
Carol V. Helland, Land Use Director

Application Date: 12-10-2009
Notice of Application Date: 01-20-2010
Public Meeting Date: 01-28-2010
Notice of Decision Date: 12-16-2010
Appeal Deadline: 12-30-2010

For information on how to appeal the project, visit the Development Services Department at City Hall, 450 110th Avenue NE, or call (425) 452-6800. Comments on State Environmental Policy Act (SEPA) Determinations can be made with or without appealing the proposal within the noted comment period for a SEPA Determination. Appeal of the decision must be received in the City Clerk's office by 5 p.m. on the date noted for the appeal deadline.

I. Request/Proposal Description

The applicant is proposing to replace a 66-foot tall wood utility pole in the public right-of-way with an 81-foot tall glue-lam pole with flush-mounted antennae at the top and a related electrical cabinet located near the base. An Administrative Conditional Use permit is required because the proposed pole height exceeds the maximum structure height for the residential zone and the height of the replacement pole is no more than 21-feet taller than the original pole. The proposed facility would fill a gap in ClearWire's internet coverage within the south western part of the Bridle Trails neighborhood. The coverage gap is shown on the attached Propagation Map, Attachment C. The images below show the existing and proposed pole, looking southward on 116th Avenue NE.



II. Site Location & Context

The proposal site is shown on the vicinity/zoning map at right. The site is located east of I-405, on the eastern side of the 116th Avenue NE right-of-way, next to 3724 116th Avenue NE. The neighborhood is zoned R-1, single-family residential. At the present time, the lot next to the proposal site is not developed. However, City records show that an on-site wetland has been delineated in anticipation of single-family home construction.



The existing power pole is surrounded by a number of evergreen trees, including two 20-25 foot tall Cedars located immediately north and east of the pole; a 30-35 foot tall Alder immediately east of the pole, two Cedars (15 feet and 25 feet) located immediately south of the pole, and two Cedars that are approximately 140-feet tall and located between the

power pole and the existing single family home located on the lot immediately south of the subject property. Together, these trees will provide visual screening for the lower half of the proposed pole.

III. Aerial Photograph



The proposal site is in the right-of-way, next to a large, undeveloped lot with wetland covering most of its northern half. The area around the proposal site is vegetated with native evergreen trees and low growing, scrubby plant material, including non-native blackberry. The trees will help screen the glue-lam pole. The ROW Division has authorized the applicant to initiate a lease agreement and pursue permit approvals for the proposed facility.

III. Environmental Impacts

The environmental review indicates no probability of significant adverse environmental impacts occurring as a result of the proposal. The Environmental Checklist adequately discloses expected environmental impacts associated with the project. The Checklist can be found in the project file in the Record's Office of Bellevue City Hall. The City codes and requirements, including the Clear and Grade Code, Utility Code, Land Use Code, Noise Ordinance, Building Code and other construction codes adequately mitigate expected environmental impacts. Therefore, issuance of a Determination of Non-Significance (DNS) is the appropriate threshold determination under the State Environmental Policy Act (SEPA) requirements.

IV. Public Comments

On January 20, 2010, notice of the application was published in The Seattle Times and the Weekly Permit Bulletin, and a public information sign for the proposal was installed on-site. The public notice included information on a public meeting for the proposal, which occurred on January 28, 2010, at Bellevue City Hall, 450 110th Avenue NE, Room 1E-118, at 6:00 PM. The meeting was held as scheduled and attended by three citizens, City staff and three members of the applicant's project team. The minimum public comment period ended on February 4, 2010, however comments were accepted until the date of decision issuance. The City received written comments from two citizens. The comments were submitted on January 29, 2010 and on February 1, 2010. The comments are summarized below, followed by a response from City staff.

A. Comment: *The proposal site is next to a large residential lot. The proposed replacement pole is located directly west of a future home to be built on the lot. This location would significantly impact the curb appeal and the value of the home. The applicant should explore the potential for locating this facility across the freeway on a site that already has a wireless facility. This location would have fewer aesthetic impacts and be consistent with the City's decision criteria, which encourage the co-location of wireless facilities.*

Response: The applicant explored the potential for locating the proposed facility on three alternative sites. The photo-simulations located in Attachment A show each of the alternative sites. The alternative sites include two within the 116th Avenue NE corridor and one directly west of I-405, within 111th Avenue NE at approximately NE 36th Street. After considering all locations the applicant concluded that the proposal site is the best option for meeting its coverage needs. Regarding the site west of I-405, the applicant explored two options.

The first option was to replace an existing wireless facility operated by T-Mobile. This existing facility is a 65-foot tall monopole located next to the freeway with the antennae located inside the pole. In order to get the same propagation as the proposal site, the 65 foot pole would need to be replaced with an 80-foot tall pole with ClearWire's antennae located at the top. According to a T-Mobile representative, the replacement of an existing wireless pole with a taller pole in order to accommodate another carrier is not practical for the existing carrier given the interruption in service and loss of revenue. If ClearWire could operate with their antennae at 55-feet in height then it would just be a collocation without replacing the pole, which T-Mobile would support.

The second option was to replace an existing power pole that is located approximately 45-feet directly north of the T-Mobile facility described above with a glulam pole that is 15-feet taller. However, The City of Bellevue Land Use Code requires at least 520 feet of separation between wireless communication facilities located in residential districts in the public right-of-way, unless the applicant can demonstrate that no other site within the search ring is available for siting the WCF. Therefore, this option is nullified by the requirement.

B. Comment: *The owners of the property located at 3628 116th Ave NE oppose the cell tower proposal located within the public right-of-way, next to 3724 116th Avenue NE, for several reasons.*

1. Health Issues

The potential adverse health effects of living in close proximity to a cellular tower emitting EMR is not clearly understood at this time. The proposed cellular tower will be within about 180 feet of our property line, back yard and play area. We have true concerns about allowing our children to live and play in such close proximity to this cellular tower. Please provide us with a letter from the City of Bellevue's attorney stating the City's position on this potential health matter. We want assurances from the City of Bellevue that there is no risk to our children being in such close proximity to this newly proposed cellular tower.

Response: All cellular companies are required to meet the radio frequency (RF) emission standards adopted by the Federal Communication Commission (FCC), and the City is prohibited under federal law from regulating wireless facilities based on the effects of RF emissions. As a result, the City does not set the standards or monitor for compliance with the emissions standards. Cellular companies are required to state in writing that their proposal meets the federal standards. Clearwire has complied with this requirement. The project file includes a letter from the RF Engineer stating that the proposed facility meets RF emission standards.

2. Property Value:

Published studies link proximity to cellular towers and the devaluation of property values. The northwest side of our home will be in direct view of the proposed 85 foot tower, including bedrooms, family room, den, patio and back yard, which negatively affect the value of our property. Will the City of Bellevue assume responsibility for our loss and immediately lower our property taxes commensurate with the devaluation?



Response: Neither the City's development regulations nor the state's environmental regulations require consideration be given for potential impacts to property values as a result of proposed development. The proposed facility is approximately 270 linear feet from the subject home and there are at least five significant evergreen trees between the proposed power pole and the subject property. At least two of these existing trees are of sufficient height to soften the visual impacts of the proposed facility. Regarding your property tax assessment, King County is the tax assessor. The City of Bellevue does not set the rates. Approximately 12.7 % of the assessment is used for City purposes. Property tax is mainly used to support things like hospitals, schools and libraries.

3. Alternative Locations: *A number of other sites would work for the proposed facility. The existing cell tower site located directly west of I-405 could be replaced with a taller pole and a second antennae array. Impacts to the broader community would be reduced by collocating two carries on a single facility.*

Response: See above response to the alternative site issue.

4. Legal Action: *Our neighborhood association is considering legal action to stop the placement of the cellular tower at the proposal site. We would like to avoid legal action if possible, but we will take whatever measures are necessary to prevent the proposed facility.*

Response: Communication, Broadcast & Relay Facilities are regulated by the Land Use Code, Section 20.20.195. Such facilities may be located in all zones within the City of Bellevue, subject to compliance with the applicable regulations. The proposal site is located in the Bridle Trails Neighborhood because a coverage gap has been shown to exist within that neighborhood, along the 116th Avenue NE corridor. Alternative sites were considered as part of this review and rejected by the applicant because the proposal site is deemed best suited to fill the coverage gap. Second, the proposed facility is attached to a public facility structure, the most preferred design hierarchy according to LUC 20.20.195.D.2.b. Third, the proposed replacement pole is no more than 15-feet taller than the existing pole. A licensed engineer has certified that the proposed antennae height is the minimum necessary to fill the coverage gap and support the provider's network (see the project file for the Engineer's Certification letter). Lastly, as described in Section II of this decision the existing power pole is surrounded by a number of evergreen trees that will visually soften the proposed pole from views originating from the western side of the pole. For access to the project file and the written comments, contact Records at 425-452-7914, or send email to: dsrecords@bellevuewa.gov

V. Applicable Decision Criteria / Findings and Conclusions

The proposed project is required to comply with the decision criteria of Land Use Code, Section 20.30E.140, as discussed below.

A. The administrative conditional use is consistent with the Comprehensive Plan.

Finding: This proposal is consistent with the Comprehensive Plan policies for wireless communications facilities. The policies that specifically support the City's decision on this application are:

UT-40: *Require the reasonable screening and/or architecturally compatible integration of all new above-ground utility facilities.*

UT-41: *Protect Bellevue's aesthetic quality and infrastructure investment from unnecessary degradation caused by the construction of telecommunication infrastructure.*

The proposed antennae are flush-mounted to the replacement pole and painted to match the color of the pole. The replacement pole is limited to 15-feet above the existing pole height. The pole mounted electrical cabinet is proposed near the base of the pole, required to be hidden from the street view and screened by the existing landscaping on the eastern side of the pole. To further minimize the visual impacts of the antennae, this decision requires them to be located within a shroud on top of the replacement pole, as shown on the first page of Attachment A. The total height of the pole plus the shroud may not exceed 81 feet, and the shroud must be approximately match the pole's width and depth.

UT-43: *Encourage consolidation on existing facilities where reasonably feasible, and where such consolidation leads to fewer impacts than would construction of separate facilities.*

Finding: The proposed monopole is a replacement utility pole in a line of existing utility poles. Collocating the facility on replacement pole will create fewer impacts compared to new pole located on a new support structure.

UT-53: *Require all utility equipment support facilities to be aesthetically compatible with the area in which they are placed by using landscape screening and/or architecturally compatible details and integration.*

Finding: The existing site includes several Western Red Cedar trees (as described in Section II) which are located on the north, east and south sides of the proposed pole. Based on their existing height, these trees will immediately screen the lower third of the pole. With a growth rate of 1 foot to 3 feet annually, these trees will screen the entire installation in time. These trees can live to 150 years of age or longer and unlike Douglas Fir, they tend to retain their lower branches as they age. This decision is conditioned to require the existing cedar trees to be protected during the proposed construction.

UT-56: *Encourage permit applicants to submit an area wide plan that demonstrates the lowest land use impacts consistent with telecommunication customer needs.*

The applicant submitted an area-wide plan with a Search Ring and four possible WCF locations within the search ring. Except for one site west of I-405, all of the sites are located within the 116th Avenue NE corridor and within a quarter mile of the proposal site. Each alternative site was evaluated by the applicant based on their coverage objectives and the photosimulations located in Attachment A. The proposal site had the same ranking as the other sites along 116th Avenue NE, but ranked slightly lower than the site on the western side of I-405. However, the site west of I-405 was found to be unacceptable for the reasons noted in Section IV.A.

UT-58: *Require wireless equipment constructed in public rights of way in residential zones to be under 30-inches high.*

The wireless equipment cabinet for the proposed facility is located on the pole, approximately 2-feet above grade. The proposed cabinet's dimensions are approximately 30-inches in height, width and depth. The cabinet will be screened from view by requiring the existing fence to remain intact and protecting significant trees and landscaping at the base of the pole.

B. The design is compatible with and responds to the existing or intended character, appearance, quality of development and physical characteristics of the subject property and immediate vicinity;

Finding: To ensure that the proposed facility is compatible with the surrounding properties the proposal includes:

1. The replacement pole will be of laminated wood, which has an appearance that is similar to the existing utility poles along 116th Avenue NE;
2. The total height, including the required shroud at the top is limited to 15-feet above the existing pole height, or a maximum of 81 feet;
3. Instead of flush-mounting to the sides of the pole, this decision requires the antennae to be located within a shroud on top of the pole, as shown on the first page of Attachment A. The shroud is required to match the pole's width, depth and color.
4. The equipment near the base of the pole will be screened by requiring the existing fence to remain intact, shifting the cabinet eastward to clear the fence line and by protecting the existing trees/vegetation near the pole;
5. Any areas disturbed and/or damaged during the construction or during future maintenance of the WCF facility are required to be fully restored by this decision.

C. The administrative conditional use will be served by adequate public facilities including streets, fire protection, and utilities.

Finding: The proposed facility is located within the public right-of-way, which is already served by adequate public facilities including streets, fire protection and utilities.

D. The administrative conditional use will not be materially detrimental to uses or property in the immediate vicinity of the subject property; and

Finding: The proposed administrative conditional use permit will not be materially detrimental to the uses or property in the immediate vicinity. This section of 116th Avenue NE has an existing string of utility poles. The pole to be replaced is 66-feet in height. The proposed replacement pole is 81-feet in height and of glue-lam wood construction, which is similar to the existing poles. The antennae required to be located in a shroud, mounted to the top of the pole and finished to match the color of the pole. The equipment at the base of the pole will be screened by requiring the fence to remain intact and protecting the existing vegetation at the base of the pole. The cable between the equipment box and antennae is required to be embedded within the pole where possible or covered by a shroud matching the color of the pole. The pole and the antenna are designed to be as compatible as possible with the existing above grade utilities in the right-of-way. The pole will be visually softened by existing trees located to the north, east and south of the proposed pole. Lastly, the facility is required to be removed if it ceases to be operational or falls into disrepair as conditioned by this decision. Together these measures help ensure that the proposed project will not be materially detrimental to uses or property in the immediate vicinity of the proposed pole.

E. The administrative conditional use complies with the applicable requirements for a wireless communication facility as provided by the Land Use Code (20.20.195), including location and design preferences.

Finding: The proposed wireless facility complies with the location and design preferences of LUC 20.20.195. Further, the proposal meets all specific Land Use Code requirements applicable to non-exempt wireless communications facilities per LUC 20.20.195.D, summarized below.

1. **Height:** The proposed pole exceeds the maximum height allowed for exempt WCF in a residential land use district. A licensed Radio Frequency (RF) engineer has determined that the proposed height it is the minimum necessary for effective functioning of the provider's network.

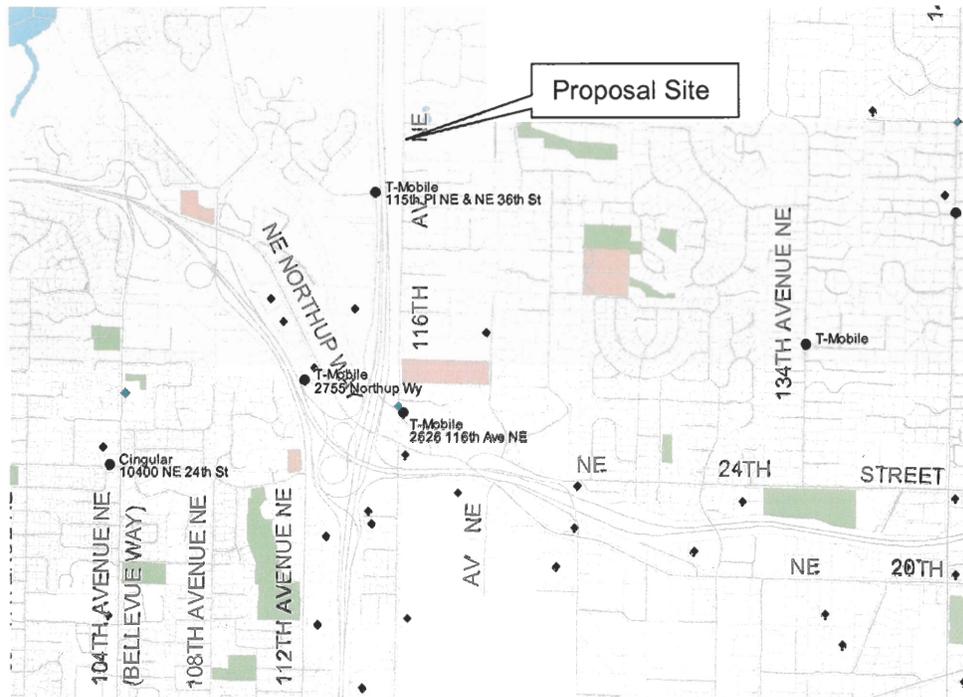
2. **WCF Location and Design**

a. **Location (LUC 20.20.195D.2.a):** While a single-family land use district is least preferred for locating wireless facilities per the applicable decision criteria (20.20.195.D.2.a), ClearWire's coverage gap cannot be addressed by locating the proposed facility in a nonresidential zone. There are a number of challenges for the proposed facility: single-family residential zoning, coverage needs, and aesthetic considerations. After evaluating three alternative sites, the applicant and staff deemed the proposal site best suited to fill the coverage gap. It involves replacing an existing utility pole instead of a new pole. The replacement pole is limited to 15-feet of additional height, including the top-mounted shroud, and visually similar to the existing utility poles along this section of 116th Avenue NE. The applicant's engineer has certified that the proposed location is the best option for addressing ClearWire's coverage gap and meeting the capacity needs for this area. This decision requires the replacement pole be located within ten feet of the existing pole. The existing pole location is within the right-of-way (ROW), and located approximately 7-feet inside of the ROW's eastern edge.

b. **Preferred System Design (LUC 20.20.195D.2.b):** Locating wireless facilities on existing utility poles is the second preferred design hierarchy, after "attached to public structures, building-mounted or integrated with utility support structures." Together, the glu-lam pole, top-mounted antennae shroud and protection of the existing landscaping respond to the character, appearance, quality of development and physical characteristics of the subject property and immediate vicinity.

c. **Minimizing Adverse Impacts LUC 20.20.195D.2.c):** The proposed replacement pole is 15-feet taller than the existing pole. It is constructed of wood that is similar in color and appearance to the existing pole. The proposed pole will be screened by five existing significant trees located around the base of the pole, including four Cedar trees. The trees will reduce the adverse impacts of the WCF, considering the search ring as a whole. This decision includes a condition requiring the existing trees surrounding the proposal site to be protected. The project file includes a written statement by the RF engineer that the proposed facility complies with RF Emission Guidelines set forth by the FCC.

3. **Dispersal Limits:** The dots on the map below represent existing cellular facilities surrounding the proposal site. The cellular facility that is closest to the proposed facility is approximately 1,700-feet away, considerable more than the required 520 feet of separation between wireless communication facilities.



- 4 **Development Standards:** The following development standards may be applied to ensure that the proposed wireless facility minimizes adverse impacts, especially visual and aesthetic impacts to the surrounding properties.

a. **Colors & Screening:** Specific paint colors and screening may be required to visually blend the facility with the site context.

The proposed replacement pole is glue-lam wood, similar in color and texture to the existing poles along this stretch of 116th Avenue NE. The antennae and related equipment are required to be painted to match the pole to make them visually less intrusive and help them blend in with the pole. The proposal also includes the preservation of the existing landscaping at base of the pole to help soften views of the pole from 116th Avenue NE and the surrounding properties.

5. **Radio Frequency Emissions:** The project file includes a letter from ClearWire's radio frequency engineer stating that the facility will comply with the radio frequency emission standards adopted by the Federal Communications Commission.

6. **Setback Requirements for Freestanding Wireless Communication Facilities:** The requirements of this section do not apply to this proposal since the facility is located within the public right of way.
7. **Independent Technical Review:** No such review was deemed necessary for this application.
8. **Removal of Abandoned Antennas and Towers:** Refer to Section VII of this report for a related condition of approval.
9. **Removal Upon Under-grounding:** Refer to section VII of this report for a related condition of approval.

VI. Decision

After conducting the various administrative reviews associated with this proposal, including applicable land use consistency, SEPA, and City Code and Standard compliance reviews, the Director of Development Services hereby **APPROVES** the proposed project subject to the following conditions:

VII. Conditions of Approval

1. Codes & Ordinances

The applicant shall comply with all applicable Bellevue City Codes and ordinances including but not limited to:

Applicable Ordinances	Contact Person
Clearing and Grading Code- BCC 23.76	Janney Gwo, 425-452-6190
Construction Codes- BCC Title 23	Bldg. Division 425-452-6864
Fire Code- BCC 23.11	Adrian Jones, 425-452-2329
Land Use Code- BCC Title 20	Ken Thiem, 425-452-2728
Noise Control- BCC 9.18	Ken Thiem, 425-452-2728
Sign Code- BCC Title 22B	Ken Thiem, 425-452-2728
Right of Way Use Code- BCC 14.30	Dottie Schmidt, 425-452-2888
Utility Code- BCC Title 24	Robert Hutchinson, 425-452-7903

2. **Site Disturbance:** During the construction, the applicant shall implement the measures described herein to protect the health of the five (5) Cedar trees and the one (1) Alder tree located near the proposal site. Within the dripline areas of the trees to remain, there shall be no disturbance or compaction of the soil. In addition, orange construction barrier fencing shall be erected at the edge of the right of way, or at the driplines of the protected trees if located closer to the replacement pole. In addition, any vegetation around the pole that is disturbed or damaged during the construction shall be replaced with indigenous shrubs and groundcover at a size and spacing that will provide full coverage in three years.

Authority: LUC 20.20.195D.4.c

Reviewer: Ken Thiem

3. Replacement Pole: The proposed replacement pole shall be located within 10 feet of the existing pole, but not south or east of the existing pole, and shall not block sight distance between drivers, or between drivers and cyclists/pedestrians.

Authority: LUC 20.20.195.B.1.a.2
Reviewer: Ken Thiem

4. Future Undergrounding: The facility shall be removed at no expense to the City if Co-located on an electrical system facility or utility support structure that is subsequently undergrounded.

Authority: LUC 20.20.195.D.9
Reviewer: Ken Thiem

5. Abandoned Sites: The owner of this facility shall provide the Director with copies of any notice of intent to cease operations that is provided to the Federal Communications Commission (FCC). All WCFs and the associated equipment shall be removed by the facility owner within 90 days of the date it ceases to be operational, or if the facility falls into disrepair and is not maintained. Disrepair includes structural features, paint, or general lack of maintenance, which could result in safety or visual impacts.

Authority: LUC 20.20.195.D.8
Reviewer: Ken Thiem

6. Antennae Shroud

The antennae shall be located within a shroud mounted to the top of the pole. The shroud's overall width and depth shall approximately equal that of the replacement pole, and the total height of the pole plus the shroud shall not exceed 81 feet.

Authority: LUC 20.20.195.C.2
Reviewer: Ken Thiem, 425-452-2728

7. Shroud & Cabinet Color

The applicant shall submit a color sample for the shroud and cabinet for City review and approval. The proposed color shall match/blend with the pole color.

Authority: LUC 20.20.195.D.4.a
Reviewer: Ken Thiem, 425-452-2728

8. Exterior Cabling from Pole to Antennae

To the maximum extent possible, all cables shall be embedded within the pole or located within a shroud painted to match the pole. Sections of exposed cable shall be minimized, bundled and pulled tightly to reduce adverse visual impacts.

Authority: LUC 20.20.195.B.1.a.iii
Reviewer: Ken Thiem, 425-452-2728

9. Right-of-Way Use Permit

The Right of Way Use Permit will be issued only after receipt and approval of all associated Right of Way use permits necessary for the construction and operation of the site. This includes all necessary permits for power, Telco, and other basic site service needs. All permits will be released simultaneously. Clearwire will be responsible for joining "One Call" for locating this Telco line in the future.

Traffic control plans must be submitted with the Right of Way Use permit materials for work at this site. Plans must show pedestrian system impacts and mitigations.

The Site Right of Way Lease (beginning at \$600.00 per month) will start upon issuance of the Right of Way Use permit regardless of construction start time. The Lease terms are covered under an Addendum to the Right of Way Use Agreement to be executed prior to issuance of the Right of Way permits for this site.

Reviewer: Dottie Schmidt, Right-of-Way
Authority: BCC 14.30.070 and 14.30.080

10. The Fencing Gap

The proposal shall *exclude* removal of the existing fence section. If the proposed gap in the fence is necessary for access, the applicant shall submit revised plans for the related construction permit (09-131033-CA) showing how that section of the fence can be constructed to temporarily provide access without sacrificing the integrity of the fence.

Reviewer: Dottie Schmidt, Right-of-Way
Authority: BCC 14.30.070 and 14.30.080

11. The Cabinet

The applicant shall submit revised plans for the related construction permit (09-131033-CA) showing a site support cabinet that does not intrude into the fence and gravel trail.

Reviewer: Dottie Schmidt, Right-of-Way
Authority: BCC 14.30.070 and 14.30.080

Attachments

- A Photosimulations
- B Project Plans
- C SEPA Checklist

ATTACHMENT A
Photosimulations



ANTENNAE SHROUD MOUNTED ON TOP OF POLE

Received

WA-SEA0491-C (A)

BRIDLE TRAILS
3724 116TH AVE NE
BELLEVUE, WA 98004

OCT 13 2010

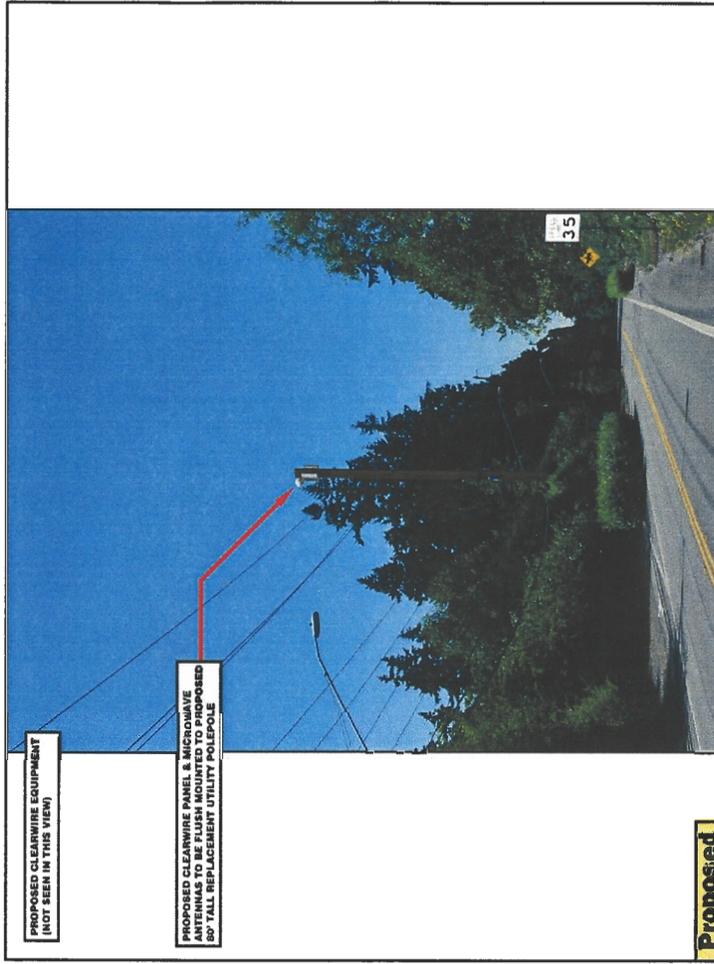
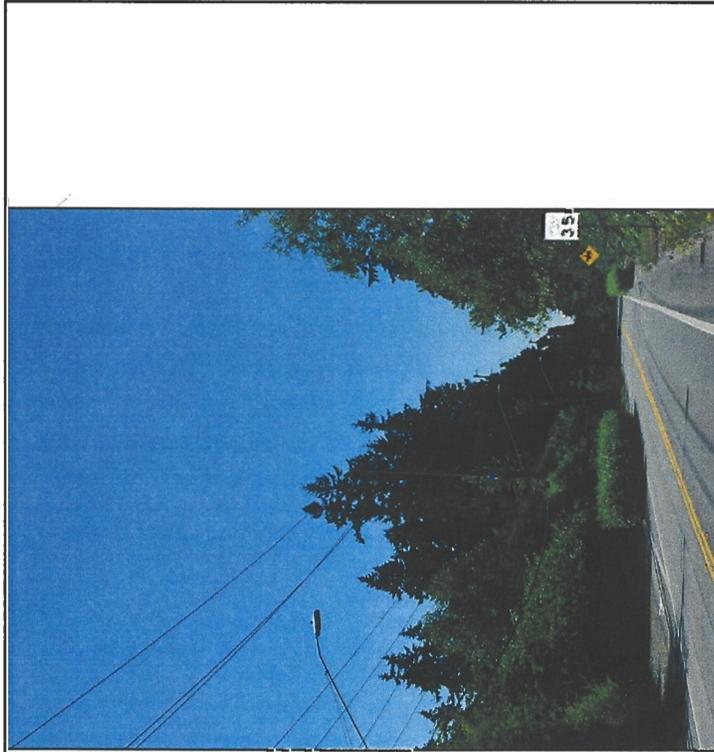
Permit Processing

clearwire®

October 08, 2010

VIEW #: 1A

ALTERNATE SITE LOCATION



The illustration above is a representation of the proposed project based on information provided by the client. Actual construction may vary dependent on approved construction plans and therefore PTS (Pacific Telecom Services) is not responsible for any post production design changes.

Clearwire
4400 Carillon Point
Kirkland, WA 98033
Steven Topp - Phone: (809) 708-7337

Prepared by: RLT
Approved by: RLT

PTS
Pacific Telecom Services, LLC
3199 C Airport Loop Drive, Costa Mesa, CA 92626-3414

REV: **2**

WA-SEA0491-C (A)

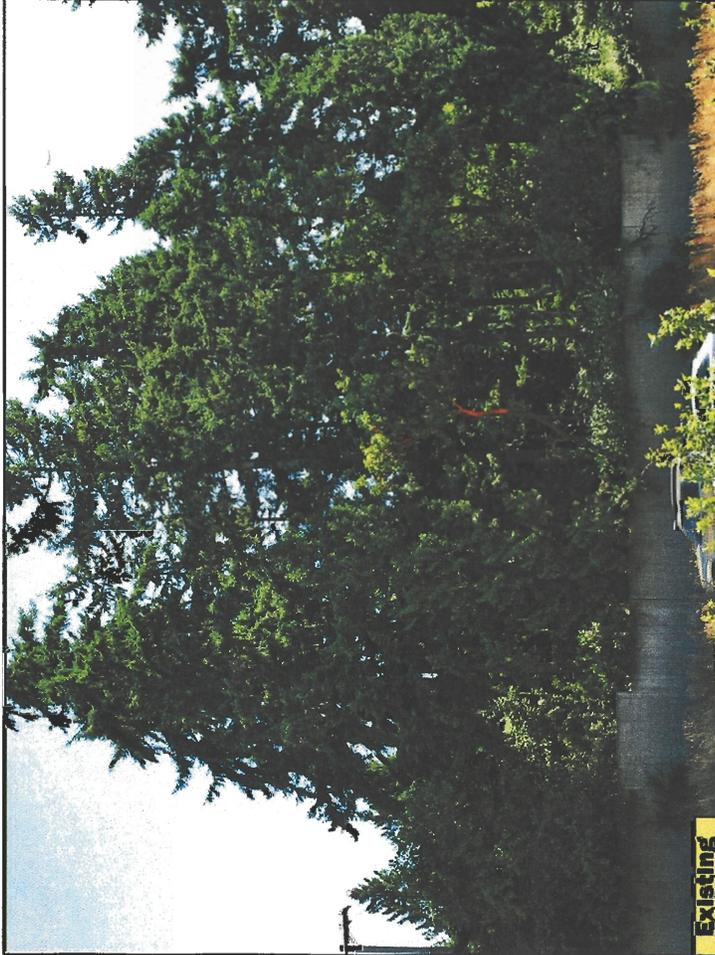
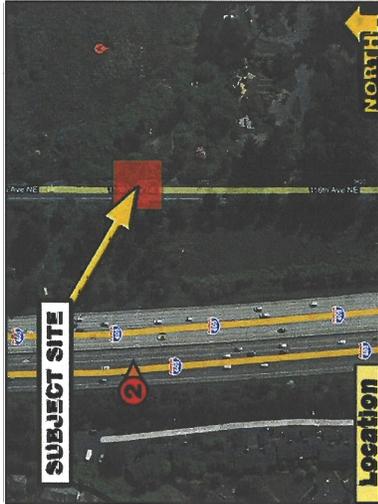
BRIDLE TRAILS
3724 116TH AVE NE
BELLEVUE, WA 98004



October 08, 2010

VIEW #: 2A

ALTERNATE SITE LOCATION



The illustration above is a representation of the proposed project based on information provided by the client. Actual construction may vary, dependent on approved construction plans and therefore PTS (Pacific Telecom Services) is not responsible for any post production design changes.

Clearwire
4400 Carillon Point
Kirkland, WA 98033
Steven Topp - Phone: (503) 708-7337

Prepared by: RLT
Approved by: RLT

PTS
Pacific Telecom Services, LLC
3199 G Airport Loop Drive, Costa Mesa, CA 92626-3414

REV: 2

WA-SEA0491-C (B)

BRIDLE TRAILS

111TH AVE NE & NE 36TH ST
BELLEVUE, WA 98004



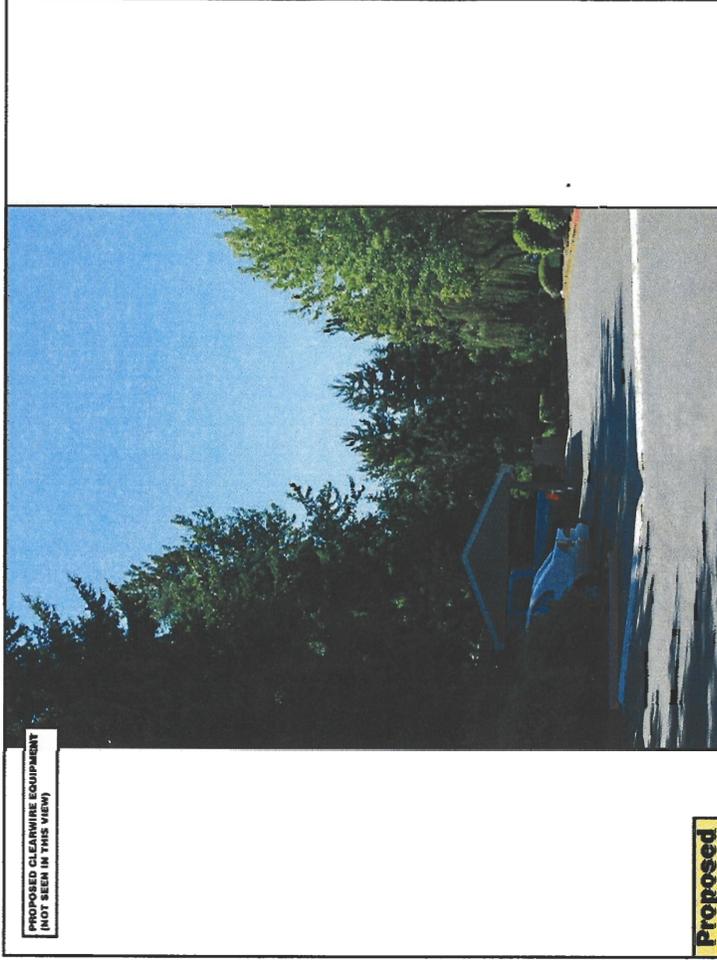
October 08, 2010

VIEW #: 1B

ALTERNATE SITE LOCATION



Existing



**PROPOSED CLEARWIRE EQUIPMENT
(NOT SEEN IN THIS VIEW)**

Proposed

The illustration above is a representation of the proposed project based on information provided by the client. Actual construction may vary dependent on approved construction plans and therefore PIS (Pacific Telecom Services) is not responsible for any post production design changes.

Clearwire
4400 Carillon Point
Kirkland, WA 98033
Steven Topp - Phone: (503) 708-7337

Prepared by: RLT
Approved by: RLT

PIS
Pacific Telecom Services, LLC
3199 C Airport Loop Drive, Costa Mesa, CA 92626-3414

REV: 2

WA-SEA0491-C (B)

BRIDLE TRAILS

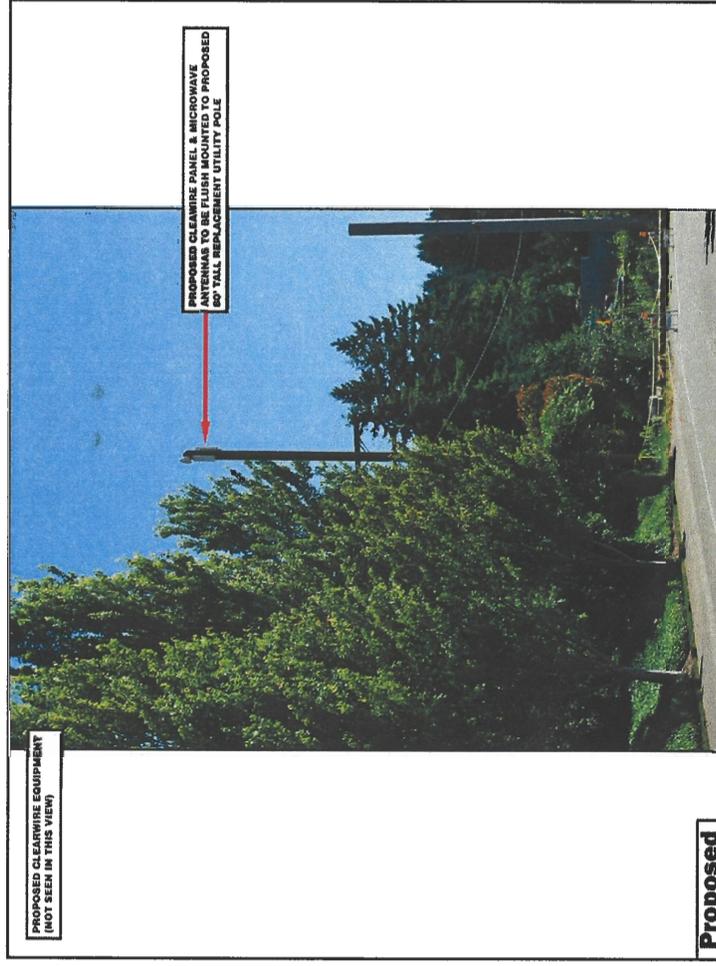
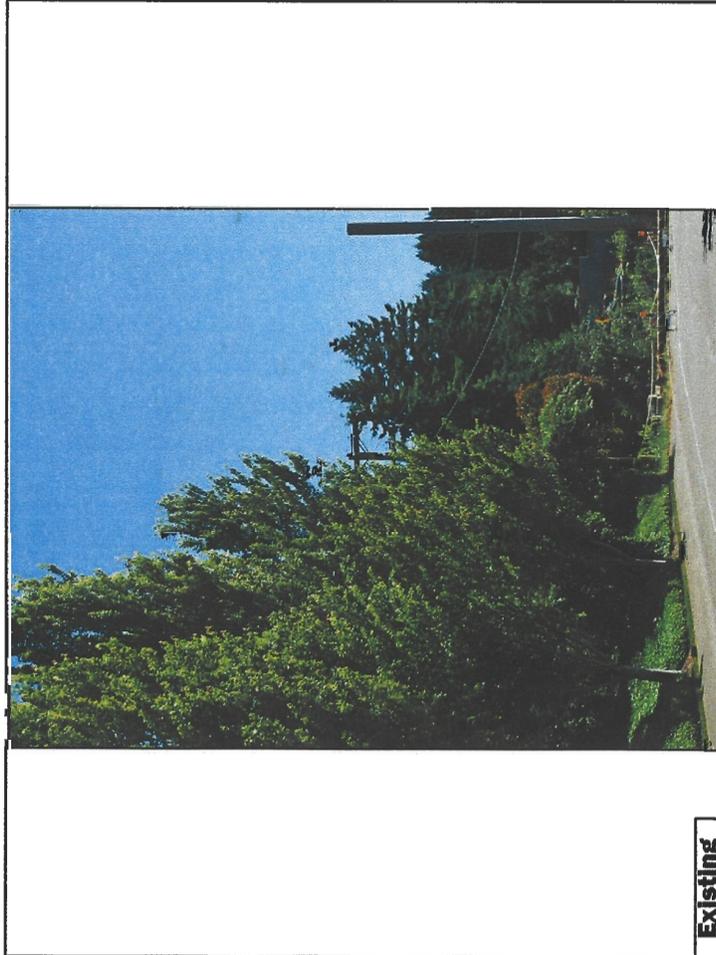
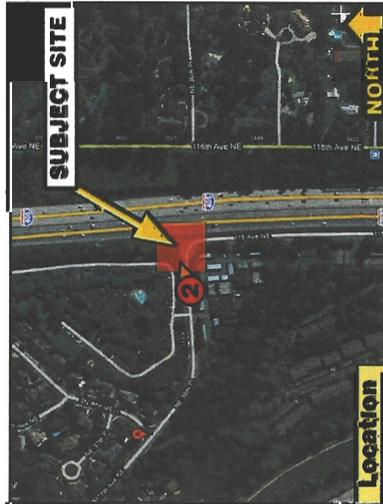
111TH AVE NE & NE 36TH ST
BELLEVUE, WA 98004

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October 08, 2010

VIEW #: 2B

ALTERNATE SITE LOCATION



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Clearwire
4400 Carillon Point
Kirkland, WA 98033
Steven Topp - Phone: (503) 708-7337

Prepared by: RLT
Approved by: RLT

PTS
Pacific Telecom Services, LLC
3199 C Airport Loop Drive, Costa Mesa, CA 92626-3414

REV: 2

WA-SEA0491-C (B)

BRIDLE TRAILS

111TH AVE NE & NE 36TH ST
BELLEVUE, WA 98004



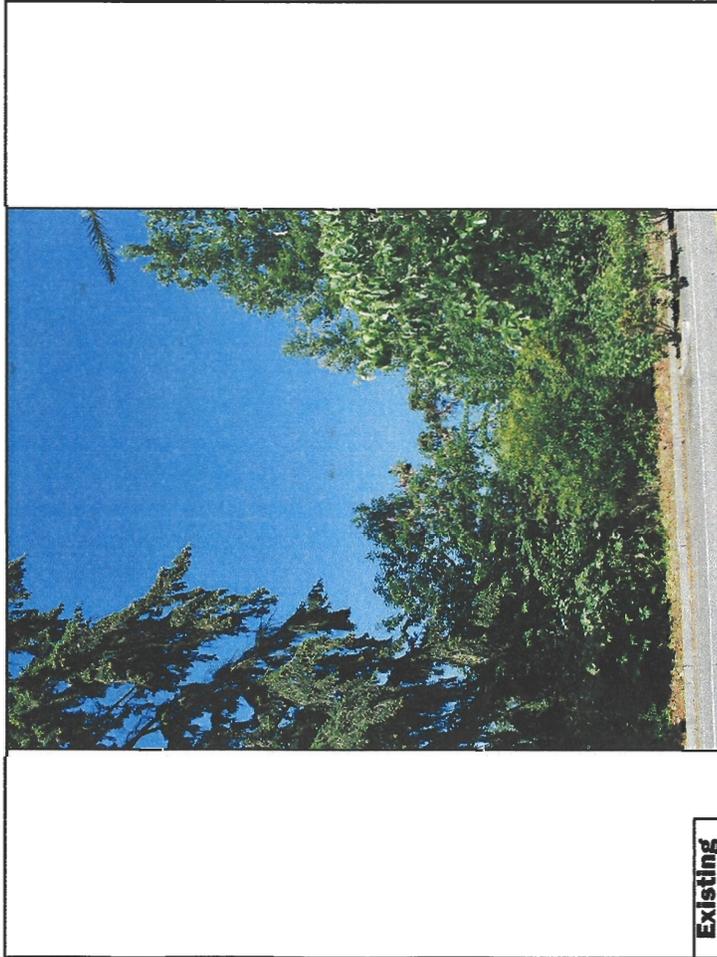
October 08, 2010

VIEW #: 3B

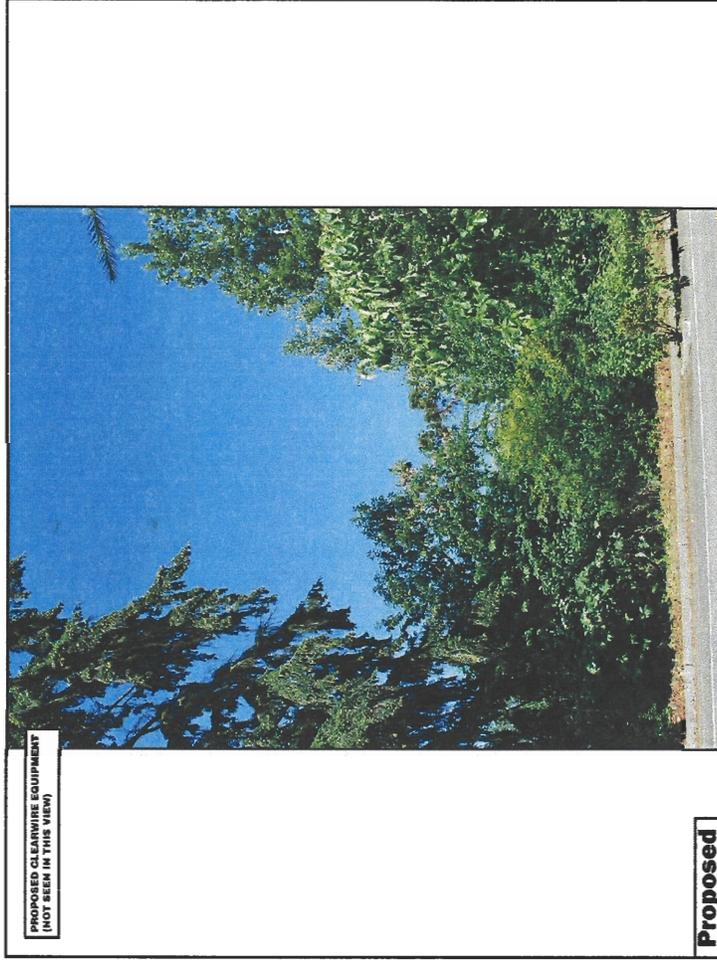
ALTERNATE SITE LOCATION



Location



Existing



Proposed

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4400 Cawthon Point
Kirkland, WA 98033
Steven Yapp - Phone: (509) 708-7337

Prepared by: RLT
Approved by: RLT

PIS
Pacific Telecom Services, LLC
3199 G. Alpert Loop Drive, Costa Mesa, CA 92626-3414

REV: 2

WA-SEA0491-C (B)

BRIDLE TRAILS

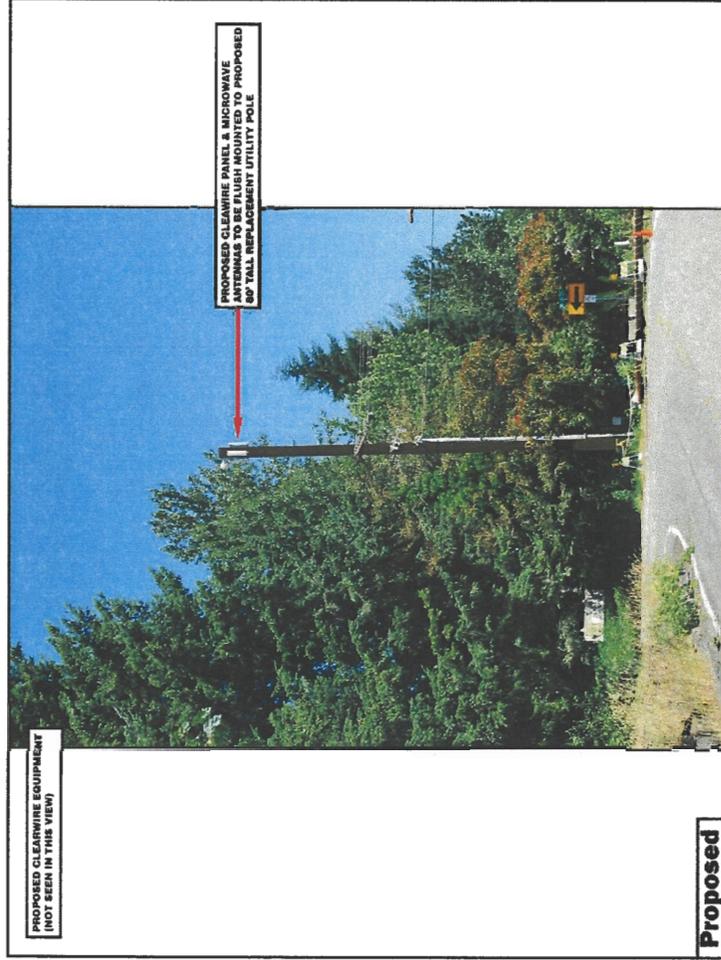
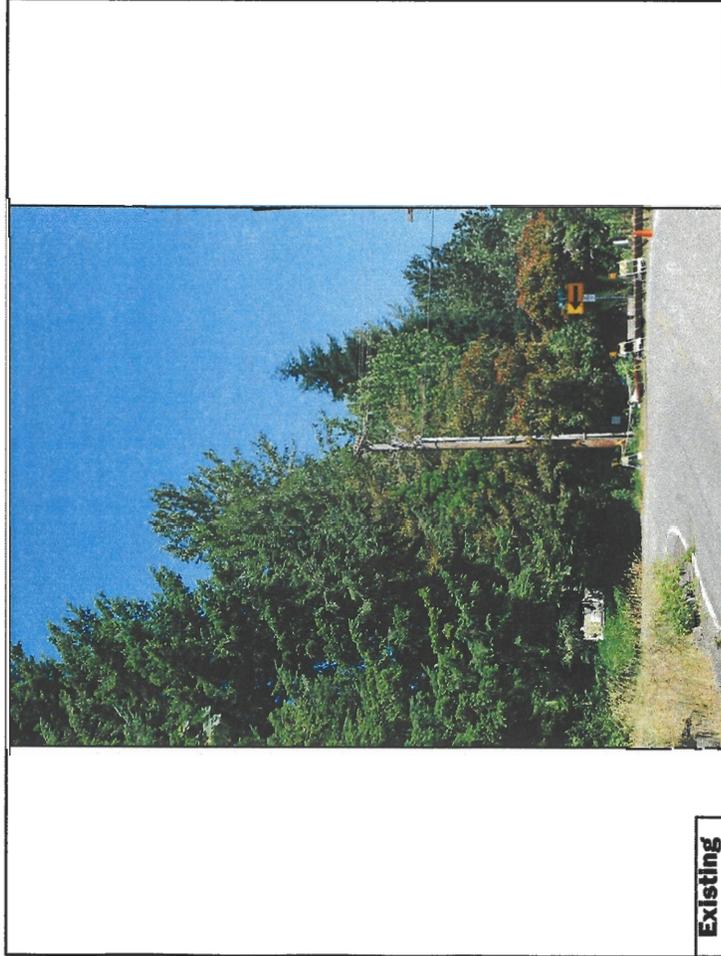
111TH AVE NE & NE 36TH ST
BELLEVUE, WA 98004



October 08, 2010

ALTERNATE SITE LOCATION

VIEW #: 4B



PROPOSED CLEARWIRE EQUIPMENT
(NOT SEEN IN THIS VIEW)

PROPOSED CLEARWIRE PANEL & MICROWAVE
ANTENNA TO BE FLUSH MOUNTED TO PROPOSED
80' TALL REPLACEMENT UTILITY POLE

Proposed

Existing

The illustration above is a representation of the proposed project based on information provided by the client. Actual construction may vary dependent on approved construction plans and therefore PIS (Pacific Telecom Services) is not responsible for any post production design changes.

Clearwire
4400 Carillon Point
Kirkland, WA 98033
Steven Topp - Phone: (503) 708-7337

Prepared by: RLT
Approved by: RLT
Pacific Telecom Services, LLC
3199 C Airport Loop Drive, Costa Mesa, CA 92626-3414

REV: 2

Received

WA-SEA0491-C

BRIDAL TRAILS
3724 116TH AVE NE
BELLEVUE, WA 98004

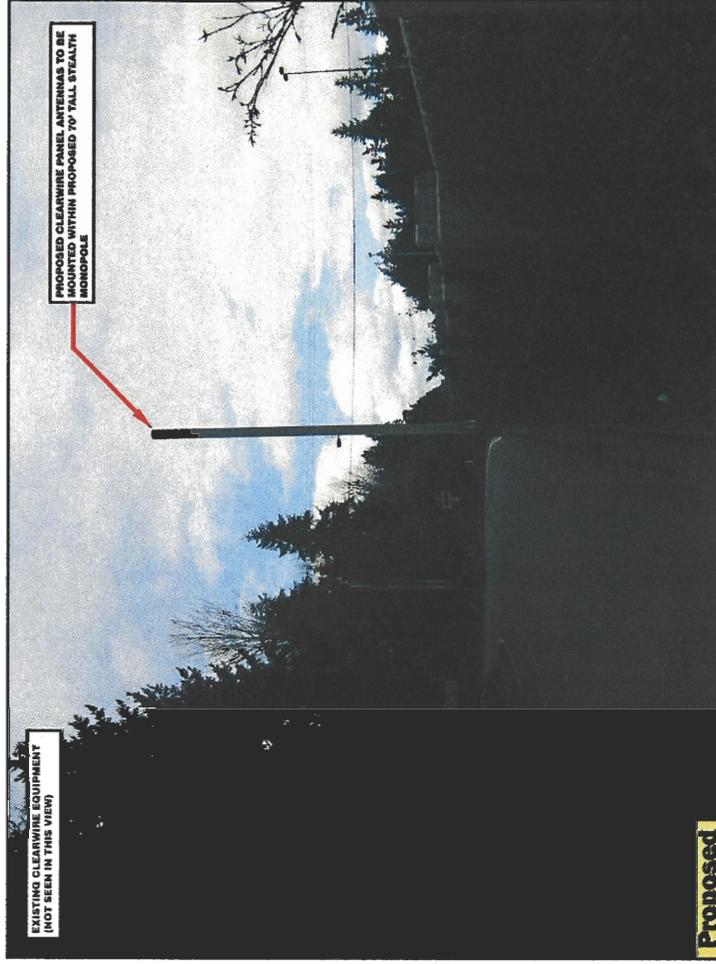
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PRIMARY SITE LOCATION

VIEW #: 1



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4400 Carillon Point
Kirkland, WA 98033
Steven Topp - Phone: (503) 708-7337

Prepared by: RLT
Approved by: RLT

Pacific Telecom Services, LLC
3199 C Airport Loop Drive, Costa Mesa, CA 92625-3414

REV: 2

Received

OCT 13 2010

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WA-SEA0491-C (C)

BRIDLE TRAILS

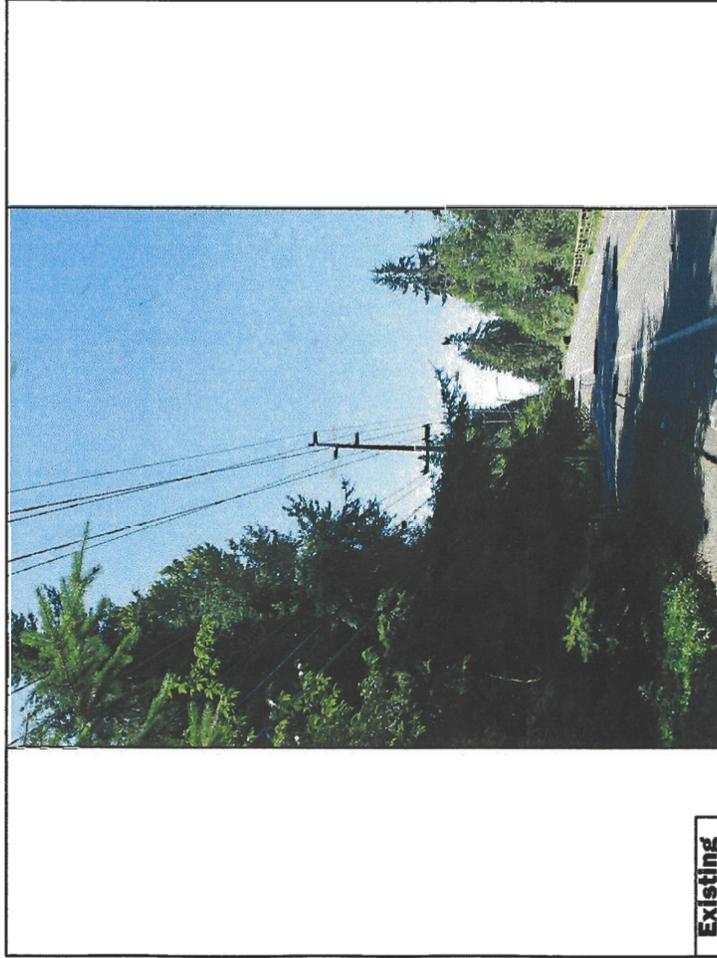
116TH AVE NE & NE 39TH ST
BELLEVUE, WA 98004

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October 11, 2010

ALTERNATE SITE LOCATION

VIEW #: 1C



PROPOSED CLEARWIRE EQUIPMENT (NOT SEEN IN THIS VIEW)

PROPOSED CLEARWIRE PANEL & MICROWAVE EQUIPMENT TO BE SUPPORTED BY TALL REPLACEMENT UTILITY POLE

The illustration above is a representation of the proposed project based on information provided by the client. Actual construction may vary dependent on approved construction plans and therefore PTS (Pacific Telecom Services) is not responsible for any post production design changes.

Clearwire
4400 Carillon Point
Kirkland, WA 98033
Steven Topp - Phone: (503) 708-7337

Prepared by: SEP
Approved by: RLT

PTS
Pacific Telecom Services, LLC
3199 C Airport Loop Drive, Costa Mesa, CA 92626-3414

REV: 2

WA-SEA0491-C (C)

BRIDLE TRAILS

116TH AVE NE & NE 39TH ST
BELLEVUE, WA 98004

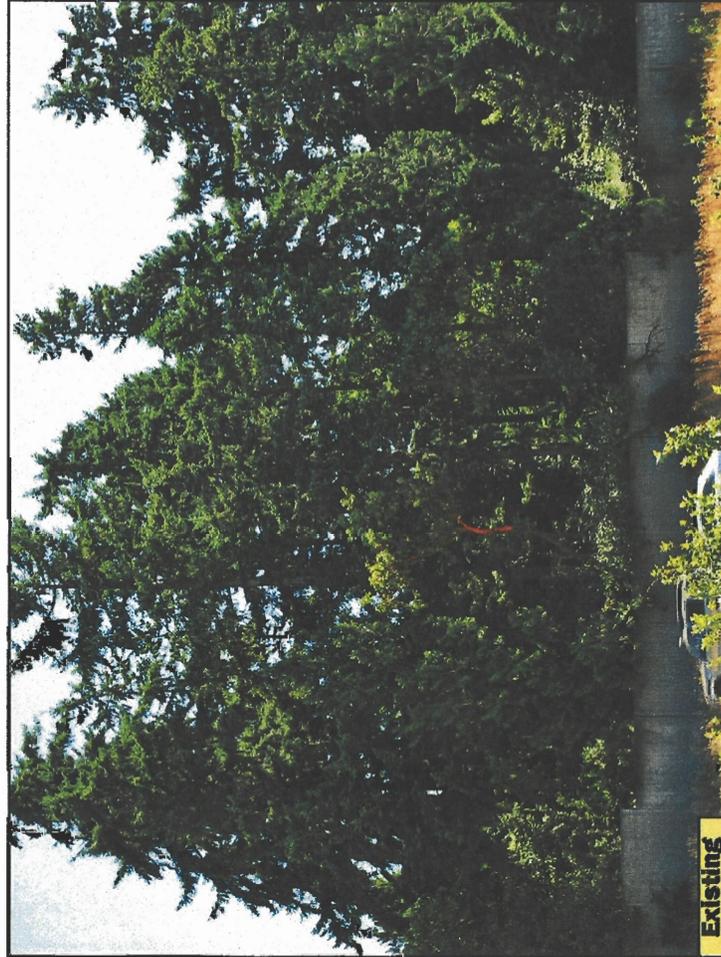


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VIEW #: 2C

ALTERNATE SITE LOCATION



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Clearwire
4400 Carillon Point
Kirkland, WA 98033
Steven Topp - Phone: (509) 708-7337

Prepared by: SEP
Approved by: RLT

PIS
Pacific Telecom Services, LLC
3189 C Allport Loop Drive, Costa Mesa, CA 92626-3414

REV: **2**

WA-SEA0491-C (C)

BRIDLE TRAILS

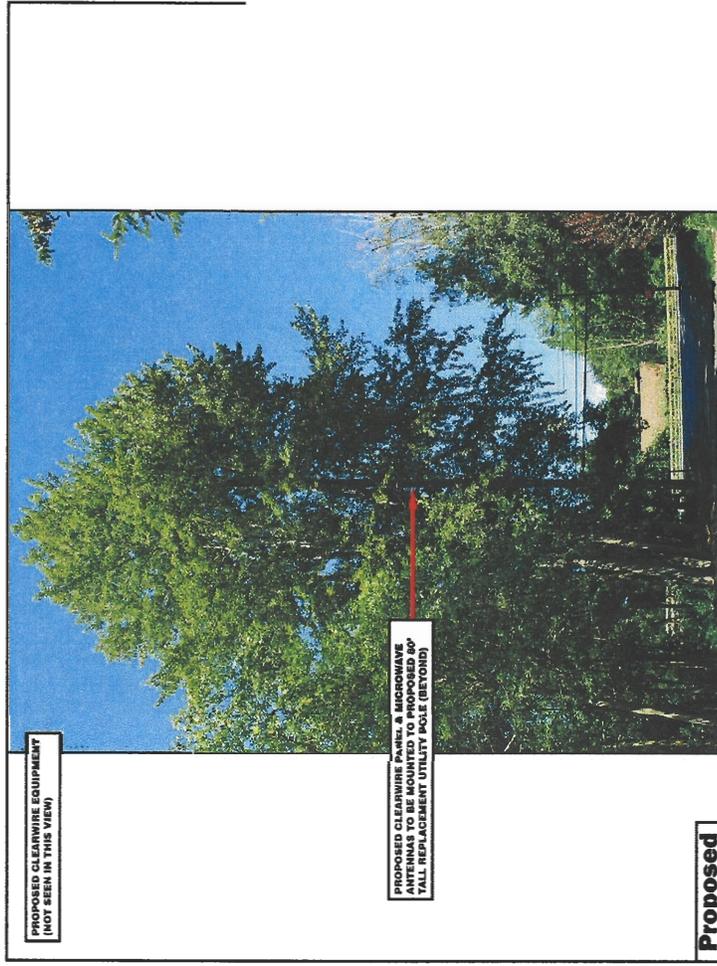
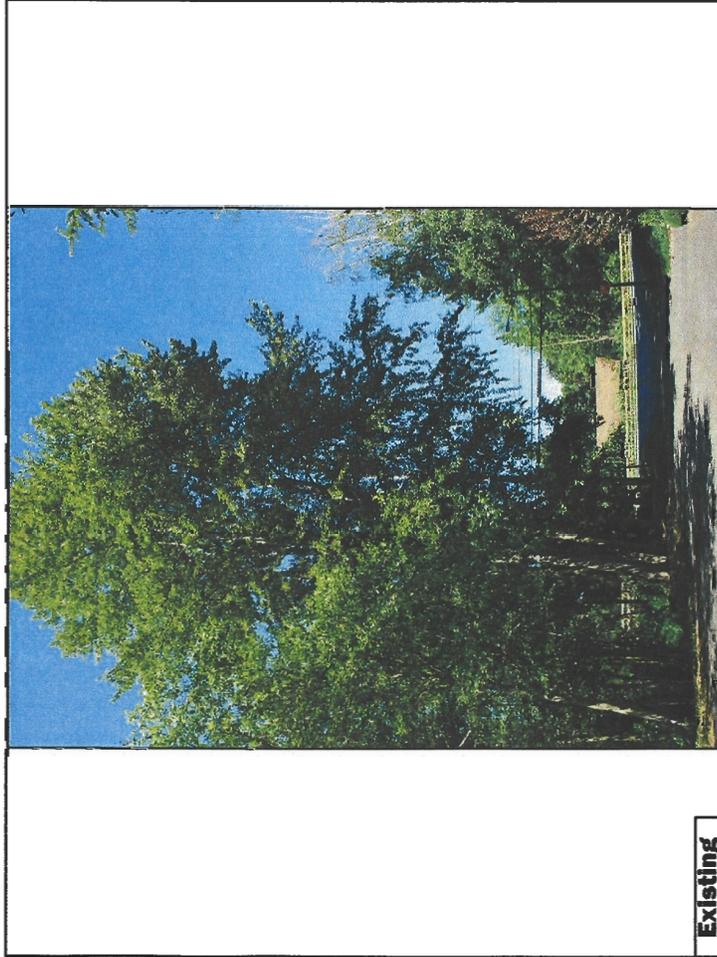
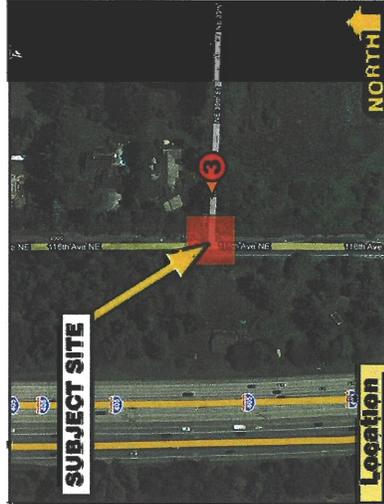
116TH AVE NE & NE 39TH ST
BELLEVUE, WA 98004

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VIEW #: 3C

ALTERNATE SITE LOCATION



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Clearwire
4400 Carillon Point
Kirkland, WA 98033
Steven Topp - Phone: (503) 708-7337

Prepared by: SEP
Approved by: RLT

PIS
Pacific Telecom Services, LLC
3199 E Airport Loop Drive, Costa Mesa, CA 92626-3414

REV: 2

WA-SEA0491-C (C)

BRIDLE TRAILS
116TH AVE NE & NE 39TH ST
BELLEVUE, WA 98004



October 11, 2010

VIEW #: 4C

ALTERNATE SITE LOCATION



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Clearwire
4404 Cawthon Point
Kirkland, WA 98033
Steven Tapp - Phone: (503) 708-7337

Prepared by: SEP
Approved by: RLT

PIS
Pacific Telecom Services, LLC
3199 C Alport Loop Drive, Costa Mesa, CA 92626-3414

REV: **2**

Received

WA-SEA0491-C (E)

BRIDLE TRAILS

115TH AVE NE & NE 116TH AVE NE
BELLEVUE, WA 98004

OCT 13 2010

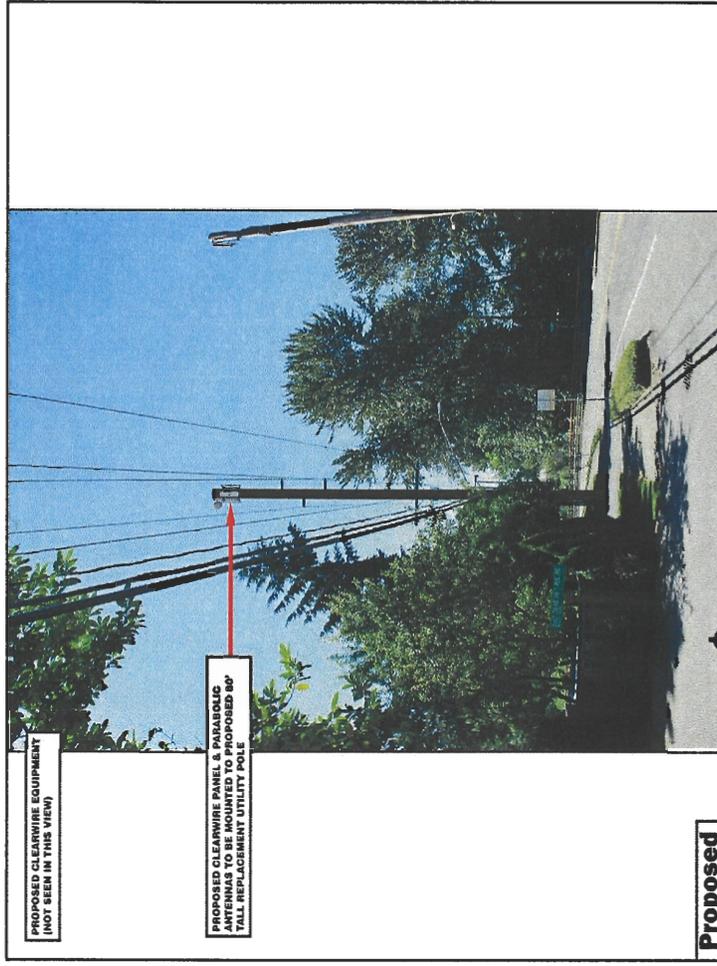
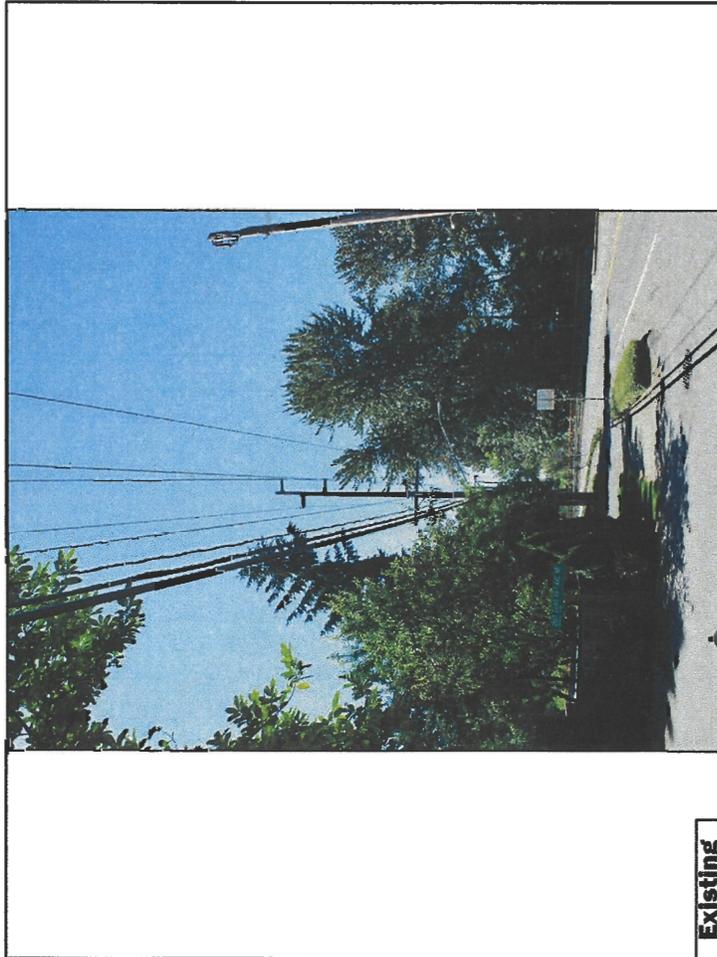
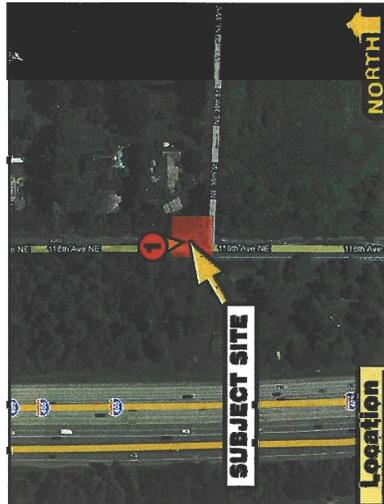
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ALTERNATE SITE LOCATION

VIEW #: 1E



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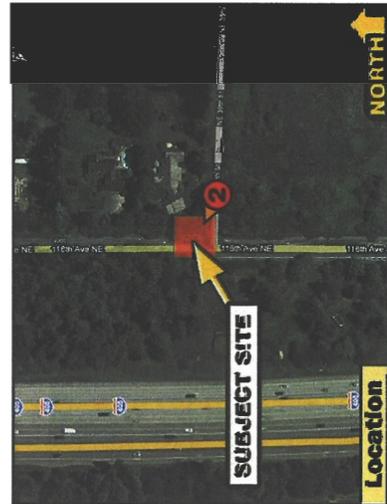
Clearwire
4400 Carillon Point
Kirkland, WA 98033
Steven Topp - Phone: (503) 708-7337

Prepared by: SEP
Approved by: RLT

PTS
Pacific Telecom Services, LLC
3199 C Airport Loop Drive, Costa Mesa, CA 92626-3414

REV: **2**

WA-SEA0491-C (E)
BRIDLE TRAILS
115TH AVE NE & NE 116TH AVE NE
BELLEVUE, WA 98004

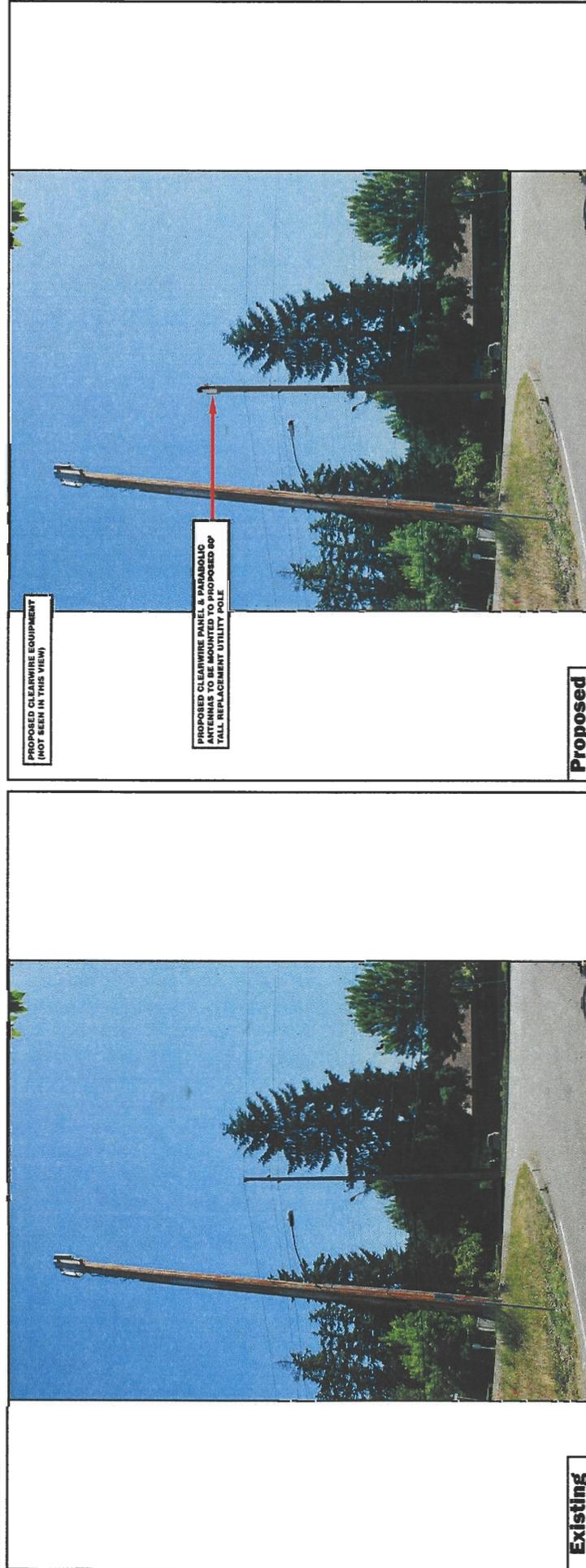


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October 11, 2010

VIEW #: 2E

ALTERNATE SITE LOCATION



PROPOSED CLEARWIRE EQUIPMENT (NOT SEEN IN THIS VIEW)

PROPOSED CLEARWIRE PANEL & PARABOLIC ANTENNAS TO BE MOUNTED TO PROPOSED 60' TALL REPLACEMENT UTILITY POLE

Proposed

Existing

The illustration above is a representation of the proposed project based on information provided by the client. Actual construction may vary dependent on approved construction plans and therefore PTS (Pacific Telecom Services) is not responsible for any post production design changes.

Clearwire
 4400 Carillon Point
 Kirkland, WA 98033
 Steven Tapp - Phone: (503) 708-7337

Prepared by: SEP
 Approved by: RLT

PTS
 Pacific Telecom Services, LLC
 3199 G Airport Loop Drive, Costa Mesa, CA 92626-3414

REV: **2**

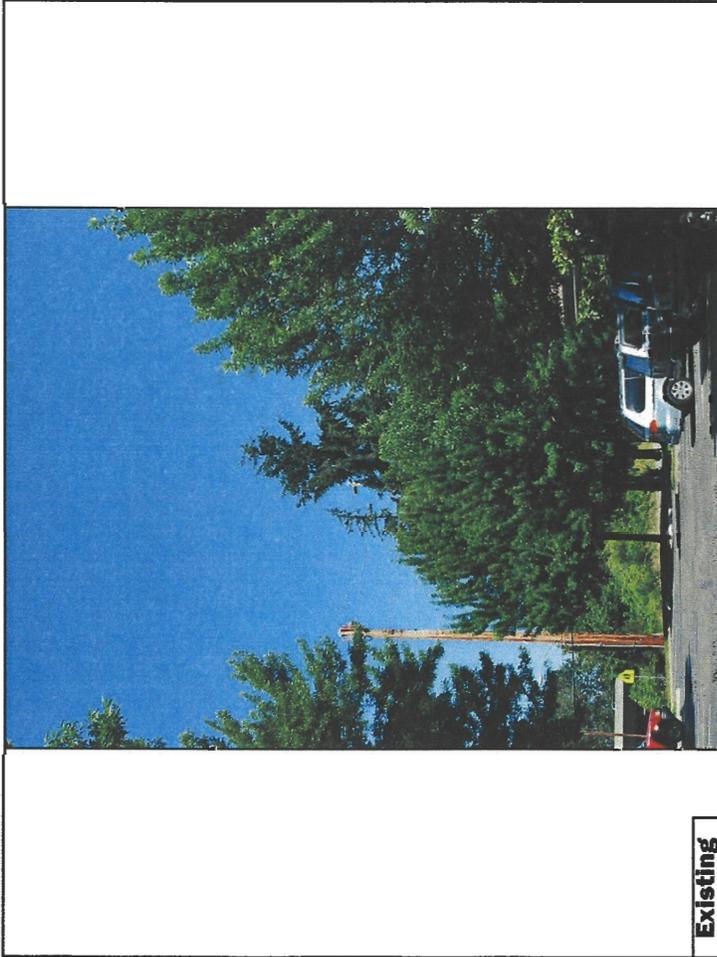
WA-SEA0491-C (E)
 BRIDLE TRAILS
 115TH AVE NE & NE 116TH AVE NE
 BELLEVUE, WA 98004

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October 11, 2010

VIEW #: 3E

ALTERNATE SITE LOCATION



Existing



Proposed

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Clearwire
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 Kirkland, WA 98033
 Steven Topp - Phone: (509) 708-7337

Prepared by: SEP
 Approved by: RLT

PTIS
 Pacific Telecom Services, LLC
 3199 C Airport Loop Drive, Costa Mesa, CA 92626-3414

REV: **2**

WA-SEA0491-C (E)

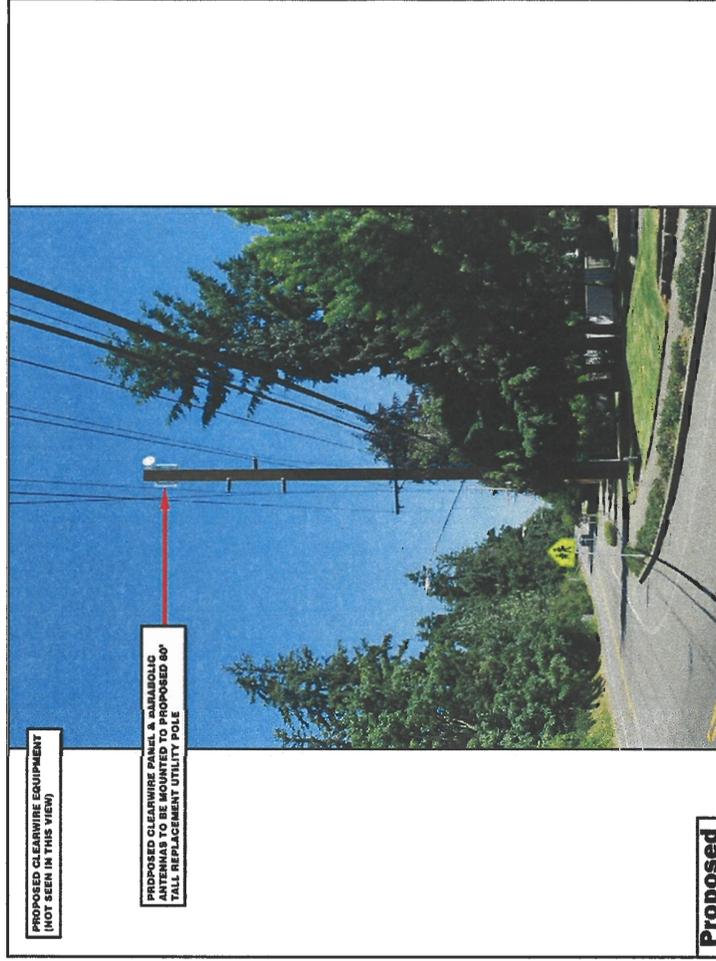
BRIDLE TRAILS
115TH AVE NE & NE 116TH AVE NE
BELLEVUE, WA 98004



October 11, 2010

VIEW #: 4E

ALTERNATE SITE LOCATION



PROPOSED CLEARWIRE EQUIPMENT
(NOT SEEN IN THIS VIEW)

PROPOSED CLEARWIRE PANEL & SUBELEMENT
ANTENNAS TO BE MOUNTED TO PROPOSED 60'
TALL REPLACEMENT UTILITY POLE

Proposed

Existing

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Clearwire
4400 Carillon Point
Kirkland, WA 98033
Steven Topp • Phone: (503) 708-7337

Prepared by: SEP
Approved by: RLT

PTS
Pacific Telecom Services, LLC
3199 C Airport Loop Drive, Costa Mesa, CA 92626-3414

REV: 2

Received

WA-SEA0491-C (F)

BRIDLE TRAILS

116TH AVE NE & NE 36TH PL
BELLEVUE, WA 98004

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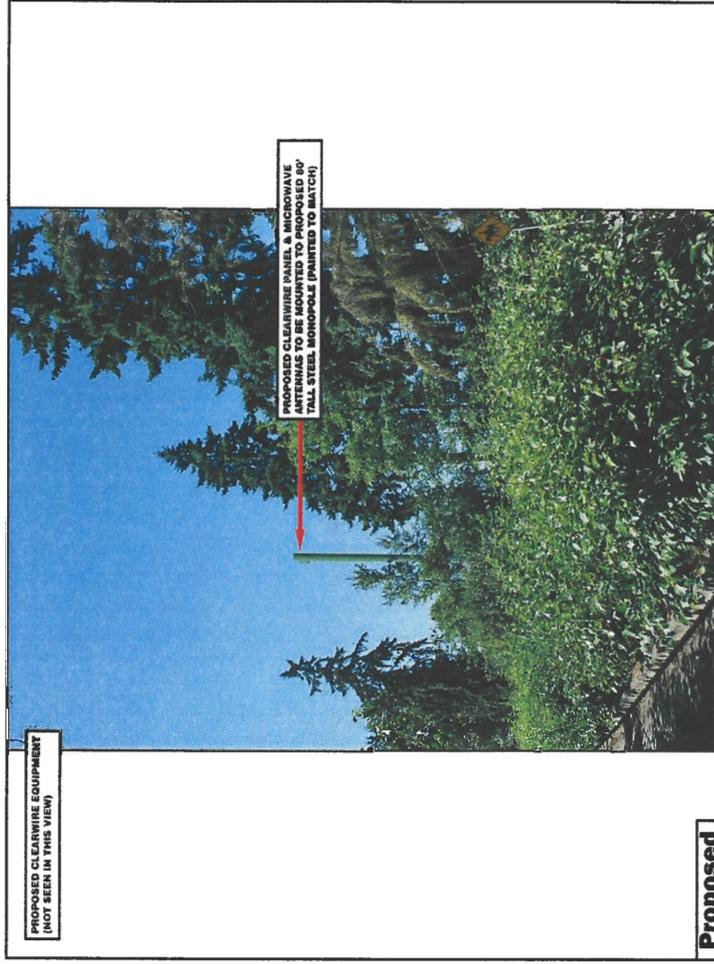
October 11, 2010

OCT 13 2010

Permit Processing

ALTERNATE SITE LOCATION

VIEW #: 1F



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Clearwire
4400 Carillon Point
Kirkland, WA 98033
Steven Topp - Phone: (503) 708-7337

Prepared by: SEP
Approved by: RLT
Pacific Telecom Services, LLC
3199 C-Alipart Loop Drive, Costa Mesa, CA 92626-3414

REV: 2

WA-SEA0491-C (F)

BRIDLE TRAILS
116TH AVE NE & NE 36TH PL
BELLEVUE, WA 98004

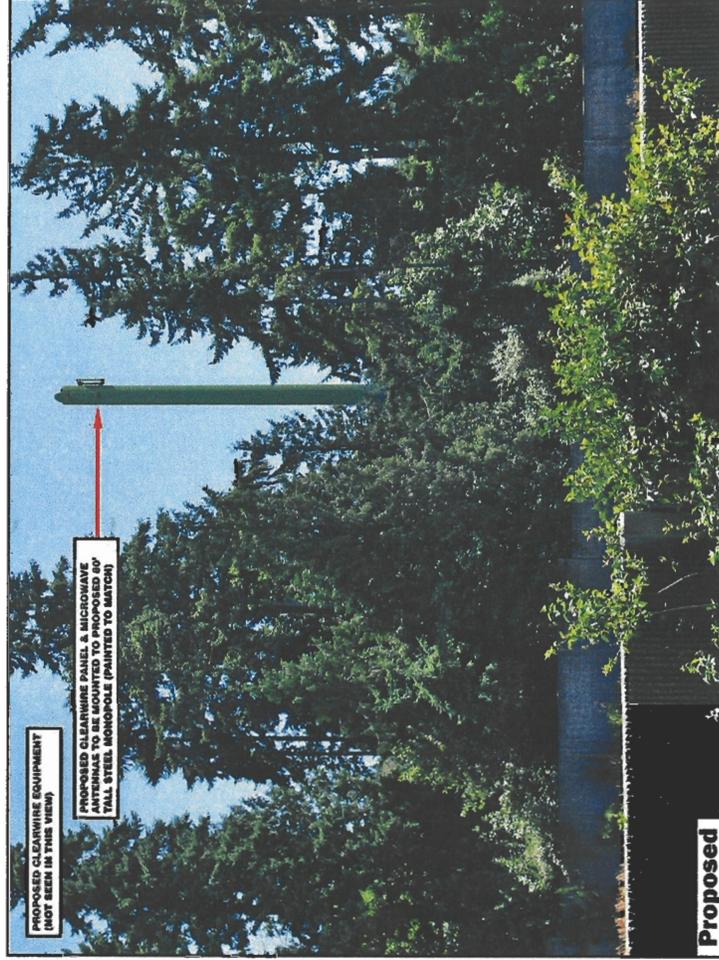


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October 11, 2010

VIEW #: 2F

ALTERNATE SITE LOCATION



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REV: 2

WA-SEA0491-C (F)

BRIDLE TRAILS
116TH AVE NE & NE 36TH PL
BELLEVUE, WA 98004

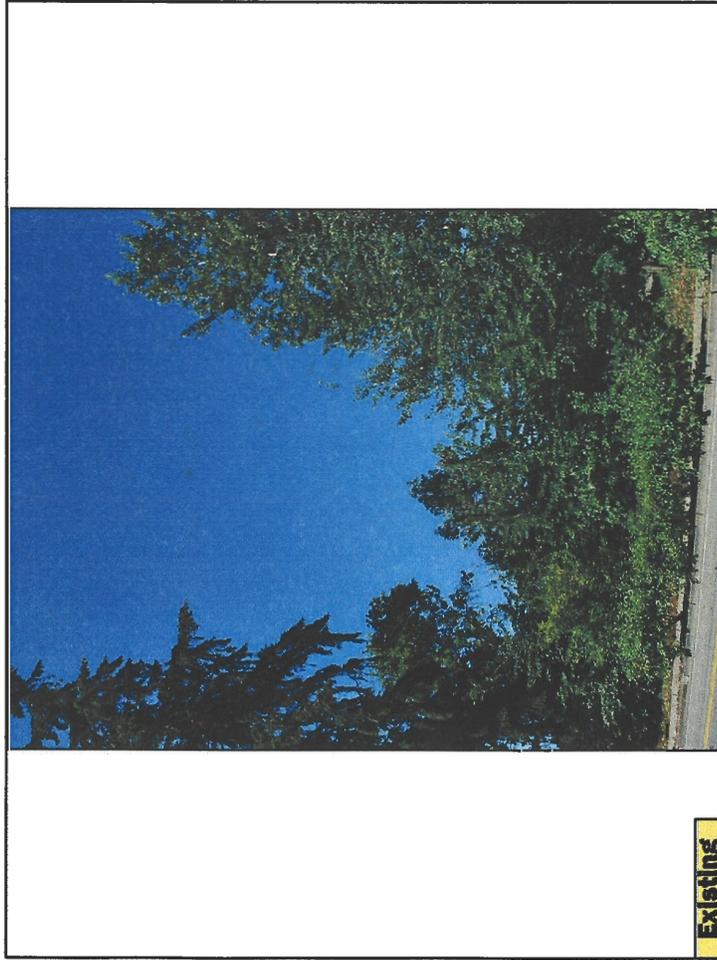


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October 11, 2010

VIEW #: 3F

ALTERNATE SITE LOCATION



PROPOSED CLEARWIRE EQUIPMENT
(NOT SEEN IN THIS VIEW)

PROPOSED CLEARWIRE PANEL & MICROWAVE
ANTENNAS TO BE MOUNTED TO PROPOSED 80'
TALL STEEL MONOPOLE (PAINTED TO MATCH)

Proposed

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Clearwire
4400 Carillon Point
Kirkland, WA 98033
Steven Topp - Phone: (509) 708-7337

Prepared by: SEP
Approved by: RLT

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Pacific Telecom Services, LLC
3199 C Airport Loop Drive, Costa Mesa, CA 92626-3414

REV: 2

WA-SEA0491-C (F)

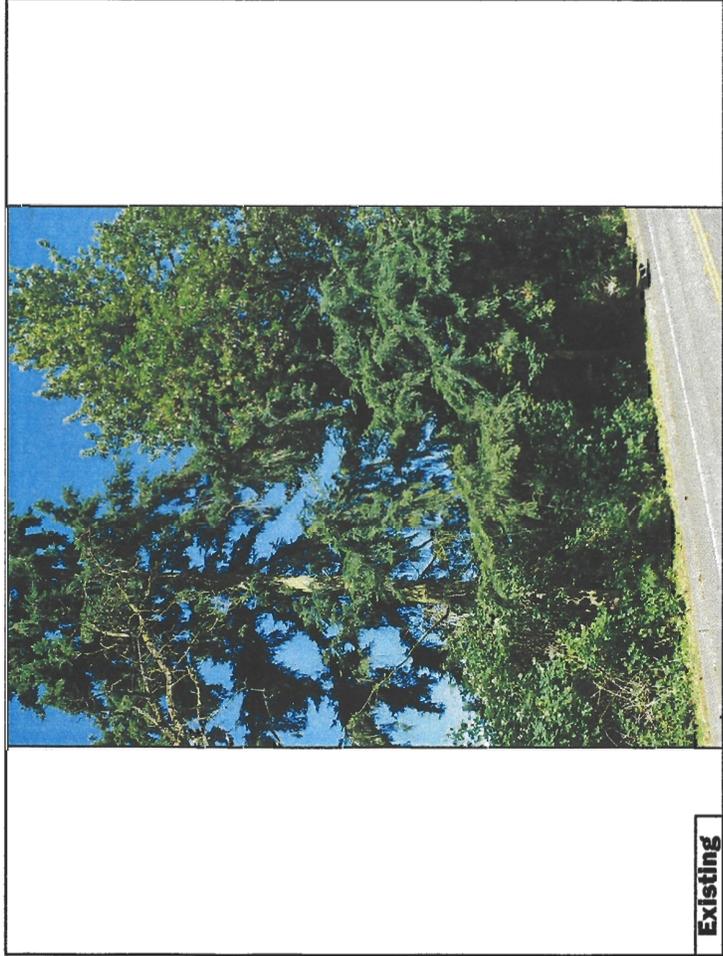
BRIDLE TRAILS
116TH AVE NE & NE 36TH PL
BELLEVUE, WA 98004



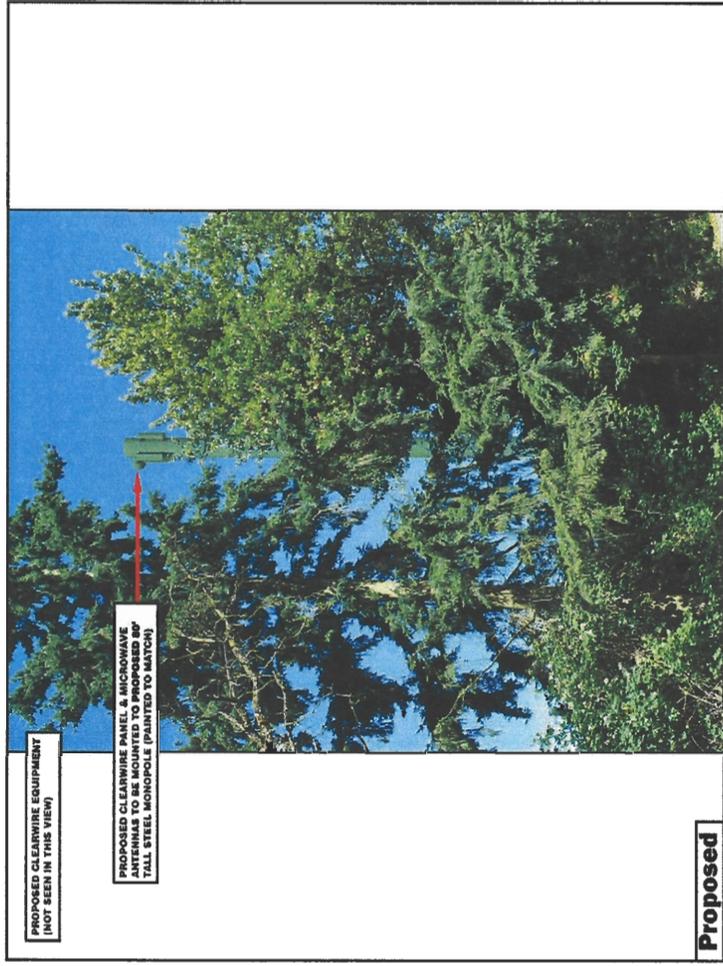
October 11, 2010

VIEW #: 4F

ALTERNATE SITE LOCATION



Existing



Proposed

PROPOSED CLEARWIRE PANEL & MICROWAVE ANTENNAS TO BE MOUNTED TO PROPOSED 80' TALL STEEL MONOPOLE (PAINTED TO MATCH)

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Clearwire
4400 Carillon Point
Kirkland, WA 98033
Steven Topp - Phone: (503) 708-7337

Prepared by: SEP
Approved by: RLT
Pacific Telecom Services, LLC
3199 C Airport Loop Drive, Costa Mesa, CA 92626-3414

REV: 2

ATTACHMENT B

Project Plans

clear wire®

BRIDAL TRAILS UTILITY ON 116TH WA-SEA0491-C

3724 116TH AVE NE
BELLEVUE, WA 98004
PSE POLE: #223808-166701

PROPRIETARY INFORMATION

THE INFORMATION CONTAINED IN THIS SET OF CONSTRUCTION DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO CARRIER SERVICES IS STRICTLY PROHIBITED.

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4400 CARILLON POINT
KIRKLAND, WA 98033

PTS

PACIFIC TELECOM SERVICES,
LLC

555 First Avenue S., Suite 650
Seattle, WA 98104
Phone: (206) 342-9000 Fax: (206) 903-8513

6228 REGISTERED
ARCHITECT

RICHARD B. HALL
STATE OF WASHINGTON

EXPIRATION DATE OF THE
LICENSE: 06/30/16

BRIDAL TRAILS UTILITY ON 116TH

WA-SEA0491-C

3724 116TH AVE NE
BELLEVUE, WA 98004

PROJECT INFORMATION

PROJECT DESCRIPTION:

CLEARWIRE PROPOSES TO CONSTRUCT AN UNSTAFFED TELECOMMUNICATIONS FACILITY CONSISTING OF (3) PANEL ANTENNAS, (1) MICROWAVE DISH, AND (3) RRU UNITS MOUNTED TO A PROPOSED 81'-0" AGL PSE REPLACEMENT WOOD LAM UTILITY POLE ALONG WITH A CLEARWIRE SITE SUPPORT CABINET SHELF MOUNTED TO PROPOSED REPLACEMENT UTILITY POLE.

APPLICANT:

CLEARWIRE
4400 CARILLON POINT
KIRKLAND, WA 98033
CONTACT: EDWARD HILL
PH: (425) 216-4730

PROPERTY OWNER:

PUGET SOUND ENERGY
PO BOX 90888
BELLEVUE, WA 98009
CONTACT: TIM GASSER
PHONE: (425) 456-2776

CODE INFORMATION:

ZONING CLASSIFICATION: R-1

BUILDING CODE: 2006 IBC

CONSTRUCTION TYPE: IIB

OCCUPANCY: S-2

JURISDICTION: CITY OF BELLEVUE

CURRENT USE: UTILITY POLE

PROPOSED USE: TELECOMMUNICATIONS FACILITY

SITE ACQUISITION:

CONTACT: ELAINE WARD
PH: (206) 390-0853

CONSTRUCTION:

CONTACT: LARRY BELL
PH: (360) 329-6879

PERMITTING:

CONTACT: STEVEN TOPP
PH: (503) 708-7337

TELCO COMPANY:

QWEST
PH: (800) 605-6000

RF ENGINEER:

CONTACT: CESAR TANSENGCO
PH: (214) 649-1734

POWER COMPANY:

PSE
PH: (888) 225-5773

SITE LOCATION: (BASED ON NAD 83):

LATITUDE: 47° 38' 40.906" N

LONGITUDE: 122° 11' 7.595" W

TOP OF STRUCTURE AGL: 81'-0"

BASE OF STRUCTURE AMSL: 312'-0"

PARCEL NUMBER(S):

R.O.W.

AREA OF PARCEL:

N/A

PROJECT AREA:

N/A

GENERAL INFORMATION:

1. PARKING REQUIREMENTS ARE UNCHANGED.
2. TRAFFIC IS UNAFFECTED.
3. SIGNAGE IS PROPOSED.

PROJECT TEAM

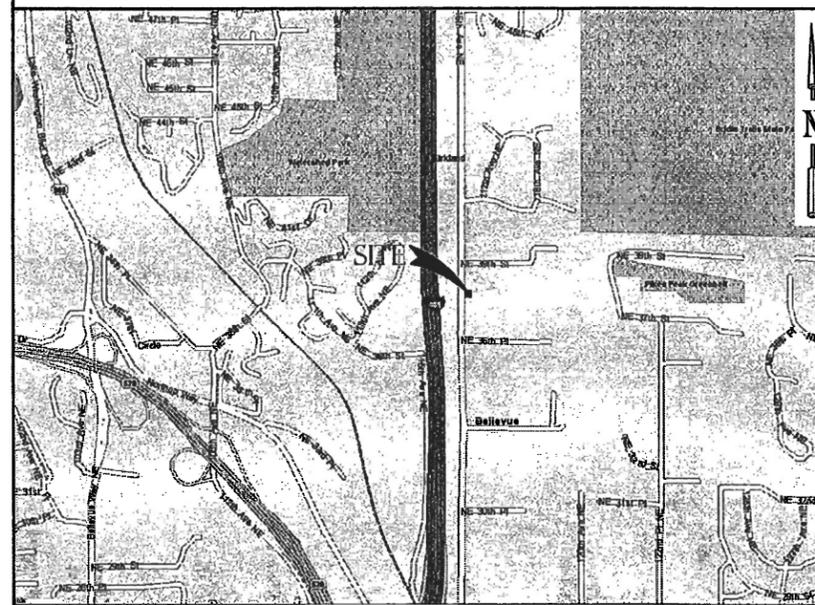
PROJECT ARCHITECT

RICHARD B. HALL, AIA
PACIFIC TELECOM SERVICES, LLC
555 FIRST AVENUE, S., SUITE 650
SEATTLE, WA 98104
CONTACT: PAUL DANNEBERG
PH: (206) 375-3788
EMAIL: PDANNEBERG@PTSWA.COM

PROJECT CONSULTANT

POWDER RIVER
17400 SW UPPER BOONES FERRY RD
SUITE 270
PORTLAND, OR 97224

VICINITY MAP



DRIVING DIRECTIONS

DEPART 4400 CARILLON PT, KIRKLAND, WA 98033 ON CARILLON PT (EAST) TURN RIGHT (SOUTH-EAST) ONTO SR-908 [LAKE WASHINGTON BLVD NE]. TURN LEFT (EAST) ONTO NORTHUP WAY. TURN LEFT (NORTH) ONTO 116TH AVE NE [NORTHUP AVE]. TURN RIGHT (EAST) ONTO LOCAL ROAD(S). ARRIVE AT SITE.

APPROVAL	DATE	SIGNATURE
CLEARWIRE:		
LANDLORD:		
CONST:		
S/A:		
R.F.:		
ZONING:		
A&E:		
B.H.:		

REVIEWERS SHALL CLEARLY PLACE INITIALS ADJACENT TO EACH REDLINE NOTE AS DRAWINGS ARE BEING REVIEWED

DRAWING INDEX

SHEET	DESCRIPTION
T-1	TITLE SHEET
G-1	GENERAL NOTES
CO1	SURVEY (BY OTHERS)
A-1	SITE PLAN
A-2	ENLARGED SITE PLAN AND WEST ELEVATION
A-3	EQUIPMENT DETAILS
A-4	COAX DETAILS
A-5	CONSTRUCTION DETAILS
RF-1	RF INFORMATION AND DETAILS
RF-2	SWEEP TEST
RF-3	ANTENNA SPECIFICATIONS
E-1	GROUNDING PLAN
E-2	GROUNDING DETAILS
E-3	ELECTRICAL DETAILS

LEGAL DESCRIPTION

R.O.W.

NOTES

1. (12) RUNS OF 7/8" COAX CABLE & (1) 1/2" COAX TO BE ATTACHED WITHIN SHROUD TO REPLACEMENT WOOD LAM UTILITY POLE.
2. ALL ANTENNAS AND MOUNTING HARDWARE TO BE PAINTED A NON-REFLECTIVE COLOR TO MATCH PROPOSED WOOD LAM UTILITY POLE.
3. EXACT LOCATION OF NEW REPLACEMENT PSE WOOD LAM UTILITY POLE TO BE DETERMINED BY PSE.

ABBREVIATIONS

A/C	AIR CONDITIONING	HORZ	HORIZONTAL	PLYWD	PLYWOOD
AGL	ABOVE FINISH GRADE	HR	HOUR	PROJ	PROJECT
APPROX	APPROXIMATELY	HT	HEIGHT	PROP	PROPERTY
BLDG	BUILDING	HVAC	HEATING	PT	PRESSURE TREATED
BLK	BLOCKING		VENTILATION	REQ	REQUIRED
CLG	CEILING	ID	INSIDE DIAMETER	RM	ROOM
CLR	CLEAR	IN	INCH	RO	ROUGH OPENING
CONC	CONCRETE	INFO	INFORMATION	SHT	SHEET
CONST	CONSTRUCTION	INSUL	INSULATION	SIM	SIMILAR
CONT	CONTINUOUS	INT	INTERIOR	SPEC	SPECIFICATION
		IBC	INTERNATIONAL BUILDING CODE	SF	SQUARE FOOT
DBL	DOUBLE			SS	STAINLESS STEEL
DIA	DIAMETER	LBS	POUNDS	STL	STEEL
DIAG	DIAGONAL			STRUCT	STRUCTURAL
DN	DOWN			STD	STUD
DET	DETAIL	MAX	MAXIMUM	SUSP	SUSPENDED
DWG	DRAWING	MECH	MECHANICAL		
		MTL	METAL	THRU	THROUGH
EA	EACH	MFR	MANUFACTURE	TNNG	TINNED
ELEV	ELEVATION	MGR	MANAGER	TP	TYPICAL
ELEC	ELECTRICAL	MIN	MINIMUM		
EQ	EQUAL	MISC	MISCELLANEOUS	UNO	UNLESS NOTED OTHERWISE
EQUIP	EQUIPMENT	NA	NOT APPLICABLE	VERT	VERTICAL
EXT	EXTERIOR	NIC	NOT IN CONTRACT	VIF	VERIFY IN FIELD
		NTS	NOT TO SCALE	W/	WITH
FIN	FINISH			W/O	WITHOUT
FLOOR	FLOURESCENT	OC	ON CENTER	WP	WATER PROOF
FLR	FLOOR	OD	OUTSIDE DIAMETER		
FT	FOOT				
GA	GAUGE				
GALV	GALVANIZED				
GC	GENERAL CONTRACTOR				
GRND	GROUND				
GYP BD	GYP SUM WALL BOARD				

REVISIONS

NO.	DATE	DESCRIPTION	INITIAL
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4	11-01-09	REVISED FINAL CONSTRUCTION DRAWINGS	PHD
5	11-13-09	REVISED FINAL CONSTRUCTION DRAWINGS	CBK
6	02-02-10	REVISED FINAL CONSTRUCTION DRAWINGS	PHD

NOT FOR CONSTRUCTION UNLESS
LABELED AS CONSTRUCTION SET

SHEET TITLE
TITLE SHEET

SHEET NUMBER

T-1

GENERAL NOTES:

- ALL CONSTRUCTION AND MATERIALS SHALL COMPLY WITH THE "INTERNATIONAL BUILDING CODE 2006" AND CITY CODE. SHALL MEET OR EXCEED THE STRICTER OF APPLICABLE COUNTY CODES AND REGULATIONS, LATEST EDITIONS.
- ANTENNAS, CABINETS AND COAXIAL CABLE SHALL BE PROVIDED BY CLIENT. CONTRACTOR SHALL COORDINATE SCHEDULE OF DELIVERY TO AVOID DELAYS.
- DAMAGE TO ALL UTILITIES, LAND, DRIVEWAY AREAS, AND PROPERTY OF OTHERS, DISTURBED DURING CONSTRUCTION, SHALL BE RETURNED TO THE ORIGINAL CONDITION AT THE COMPLETION OF WORK.
- CONTRACTOR SHALL COORDINATE WITH THE LOCAL POWER, TELEPHONE UTILITIES, AND THE CONSTRUCTION MANAGER TO CONFIRM THE SOURCE OF SERVICE PRIOR TO INSTALLATION OF CONDUITS.
- FOR CLEARWIRE PROJECTS WHERE THE SITE SUPPORT CABINET IS ANCHORED TO A CONCRETE SLAB ON GRADE, EXISTING VEGETATION AND ORGANIC MATERIALS SHALL BE REMOVED FROM THE PROPOSED CONCRETE PAD AREA, FILL SITE TO DESIGN ELEVATION WITH CLEAN, 5/8" MINUS CRUSHED ROCK FILL, COMPACTED UNDER CONCRETE PAD TO OBTAIN NOT LESS THAN 95% OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY FOR SOIL IN ACCORDANCE WITH ASTM D557.
- REGRADE AROUND PAD AS REQUIRED TO ALLOW MAXIMUM 3" OF PAD THICKNESS, EXTENDING ABOVE GRADE.
- ALL WORK SHALL BE DONE SATISFACTORY IN A PROFESSIONAL WORKMANLIKE MANNER, SUBJECT TO INSPECTION DURING THE CONSTRUCTION AND FINAL APPROVAL BY THE CONSTRUCTION MANAGER.
- ANY SUBSTITUTIONS OF MATERIALS, EQUIPMENT OR ALTERATIONS FROM THE PLANS AND/OR SPECIFICATIONS SHALL BE APPROVED BY THE CONSTRUCTION MANAGER.
- COLOR SELECTION SHALL BE COORDINATED WITH CONSTRUCTION MANAGER.
- CONTRACTOR SHALL VERIFY EXISTING CONDITIONS, DIMENSIONS, AND BRING DISCREPANCIES TO THE ATTENTION OF THE CONSTRUCTION MANAGER.
- CONTRACTOR SHALL CONTACT SUBSURFACE UTILITY LOCATOR FOR EXACT LOCATION OF EXISTING UTILITIES, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL VERIFY EXISTING UTILITY LOCATIONS BY TEST PIT, AS NECESSARY. LOCATION OF UTILITIES SHOWN ON PLAN ARE APPROXIMATE AND FOR PLANNING PURPOSES ONLY.
- CONTRACTOR SHALL SECURE THE NECESSARY PERMITS FOR THIS PROJECT FROM ALL APPLICABLE GOVERNMENT AGENCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BY ALL THE CONDITIONS AND REQUIREMENTS OF THE PERMITS.
- TOWER AND TOWER FOUNDATIONS ARE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.
- CONTRACTOR SHALL VISIT THE PROJECT SITE TO VIEW ALL CONDITIONS PRIOR TO SUBMITTING BID. ANY CHANGES DURING CONSTRUCTION VISUALLY ASCERTAINABLE PRIOR TO SUBMITTING BID, CANNOT BE THE BASIS FOR A CHANGE ORDER.
- COAT ALL SURFACES WITH NO-OX WHERE DISSIMILAR METALS CONTACT.
- CONTRACTOR SHALL REMOVE ALL DEBRIS AND EMPTY COAX REELS FROM THE SITE UPON COMPLETION OF THE PROJECT.

PROJECT NOTES:

REINFORCED CONCRETE:

- R-1. CONCRETE: ALL CONCRETE WITH SURFACES EXPOSED TO STANDING WATER SHALL BE AIR-ENTRAINED WITH AN AIR-ENTRAINING AGENT CONFORMING TO ASTM C260, C494, AND C618. TOTAL AIR CONTENT FOR FROST-RESISTANT CONCRETE SHALL BE IN ACCORDANCE WITH TABLE 1904.2.1 OF THE INTERNATIONAL BUILDING CODE. EXPOSED CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 3000 PSI AT THE END OF 28 DAYS. NO SPECIAL INSPECTION IS REQUIRED FOR 3000 PSI INSTALLED SOLELY TO SATISFY EXPOSED CONCRETE REQUIREMENTS.
- R-2. PREPARATION, TESTING, AND PLACING OF CONCRETE AND REINFORCEMENT SHALL BE PER ACI-318 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, LATEST EDITION.
- R-3. REINFORCING BARS SHALL HAVE A MINIMUM YIELD STRENGTH OF $F_y = 60,000$ PSI AND SHALL COMPLY WITH ASTM A615.
- R-4. PROVIDE MINIMUM CONCRETE COVERAGE FOR REINFORCING STEEL OF 3".

DESIGN:

- D-1. DESIGN IS IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE 2006.
- D-2. EQUIPMENT CABINET LOADING PER CLEARWIRE STANDARD EQUIPMENT.
- D-3. DESIGN LOADS: WASHINGTON STATE
 - A. 100 MPH WIND SPEED
 - 3 SECOND GUST
 - CATEGORY 2 IMPORTANCE FACTOR 1.0
 - EXPOSURE CATEGORY C
 - B. ALL OTHER LOADS ARE PER ASCE 7-02

STRUCTURAL:

- S-1. DETAIL, FABRICATE, AND ERECT ALL STRUCTURAL STEEL IN ACCORDANCE WITH AISC. SPECIFICATION FOR DESIGN, FABRICATION AND ERECTION OF STRUCTURE STEEL FOR BUILDINGS.
- S-2. ALL STRUCTURAL STEEL WORK SHALL CONFORM TO THE AISC SPECIFICATION FOR STRUCTURAL STEEL FOR BUILDINGS - ALLOWABLE STRESS DESIGN AND PLASTIC DESIGN, 9th EDITION.
- S-3. STRUCTURAL PIPE COLUMNS SHALL COMPLY WITH ASTM A53, TYPE E OR S, GRADE B, $F_y = 36$ KSI. ALL WIDE FLANGE SHAPES SHALL BE ASTM A992, GRADE 50. ALL STRUCTURAL SHAPES AND PLATE SHALL COMPLY WITH ASTM A36.
- S-4. WELDING: ALL WELDING IS TO BE DONE BY PRE-QUALIFIED WELDERS HOLDING CURRENT CERTIFICATE FROM A RECOGNIZED TESTING LABORATORY. ALL WELDS SHALL BE 3/16" MINIMUM FILLET WELDS U.O.N. ELECTRODES SHALL BE E70XX.
- S-5. THERE SHALL BE NO FIELD WELDING.
- S-6. STRUCTURAL GROUT SHALL BE SHRINKAGE RESISTANCE NON-EXPANSIVE, NONMETALLIC GROUT WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 5,000 PSI WHEN TESTED IN ACCORDANCE WITH ASTM CODE C109. FORMS SHALL BE PLACED AROUND BASE PLATE AND THE STRUCTURAL GROUT SHALL BE POURED. NO DRY-DAMP PACKING.
- S-7. ANCHOR BOLTS AND ALL-THREAD RODS SHALL COMPLY WITH ASTM A36, UNLESS OTHERWISE NOTED. ALL OTHER BOLTS AND NUTS SHALL COMPLY WITH ASTM A325. ALL BOLTS SHALL BE HOT-DIPPED GALVANIZED.
- S-8. ALL EXPOSED STEEL SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION PER ASTM A153 OR A123.
- S-9. APPLY TWO COATS OF ZINC-RICH RUST-OLEUM #2185 PAINT TO ALL FIELD DRILLED HOLES AND CUTS. GRID-GUARD EPOXY #5465 COATING SHALL BE APPLIED TO ALL AREAS WHERE GALVANIZED SURFACES NEED TO BE RECONDITIONED, INCLUDING ALL WELD AREAS.

ELECTRICAL NOTES:

- ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
- ALL ELECTRICAL ITEMS SHALL BE UL APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
- THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATIONS, INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE, OPERATING AND APPROVED ELECTRICAL SYSTEM.
- GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS, AND COORDINATION OF INSPECTIONS.
- ELECTRICAL AND TELCO WIRING BETWEEN CABINETS SHALL RUN IN EMT OR SCHEDULE 40 PVC (AS PERMITTED BY CODE).
- ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR PVC WHERE LOCAL CODES AND SITE CONDITIONS PERMIT.
- ELECTRICAL WORK SHALL BE COPPER WITH TYPE XHHW, THWN, OR THW INSULATION.
- RUN ELECTRICAL CONDUIT BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND EXISTING METER SOCKET AS LOCATED ON THIS DRAWING IN PVC, PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
- RUN TELCO CONDUITS BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND EXISTING TELCO CABINET AND CLEARWIRE CABINET AS INDICATED ON THIS DRAWING IN PVC. PROVIDE FULL LENGTH PULL ROPE IN TELCO CONDUIT.
- ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
- IT IS THE GENERAL CONTRACTOR'S RESPONSIBILITY TO APPLY FOR COMMERCIAL POWER IMMEDIATELY UPON RECEIVING AWARD OF BID. THE GENERAL CONTRACTOR IS REQUIRED TO KEEP ALL RECEIPTS FROM THE POWER COMPANY ACKNOWLEDGING APPLICATION FOR POWER AND THOROUGH DOCUMENTATION OF ANY DISCUSSIONS WITH THE POWER COMPANY THEREAFTER. ALSO, THE GENERAL CONTRACTOR SHALL RECEIVE IN WRITING FROM THE POWER COMPANY AS TO WHEN THE ANTICIPATED POWER CONNECTION WILL BE COMPLETE. IF COMMERCIAL POWER IS NOT AVAILABLE BY THE "POWER COMPLETE" DATE AS CALLED OUT IN THE SPECIFICATIONS, A GENERATOR SHALL BE SUPPLIED AND MAINTAINED BY THE GENERAL CONTRACTOR UNTIL COMMERCIAL IS OBTAINED, ALL COSTS ASSOCIATED WITH THE GENERATOR WILL BE MUTUALLY AGREED UPON BETWEEN THE OWNER AND GENERAL CONTRACTOR, IN THE EVENT THAT THE GENERAL CONTRACTOR FAILS TO TAKE THE NECESSARY MEASURES AS DESCRIBED HEREIN TO SECURE POWER BY THE POWER COMPLETION DATE, THEN ALL COSTS ASSOCIATED WITH THE GENERATOR SHALL BE BORNE BY THE CONTRACTOR.

GROUNDING NOTES:

- AN ANTIOXIDANT COMPOUND SHALL BE APPLIED TO ALL EXTERIOR, ABOVE GRADE, MECHANIC, GROUND CONNECTIONS.
- CONTRACTOR SHALL SUPPLY ALL MATERIAL, LABOR, AND EQUIPMENT NECESSARY FOR A COMPLETE SYSTEM AS INTENDED HEREIN UNLESS OTHERWISE NOTED.
- ALL EXTERNAL GROUND CONDUCTORS SHALL BE #2 AWG, BARE, SOLID, TINNED COPPER UNLESS OTHERWISE NOTED.
- ALL GROUND CONNECTIONS SHALL BE MADE WITH EXOTHERMIC WELD PROCESS UNLESS OTHERWISE NOTED OR APPROVED. ALL CONNECTIONS SHALL BE MADE AT DESIGNATED LOCATIONS ON THE EQUIPMENT.
- EXACT LOCATION OF GROUND RODS AND GROUND CONNECTION POINTS SHALL BE DETERMINED IN THE FIELD. ADJUST LOCATIONS AS REQUIRED TO KEEP GROUND CONNECTIONS AS SHORT AS POSSIBLE (9" MIN. BEND RADIUS AND 90 DEGREE MAX BEND ANGLE). ALL BELOW GRADE GROUNDING SHALL BE INSPECTED AND APPROVED BY CONSTRUCTION MANAGER PRIOR TO BACKFILLING.
- ALL GROUND COMPONENTS SHALL BE INSTALLED WITHIN THE CONFINES OF THE FENCED AREA. ANY METALLIC ITEMS WITHIN 6' OF THE GROUND RING SHALL BE BONDED TO THE GROUND RING. GROUNDING REQUIREMENT NOT SHOWN ON PLANS ARE WAVEGUIDE HATCH COVER / PLATE, CABLE TRAYS, SUPPORTS, SERVICE PANELS, DISCONNECT SWITCHES, HVAC UNITS ETC. THESE ITEMS MUST BE GROUNDED.
- ALL EXTERIOR EXPOSED GROUND CONDUCTORS LONGER THAN 18" SHALL BE PROTECTED AND SUPPORTED BY A 3/4" PVC SCHEDULE 80 CONDUIT SLEEVE MOUNTED WITH CLIC-STRAP SUPPORTS FROM 6" BELOW FINISHED GRADE TO 6" FROM FINAL CONNECTION.
- ALL GROUND RODS SHALL BE DRIVEN STRAIGHT DOWN, PERPENDICULAR TO FINISHED GRADE. SUITABLE PROTECTION SHALL BE PROVIDED ON END OF RODS TO PREVENT MUSHROOMING WITH GROUND DURING INSTALLATION.
- GROUND CONDUCTORS SHALL NOT COME IN CONTACT WITH THE SLAB OR TOWER EXCEPT AS DESIGNATED.
- THE UTILITY NEUTRAL / GROUND BOND IS TO BE MADE IN THE METER OR MAIN DISCONNECT SWITCH, NOT IN ATS.
- ALL EQUIPMENT SURFACES TO BE BONDED TO GROUNDING SYSTEM SHALL BE STRIPPED OF ALL PAINT AND DIRT, CONNECTIONS TO VARIOUS METALS SHALL BE A TYPE AS TO NOT CAUSE A GALVANIC OR CORROSIVE REACTION AREA SHALL BE REPAINTED FOLLOWING BONDING.

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8428 REGISTERED ARCHITECT

RICHARD B. HALL
STATE OF WASHINGTON

EXPIRATION DATE OF THE LICENSE: 06/30/16

BRIDAL TRAILS UTILITY ON I16TH

W-A-SEA0491-C

3724 116TH AVE NE
BELLEVUE, WA 98004

REVISIONS

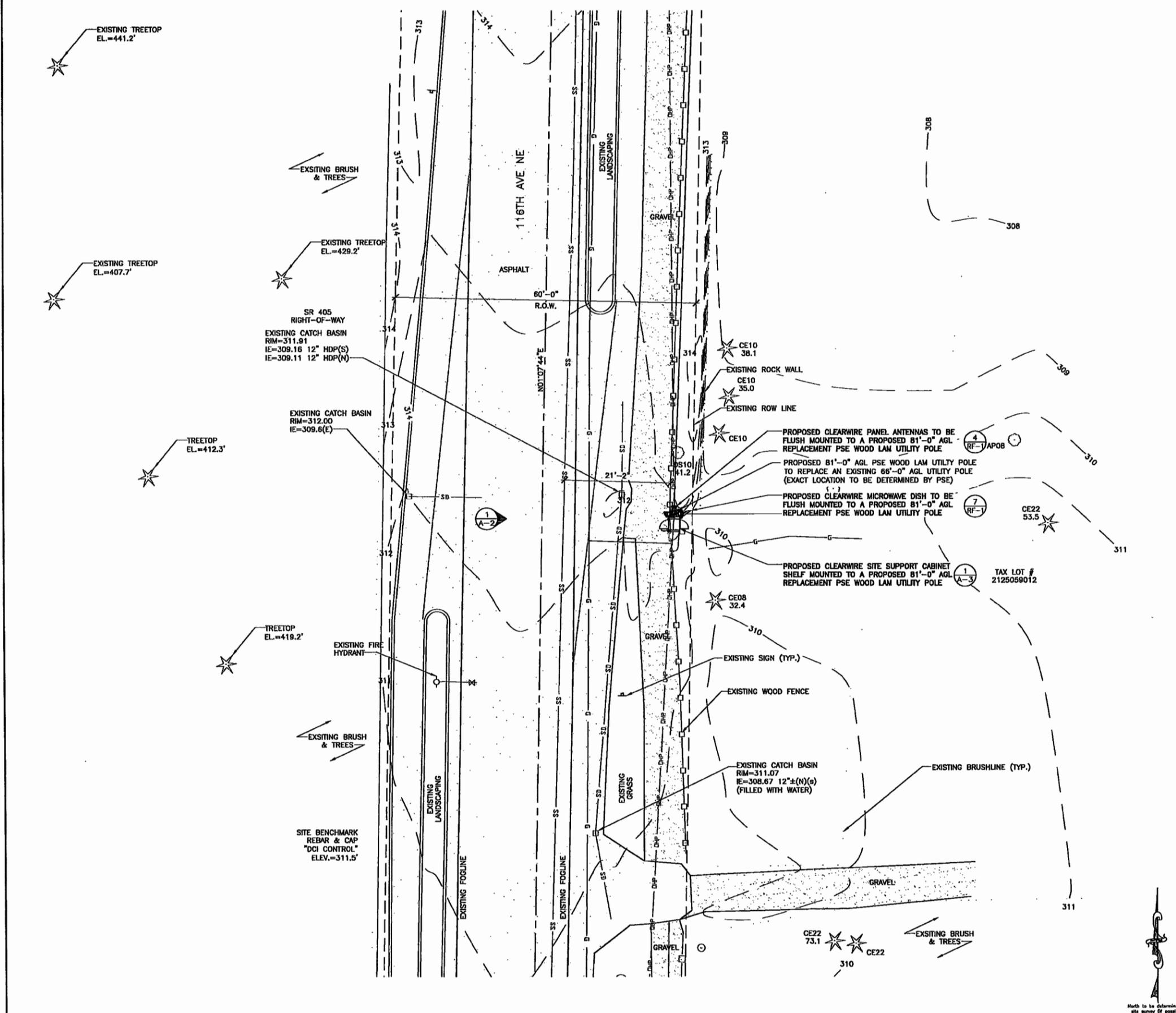
NO.	DATE	DESCRIPTION	INITIAL
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SHEET TITLE
GENERAL NOTES

SHEET NUMBER

G-1

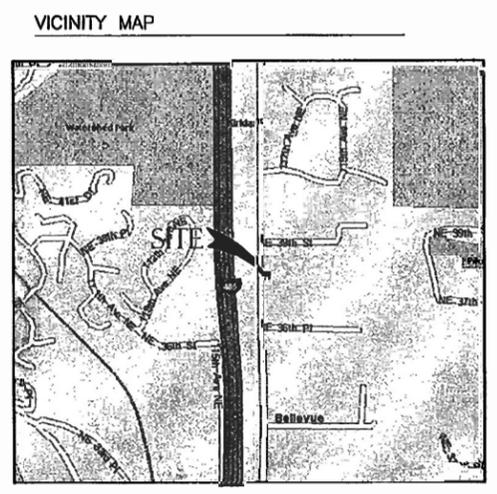


LEGEND

---	SUBJECT BOUNDARY LINE
---	RIGHT-OF-WAY CENTERLINE
---	RIGHT-OF-WAY LINE
---	ADJACENT BOUNDARY LINE
---	SECTIONAL BREAKDOWN LINE
---DHP---	OVERHEAD POWER LINE
---UGP---	BURIED POWER LINE
---	BURIED GAS LINE
---OHT---	OVERHEAD TELEPHONE LINE
---UGT---	BURIED TELEPHONE LINE
---V---	BURIED WATER LINE
---S---	BURIED SANITARY SEWER
---SB---	BURIED STORM DRAIN
---	DITCH LINE/FLOW LINE
---	ROCK RETAINING WALL
---	VEGETATION LINE
---	CHAIN LINK FENCE
---	WOOD FENCE
-x-x-x-x-	BARBED WIRE/WIRE FENCE
△	TRANSFORMER
⊗	LIGHT STANDARD
⊕	POWER VAULT
⊞	UTILITY BOX
⊟	UTILITY POLE
⊠	POLE GUY WIRE
⊡	GAS VALVE
⊢	GAS METER
⊣	TELEPHONE VAULT
⊤	TELEPHONE RISER
⊙	FIRE HYDRANT
⊞	GATE VALVE
⊕	WATER METER
⊞	FIRE STAND PIPE
⊟	CATCH BASIN, TYPE I
⊠	CATCH BASIN, TYPE II
⊡	SIGN
⊢	BOLLARD
⊣	MAIL BOX
⊤	SPOT ELEVATION

NOTES:

- (12) RUNS OF 7/8" COAX CABLE & (1) 1/2" COAX TO BE ATTACHED WITHIN SHROUD TO REPLACEMENT WOOD LAM UTILITY POLE.
- ALL ANTENNAS AND MOUNTING HARDWARE TO BE PAINTED A NON-REFLECTIVE COLOR TO MATCH PROPOSED WOOD LAM UTILITY POLE.
- EXACT LOCATION OF NEW REPLACEMENT PSE WOOD LAM UTILITY POLE TO BE DETERMINED BY PSE.



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8228 REGISTERED ARCHITECT

RICHARD B. HALL
 STATE OF WASHINGTON
 EXPIRATION DATE OF THE LICENSE 06/30/10

BRIDAL TRAILS UTILITY ON 116TH
 W/A-SEA0491-C
 3724 116TH AVE NE
 BELLEVUE, WA 98004

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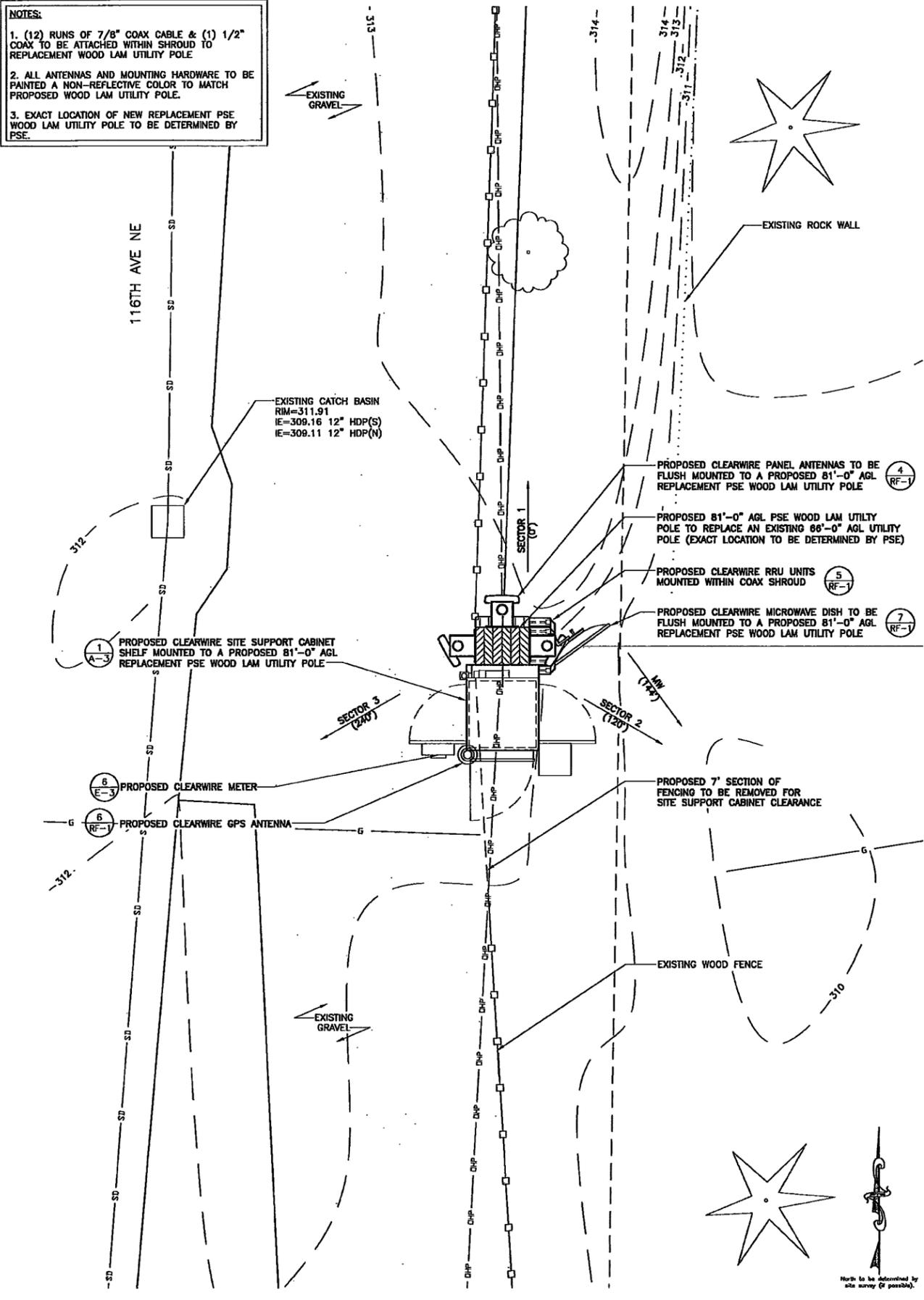
SHEET TITLE
 SITE PLAN

SHEET NUMBER
 A-1

24"x36" SCALE: 1" = 10'-0"
 11"x17" SCALE: 1" = 20'-0"

NOTES:

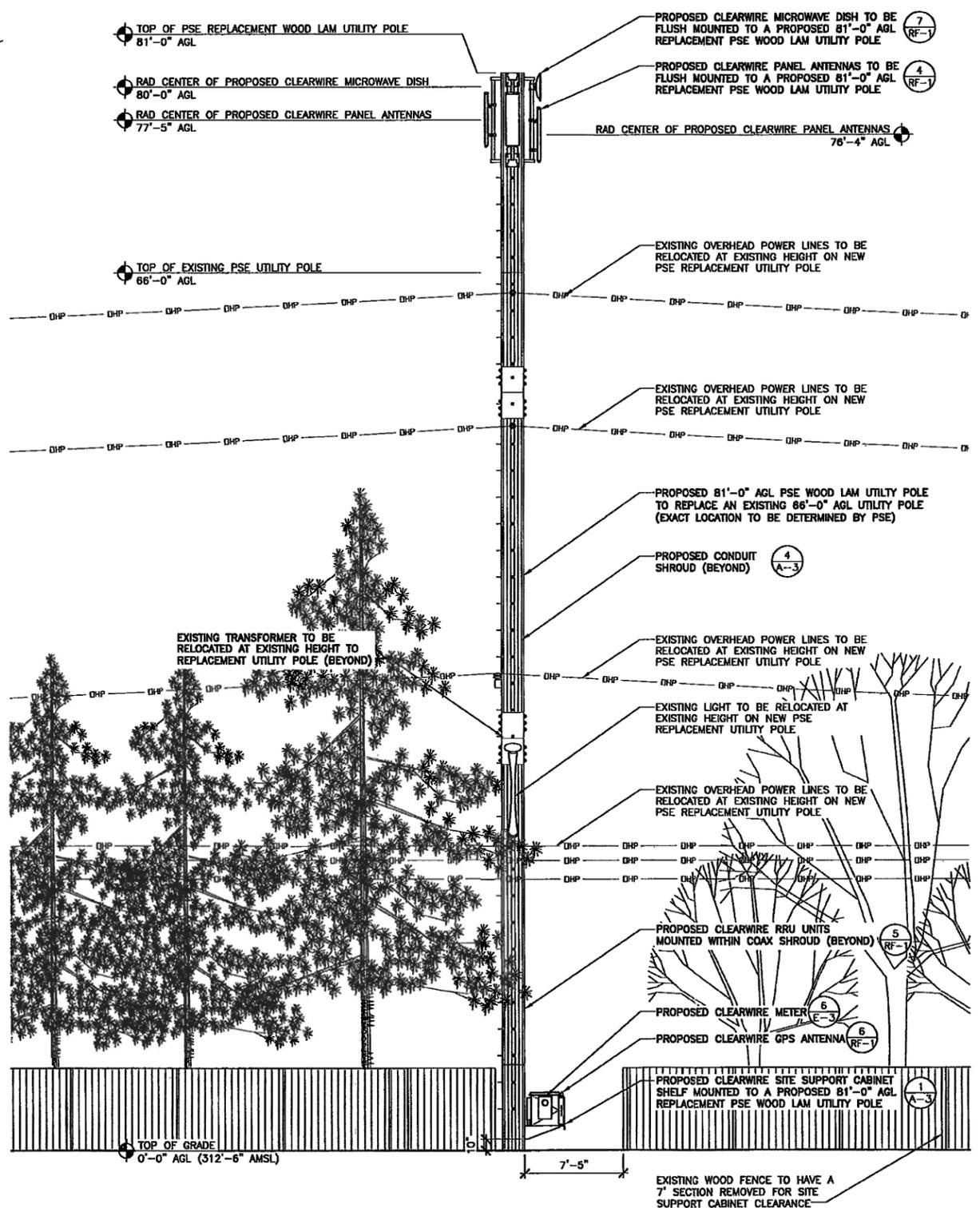
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- EXACT LOCATION OF NEW REPLACEMENT PSE WOOD LAM UTILITY POLE TO BE DETERMINED BY PSE.



24"x36" SCALE: 1/2" = 1'-0"
11"x17" SCALE: 1/4" = 1'-0"

ENLARGED SITE PLAN 2

THE INFORMATION CONTAINED IN THIS SET OF CONSTRUCTION DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO CARRIER SERVICES IS STRICTLY PROHIBITED.



24"x36" SCALE: 3/16" = 1'-0"
11"x17" SCALE: 3/32" = 1'-0"

WEST ELEVATION 1

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REGISTERED ARCHITECT
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STATE OF WASHINGTON
EXPIRATION DATE OF THE LICENSE: 06/30/10

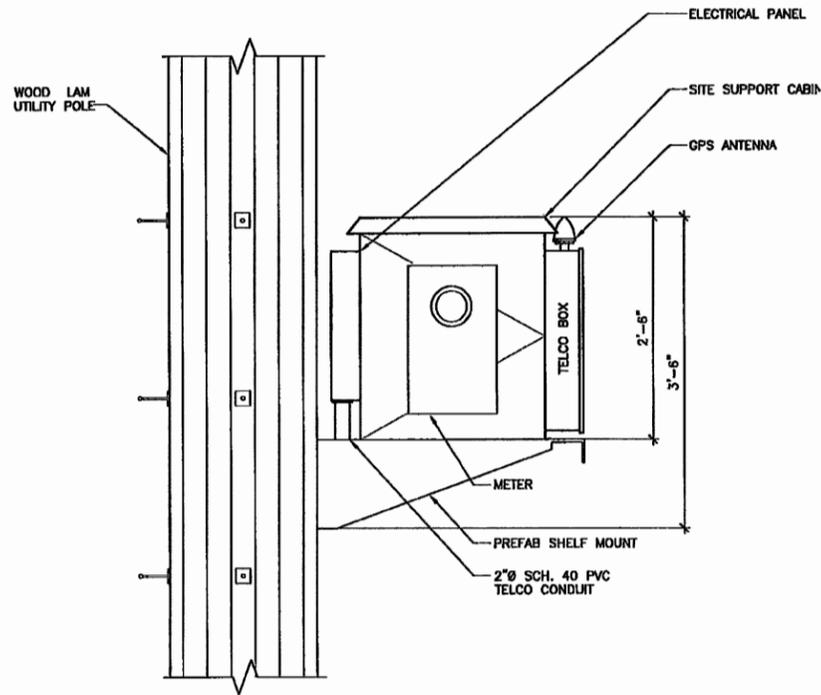
BRIDAL TRAILS UTILITY ON 116TH
WA-SEA0491-C
3724 116TH AVE NE
BELLEVUE, WA 98004

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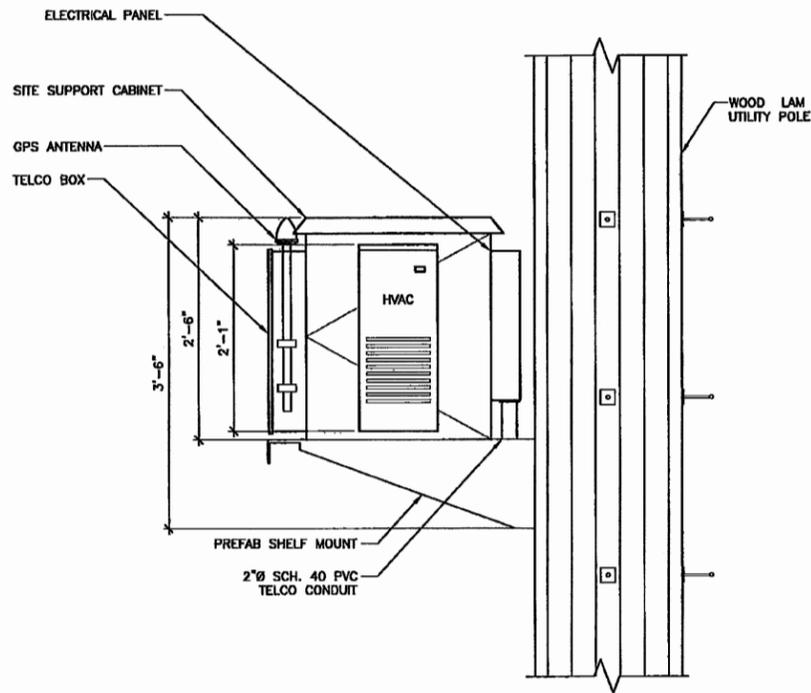
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SHEET TITLE
ENLARGED SITE PLAN

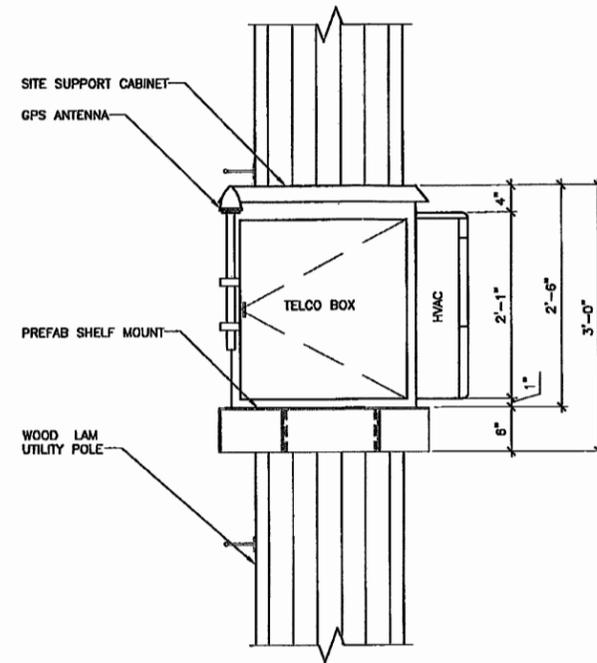
SHEET NUMBER
A-2



CABINET ELEVATION 7
 24"x36" SCALE: 1" = 1'-0"
 11"x17" SCALE: 1/2" = 1'-0"

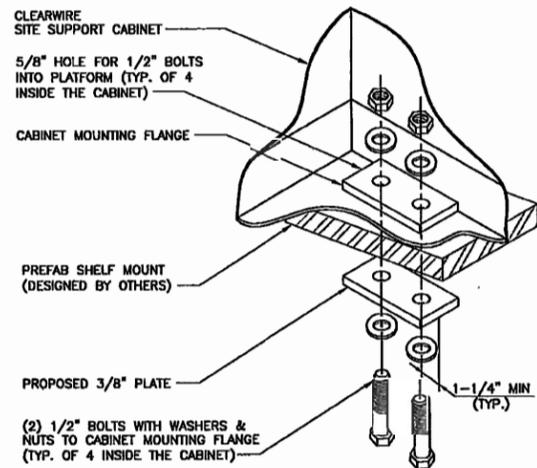


CABINET ELEVATION 6
 24"x36" SCALE: 1" = 1'-0"
 11"x17" SCALE: 1/2" = 1'-0"

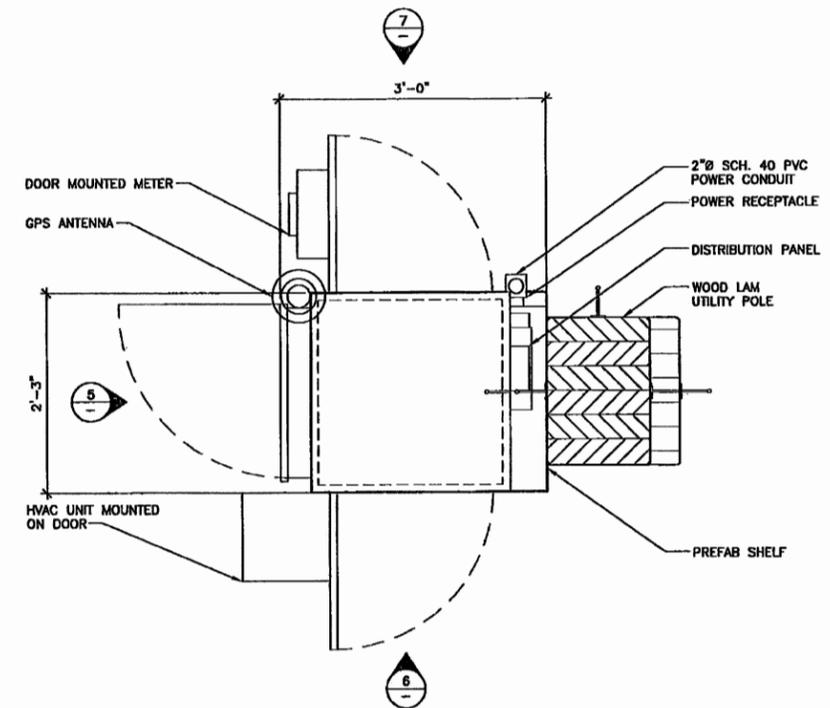


CABINET ELEVATION 5
 24"x36" SCALE: 1" = 1'-0"
 11"x17" SCALE: 1/2" = 1'-0"

CLEARWIRE
 SITE #: WA-SEA0491-C
 SITE NAME: PSE(116TH AVE
 NE & BRIDLE TRAILS)



MOUNTING DETAIL 2
 24"x36" SCALE: 3" = 1'-0"
 11"x17" SCALE: 1-1/2" = 1'-0"



EQUIPMENT PLAN 1
 24"x36" SCALE: 1" = 1'-0"
 11"x17" SCALE: 1/2" = 1'-0"

NOT USED 4
 24"x36" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE

NAME PLATE 3
 24"x36" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE

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8828 REGISTERED
 ARCHITECT

RICHARD B. HALL
 STATE OF WASHINGTON

EXPIRATION DATE OF THE
 LICENSE: 06/30/10

BRIDAL TRAILS UTILITY ON 116TH

WA-SEA0491-C

3724 116TH AVE NE
 BELLEVUE, WA 98004

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SHEET TITLE
 EQUIPMENT DETAILS

SHEET NUMBER

A-3

ANTENNA CABLING:

- 1) ACTUAL LENGTHS SHALL BE DETERMINED PER SITE CONDITION BY THE CONTRACTOR.
- 2) THE DESIGN IS BASED ON THE EMSS REPORT, SIGNED AND APPROVED BY ENGINEERING.
- 3) THE CONTRACTOR SHALL VERIFY THE ACTUAL LENGTHS OF CABLES BEFORE INSTALLATION.
- 4) ALL TIE WRAPS SHALL BE CUT FLUSH WITH THE APPROVED CUTTING TOOL FOR SAFETY AND PROTECTION.
- 5) THE ANTENNAS WILL BE FED BY RF CABLES WHICH MAY BE RUN OUTSIDE OR INSIDE THE TOWER DEPENDENT UPON SITE CONDITIONS AND ENGINEERING DRAWINGS.
- 6) ALL SITE CABLING SHALL MAINTAIN MAXIMUM CABLE SEPARATION REQUIREMENTS AS TO THE TYPE OF CABLE AND FUNCTION. THIS IS DONE TO PROTECT DAMAGE, AS WELL AS, TO PREVENT THE INDUCTION OF CURRENT INTO THE CONDUCTORS FROM MAGNETIC LINES OF FLUX CREATED FROM POWER AND CURRENTS THROUGH THE CABLES.
- 7) CABLES SHALL BE PROTECTED FROM DAMAGE AND SHALL HAVE THE MINIMUM BEND RADIUS FOR THE SIZE AND MANUFACTURER OF THAT CABLE. IN THIS CASE THE MINIMUM BEND RADIUS IS 100MM.
- 8) SLACK SHALL BE LEFT IN THE CABLES LEAVING THE EQUIPMENT TO THEIR TERMINATION POINTS. THIS IS DONE IN ORDER TO PROVIDE STRESS RELIEF ON THE CABLES AND CONNECTIONS IN THE EVENT OF SEISMIC ACTIVITY.
- 9) ALL CABLES SHALL BE ROUTED AND INSTALLED IN A MANNER AS TO PROTECT THE CABLES FROM DAMAGE OF SHARP EDGES OF HARDWARE AND WHERE CABLES ARE ROUTED DOWN THE TOWER.
- 10) CABLES SHALL BE SUPPORTED A MINIMUM OF EVERY THREE FEET EXCEPT FOR INSIDE MONOPOLES AND LATTICE TOWERS WHERE CABLE AND CONNECTOR MANUFACTURERS RECOMMENDED FIBER SUPPORT ACCESSORIES SHALL BE USED IF REQUIRED.
- 11) CABLE BRIDGE SYSTEM SHALL BE USED AS AN ICE SHIELD TO SUPPORT AND PROTECT ANTENNA AND MICROWAVE CABLES.
- 12) DRIP LOOPS SHALL BE REQUIRED ON ALL OUTSIDE CABLES. CABLES SHALL BE SLOPED AWAY FROM THE BUILDING OR OUTDOOR CABINETS TO PREVENT WATER FROM ENTERING THROUGH THE CABLE PORT.

NOTES:

- 1) ACTUAL LENGTHS SHALL BE DETERMINED PER SITE CONDITION BY THE CONTRACTOR.
- 2) THE DESIGN IS BASED ON THE EMSS REPORT, SIGNED AND APPROVED BY ENGINEERING.
- 3) THE CONTRACTOR SHALL VERIFY THE ACTUAL LENGTHS OF CABLES BEFORE INSTALLATION.
- 4) ALL TIE WRAPS SHALL BE CUT FLUSH WITH THE APPROVED CUTTING TOOL FOR SAFETY AND PROTECTION.
- 5) ALL SITE CABLING SHALL MAINTAIN MAXIMUM CABLE SEPARATION REQUIREMENTS AS TO THE TYPE OF CABLE AND FUNCTION. THIS IS DONE TO PROTECT DAMAGE, AS WELL AS, TO PREVENT THE INDUCTION OF CURRENT INTO THE CONDUCTORS FROM MAGNETIC LINES OF FLUX CREATED FROM POWER AND CURRENTS THROUGH THE CABLES.
- 6) ALL CABLES SHALL BE PROTECTED FROM DAMAGE AND SHALL HAVE THE MINIMUM BEND RADIUS FOR SIZE AND MANUFACTURER OF THAT CABLE.
- 7) SLACK SHALL BE LEFT IN THE CABLES LEAVING THE EQUIPMENT TO THEIR TERMINATION POINTS. THIS IS DONE IN ORDER TO PROVIDE STRESS RELIEF ON THE CABLES AND CONNECTIONS IN THE EVENT OF SEISMIC ACTIVITY.
- 8) ALL CABLES SHALL BE ROUTED AND INSTALLED IN A MANNER AS TO PROTECT THE CABLES FROM DAMAGE FROM SHARP EDGES ON HARDWARE AND WHERE CABLES ARE ROUTED DOWN THE TOWER.
- 9) ALL CABLES SHALL BE SUPPORTED A MINIMUM OF EVERY (3) FEET EXCEPT FOR INSIDE MONOPOLES AND LATTICE TOWERS WHERE CABLE AND CONNECTOR MANUFACTURERS SUPPORT RECOMMENDATIONS SHALL BE FOLLOWED. MANUFACTURERS RECOMMENDED CABLE SUPPORT ACCESSORIES SHALL BE USED.
- 10) A CABLE BRIDGE SYSTEM SHALL BE USED AS AN ICE SHIELD TO SUPPORT AND PROTECT ANTENNA AND MICROWAVE CABLES.
- 11) DRIP LOOPS ARE REQUIRED ON ALL OUTSIDE CABLES. CABLES SHALL BE SLOPED AWAY FROM THE BUILDING OR OUTDOOR CABINETS TO PREVENT WATER FROM ENTERING THROUGH THE CABLE PORT.

MICROWAVE CABLE DISTANCES			
EQUIPMENT	DISTANCE	MANUFACTURER	PART NUMBER
REDLINE	UP TO 300'	BELDEN	7919A CAT5
REDLINE	UP TO 200'	ANDREW	FSJ1-75 1/4" SUPERFLEX 75 OHM
REDLINE	201' TO 300'	ANDREW	LDF4-75A 1/2" HELIAX 75 OHM
DRAGONWAVE	0' TO 250'	COMMSCOPE	SFX500
DRAGONWAVE	251' TO 350'	COMMSCOPE	FXL540
DRAGONWAVE	351' TO 700'	COMMSCOPE	FXL780
DRAGONWAVE	OVER 700'	COMMSCOPE	CONTACT ENGINEERING
MOTOROLA (ORTHOGON)	UP TO 300'	BELDEN	7919A CAT5

ANTENNA CABLING NOTES

24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

6

MICROWAVE COAX

24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

5

NOTES:

THE FIBER OPTIC CABLE COMES PRE-MANUFACTURED WITH HUBER-SUHNER CONNECTORS INSTALLED ON EACH END. THE AVAILABLE LENGTHS ARE 20M, 40M, 60M, 80M, 100M.

THE POWER CABLE COMES PRE-MANUFACTURED WITH AN AMPHENOL CONNECTOR FOR USE AT THE DAP HEAD END ONLY. THE OTHER END OF THE CABLE IS BARE. THE AVAILABLE LENGTHS ARE 20M, 40M, 60M, 80M, 100M.

A UNIQUE COMBINED POWER & FIBER OPTIC CABLE (INTEGRATED CABLE 071903-1) HAS BEEN DEVELOPED TO MAKE RUNNING CABLES EASIER AND MAY BE MADE AVAILABLE IN THE FUTURE. THE POWER CABLE IS LONGER THAN THE FIBER CABLE TO PREVENT THE FIBER CABLE FROM BEING DAMAGED.

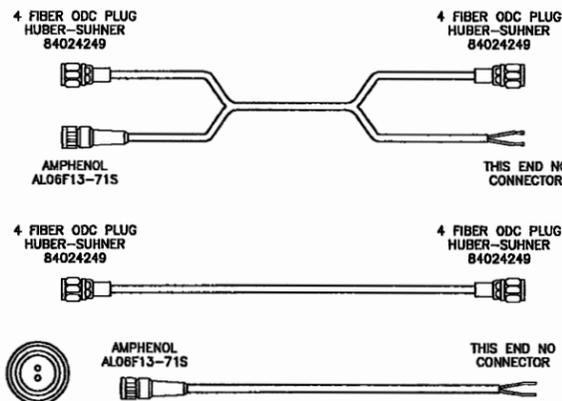
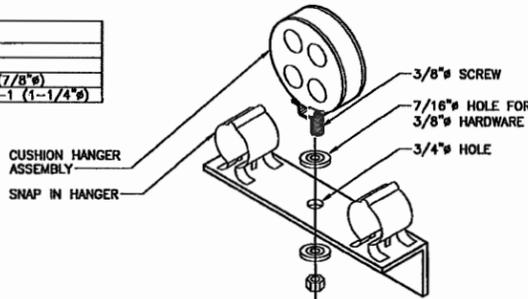
INSTALL THE POWER AND FIBER OPTIC CABLE FROM EACH DAP HEAD TO THE EQUIPMENT CABINET ATTACH THE CABLE END TO THE CONNECTORIZED POWER AND FIBER DAP HEAD CONNECTORS. EACH CABLE SHALL HAVE A SERVICE/DRIP LOOP AT EACH END OF AT LEAST ONE FULL LOOP NOT SMALLER THAN 6" IN DIAMETER. EXTRA CABLE SHALL BE LOOPED AT THE EQUIPMENT CABINET.

CABLE SHALL BE ROUTED FROM EACH DAP HEAD UNIT, ALONG THE ANTENNA MOUNT IN ULTRA-TIGHT NON-METALLIC / LIQUID TIGHT / FLEXIBLE CONDUIT / SUB-DUCT STRUCTURE TO PROTECT THE CABLES FROM EACH INDIVIDUAL SECTOR.

INSTALL TWO 2" FLEXIBLE CONDUITS. THE FIRST 2" CONDUIT IS USED TO RUN ALL FIBER AND POWER OPTIC CABLES. THE SECOND 2" CONDUIT IS INSTALLED DURING THE INITIAL INSTALLATION BUT IS RESERVED FOR FUTURE GROWTH / USE. THEN USE OF A KELLEEM GRIP PROVIDES ACCEPTABLE CABLE SUPPORT

THE RF CABLES SHALL BE RUN SEPARATELY OUTSIDE OF THE FLEXIBLE CONDUIT OTHER CABLE RUNNING OPTIONS MAY BE USED BASED ON SITE SPECIFIC REQUIREMENTS. THE INSTALLER SHOULD CONSULT WITH THE CLEARWIRE PROJECT MANAGER WHO WILL WORK WITH THE TOWER OWNER TO DEVELOP AN APPROPRIATE METHOD PER SITE. FOR CASES WHERE PROTECTIVE CONDUIT IS NOT INSTALLED, THE USE OF VALMONT MICROFLECT CUSHION HANGER OR APPROVED EQUAL IS RECOMMENDED AS A WAY TO PREVENT DAMAGE TO THE FIBER OPTIC CABLES.

CABLE LENGTH	CABLE TYPE
0' - 10'	COMMSCOPE SFX 500
10' - 40'	COMMSCOPE FXL 540
40' - 80'	COMMSCOPE FXL 780 (7/8")
80' - 120'	COMMSCOPE FXL 1480-1 (1-1/4")

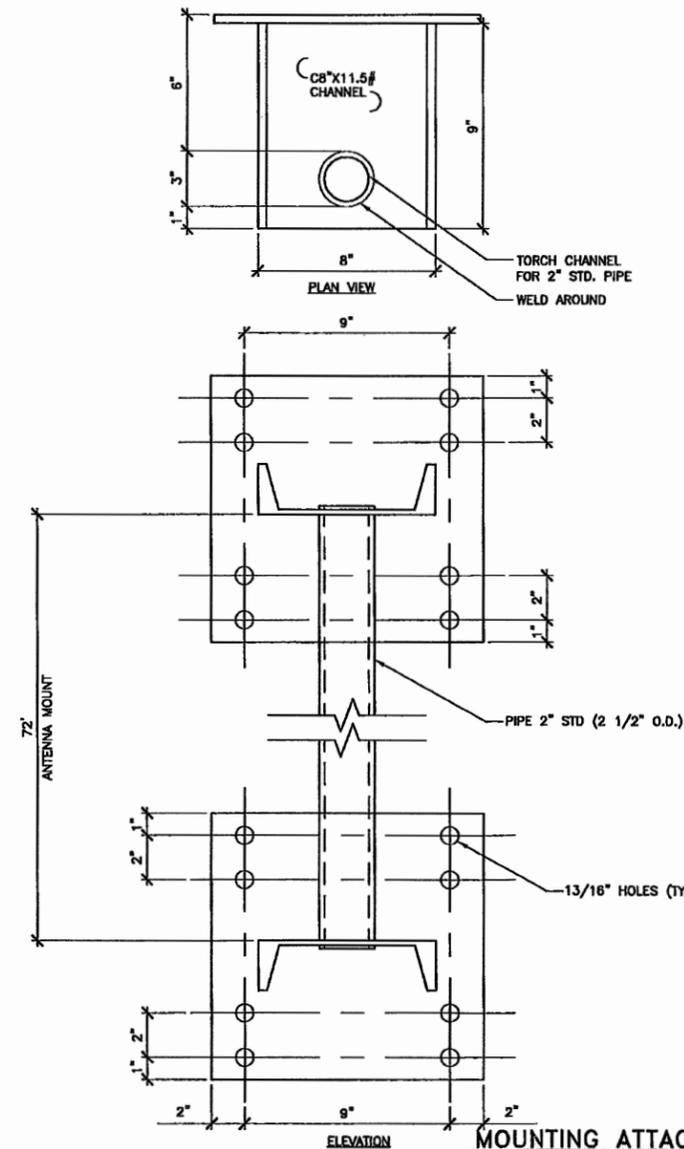


DAP UNIT COAX

24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

3

MOUNTING FRAME ATTACHMENT DETERMINED PER STRUCTURALS



MOUNTING ATTACHMENT

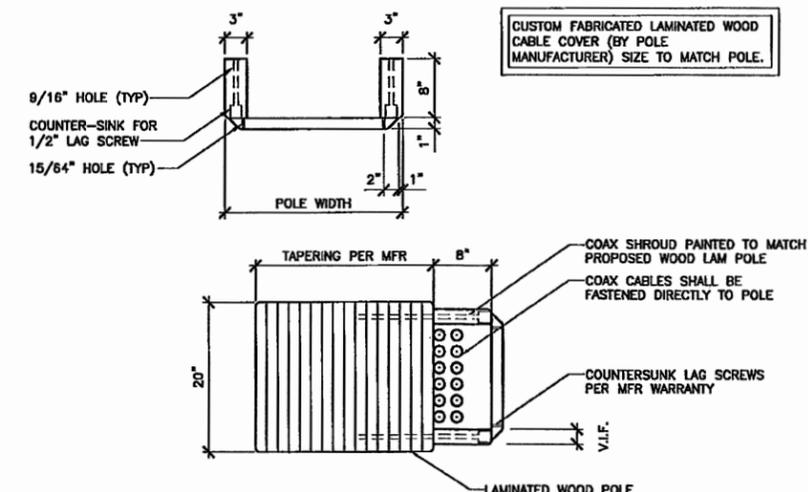
24"x36" SCALE: 3/8" = 1'-0"
11"x17" SCALE: 1-1/2" = 1'-0"

2

NOT USED

24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

4



COAX SHROUD

24"x36" SCALE: 1" = 1'-0"
11"x17" SCALE: 1/2" = 1'-0"

1

clear wire®
4400 CARILLON POINT
KIRKLAND, WA 98033

PTS
PACIFIC TELECOM SERVICES, LLC
588 First Avenue S., Suite 650
Seattle, WA 98104
Phone: (206) 342-9000 Fax: (206) 903-8513

8528 REGISTERED ARCHITECT
RICHARD B. HALL
STATE OF WASHINGTON
EXPIRATION DATE OF THE LICENSE: 09/30

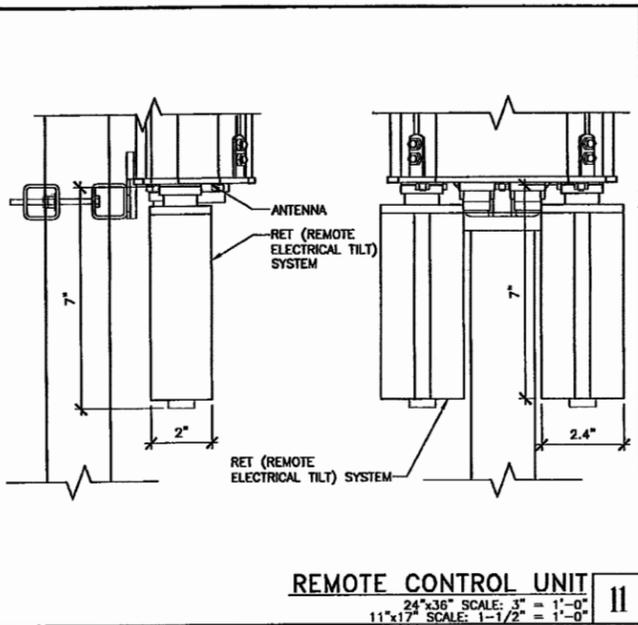
BRIDAL TRAILS UTILITY ON I16TH
WA-SEA0491-C
3724 116TH AVE NE
BELLEVUE, WA 98004

REVISIONS			
NO.	DATE	DESCRIPTION	INITIAL
1	10-07-09	PRELIMINARY CONSTRUCTION DRAWINGS	CBK
2	10-14-09	FINAL CONSTRUCTION DRAWINGS	PHD
3	10-28-09	REVISION FINAL CONSTRUCTION DRAWINGS	PHD
4	11-04-09	REVISION FINAL CONSTRUCTION DRAWINGS	PHD
5	11-13-09	REVISION FINAL CONSTRUCTION DRAWINGS	CBK
6	02-02-10	REVISION FINAL CONSTRUCTION DRAWINGS	PHD

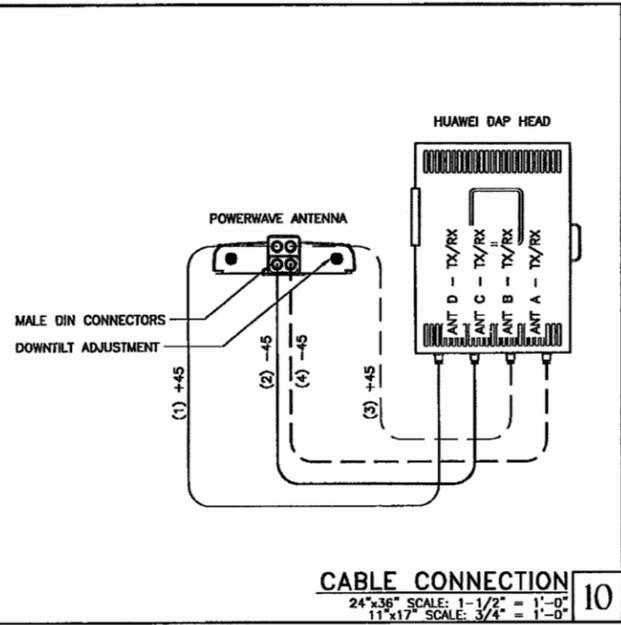
NOT FOR CONSTRUCTION UNLESS LABELED AS CONSTRUCTION SET

SHEET TITLE
COAX DETAILS

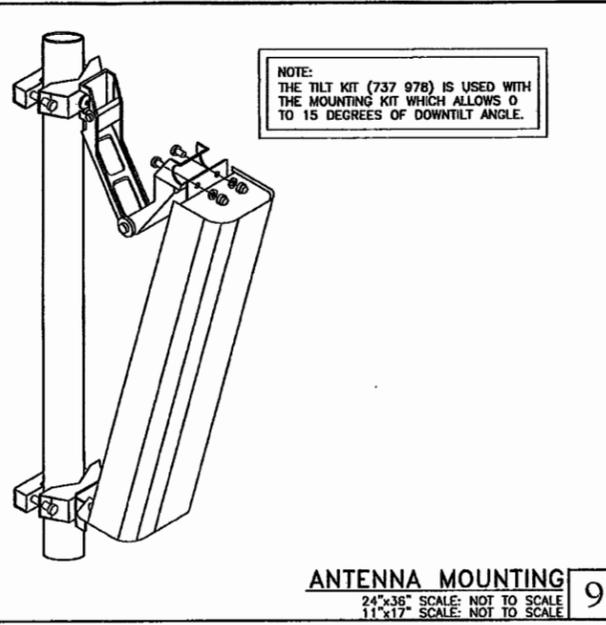
SHEET NUMBER
A-4



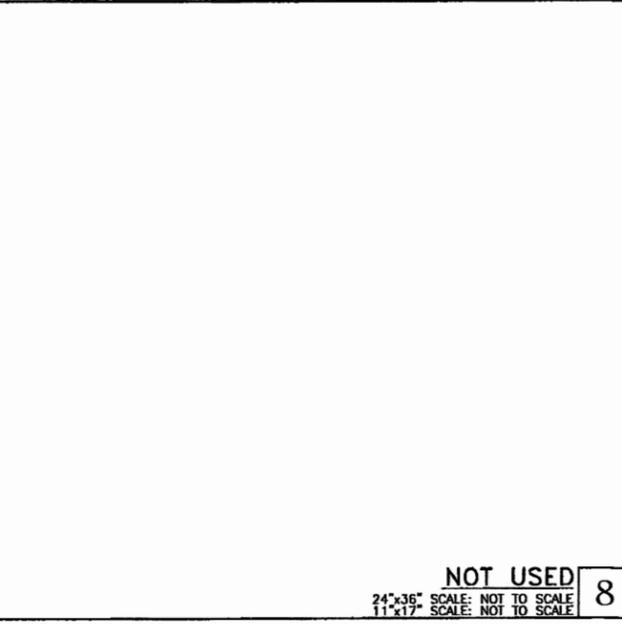
REMOTE CONTROL UNIT
 24"x36" SCALE: 3" = 1'-0"
 11"x17" SCALE: 1-1/2" = 1'-0" **11**



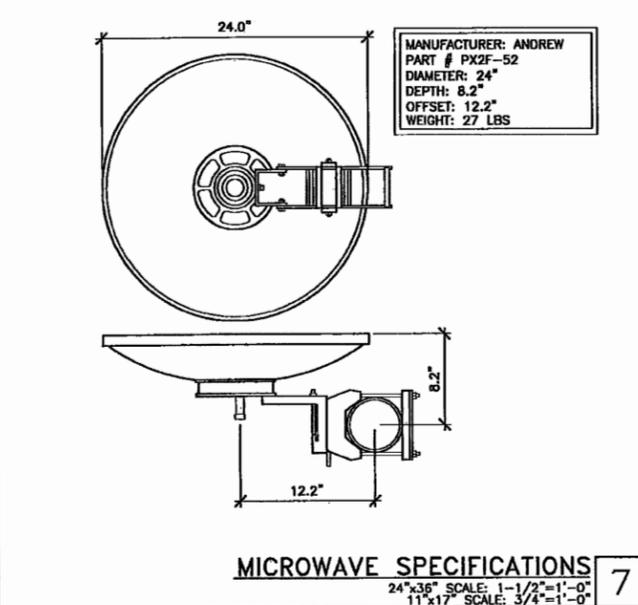
CABLE CONNECTION
 24"x36" SCALE: 1-1/2" = 1'-0"
 11"x17" SCALE: 3/4" = 1'-0" **10**



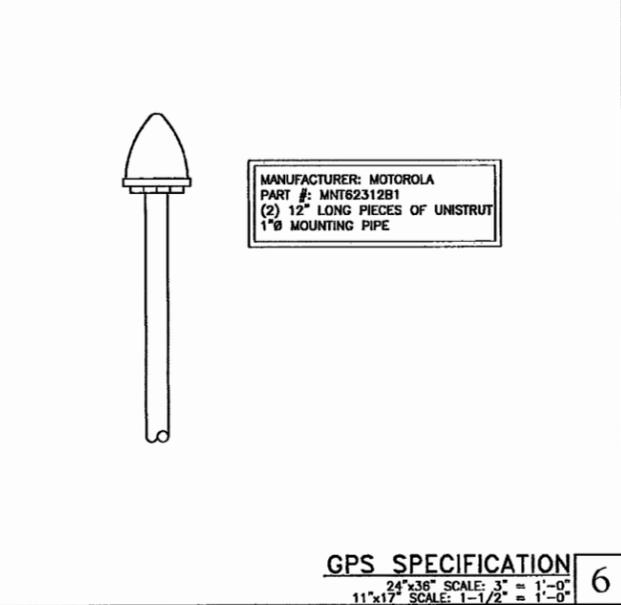
ANTENNA MOUNTING
 24"x36" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE **9**



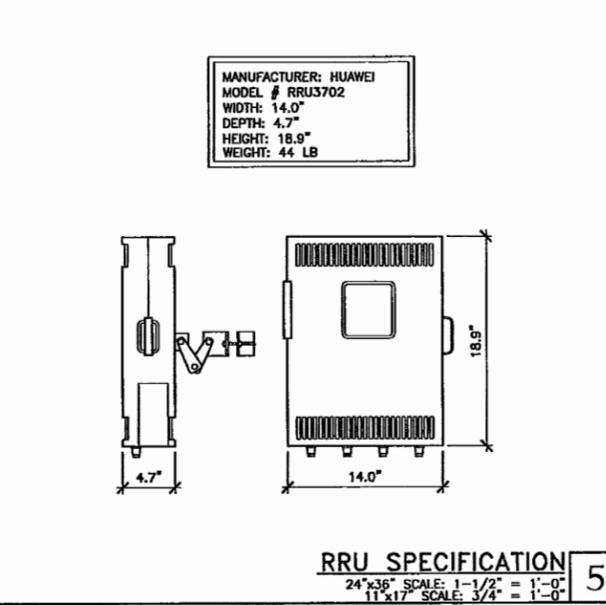
NOT USED
 24"x36" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE **8**



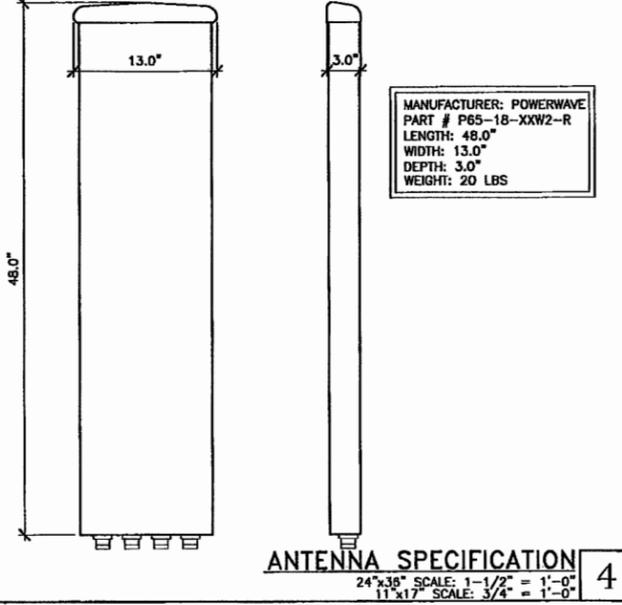
MICROWAVE SPECIFICATIONS
 24"x36" SCALE: 1-1/2" = 1'-0"
 11"x17" SCALE: 3/4" = 1'-0" **7**



GPS SPECIFICATION
 24"x36" SCALE: 3" = 1'-0"
 11"x17" SCALE: 1-1/2" = 1'-0" **6**

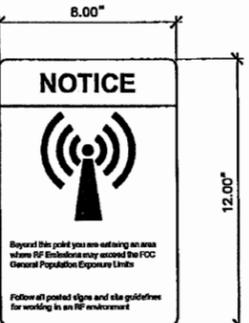


RRU SPECIFICATION
 24"x36" SCALE: 1-1/2" = 1'-0"
 11"x17" SCALE: 3/4" = 1'-0" **5**



ANTENNA SPECIFICATION
 24"x36" SCALE: 1-1/2" = 1'-0"
 11"x17" SCALE: 3/4" = 1'-0" **4**

SIGNS AND PLACEMENT:
 1. LOW LEVEL BLUE NOTICE SIGNS - PLACE AT SITE ENTRY / ACCESS POINTS ONLY.
 - ROOFTOPS: PLACE SIGNS ON THE INSIDE OF ROOF HATCH; PLACE ON ACCESS DOOR UNLESS DOOR IS USED BY GENERAL PUBLIC OR BUILDING TENANTS ON A REGULAR BASIS FOR ACCESS - IN THESE CASES CONSULT CONSTRUCTION MANAGER.
 - WATER TANKS: PLACE SIGNS ON COMPOUND GATE.
 - NETWORK CARRIER OWNED SITES: PLACE ONE SIGN ON COMPOUND GATE; ALL SIGNS SHALL BE SECURED WITH EITHER STAINLESS STEEL ZIP TIES OR STAINLESS TECH SCREWS.
 2. CONSTRUCTION COORDINATOR PARTICIPATION IN SIGN LOCATION: NETWORK CARRIER CONSTRUCTION MANAGER SHALL MEET WITH ALL CONSTRUCTION COORDINATOR'S TO OUTLINE CRITERIA FOR SIGN PLACEMENT. EMPHASIS SHALL BE PLACED ON "CHALLENGING" SITES, WHERE THE NETWORK CARRIER CONSTRUCTION MANAGERS SHALL GIVE CONSTRUCTION COORDINATOR'S AS MUCH GUIDANCE ON EACH SPECIFIC SITUATION AS POSSIBLE, HOWEVER, CONSTRUCTION COORDINATOR'S SHALL BE ENCOURAGED TO PARTNER WITH NETWORK CARRIER CONSTRUCTION MANAGER IN DECIDING PLACEMENT PERTAINING TO CHALLENGING SITES. A SITE VISIT MAY BE REQUIRED TO FULFILL REQUIREMENTS. CONSTRUCTION COORDINATOR SHALL IDENTIFY ALL SIGN LOCATIONS AT THE A&E WALK. PLEASE SEE SIGN DETAIL AND SIZE.
 3. SIGN DISBURSEMENT FROM WAREHOUSE: SIGN INVENTORY SHALL BE ACCESSIBLE AT NETWORK CARRIER WAREHOUSE TO BE DISBURSED AS PART OF THE GENERAL CONTRACTOR BOM AS CALLED OUT IN A&E DRAWINGS FOR EACH SITE.



FCC NOTICE SIGN
 24"x36" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE **3**

CLEARWIRE ANTENNA INFORMATION

SECTOR	ANTENNA	BAND #	AZIMUTH	MODEL	QTY.	DOWNTILT	RAD CENTER FT. AGL	COAX LENGTH (±)
A	RED	1	0°	POWERWAVE	1	0	77'-5"	70'-0"
B	BLUE	2	120°	POWERWAVE	1	0	76'-4"	70'-0"
C	YELLOW	3	240°	POWERWAVE	1	0	77'-5"	70'-0"
MW	MW	5.8 GHz	144°	ANDREW	1	0	80'-0"	70'-0"

GPS ANTENNA LOCATION OPTIONS: (1) EQUIPMENT CABINET; (2) ANTENNA MAST; (3) H-FRAME; FIELD VERIFY

LABEL MARKING SHALL BE PLACED AT:
 1. WITHIN 12" OF CABLE AT BOTH ENDS
 2. AT/NEAR TOWER MGB
 3. PRIOR TO ENTRY INTO THE CABINET FOR A CABLE SUPPORT BRIDGE
 *COORDINATE BACKHAUL INSTALLATION WITH FINAL ENGS

ANTENNA SCHEDULE
 24"x36" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE **2**

REVISIONS

NO.	DATE	DESCRIPTION	INITIAL
1	10-07-09	PRELIMINARY CONSTRUCTION DRAWINGS	CSK
2	10-11-09	FINAL CONSTRUCTION DRAWINGS	PHD
3	10-28-09	REVISED FINAL CONSTRUCTION DRAWINGS	PHD
4	11-04-09	REVISED FINAL CONSTRUCTION DRAWINGS	PHD
5	11-13-09	REVISED FINAL CONSTRUCTION DRAWINGS	CSK
6	02-02-10	REVISED FINAL CONSTRUCTION DRAWINGS	PHD

NOT FOR CONSTRUCTION UNLESS LABELED AS CONSTRUCTION SET

SHEET TITLE
RF INFORMATION AND DETAILS

SHEET NUMBER
RF-1

NOT USED
 24"x36" SCALE: NOT TO SCALE
 11"x17" SCALE: NOT TO SCALE **1**

EQUIPMENT SPECIFICATIONS:

- 1) BINOCULARS OR SPOTTING SCOPE, COMPASS, TELESCOPIC ANTENNA POINTING DEVICE, SURVEYOR'S MAP, INCLINOMETER AND DECLINATION INFORMATION FROM MAGNETIC NORTH.
- 2) TRANSMISSION LINE TEST EQUIPMENT; MAY BE EITHER OF THE FOLLOWING TEST EQUIPMENT SUITS BUT MUST MATE WITH BOTH N-TYPE AND DIN-TYPE CONNECTORS
- 3) PRECISION N-TYPE TERMINATIONS FOR TEST EQUIPMENT CALIBRATION
 - A) MATCHED LOAD (50 OHM TERMINATION AT PCS/ESMR FREQUENCIES)
 - B) SHORT LOAD
 - C) OPEN LOAD
- 4) PLOTTER/PRINTER OR LAPTOP PC WITH CABLING
- 5) PRECISION DIN-TYPE TERMINATIONS FOR SWEEP TESTS
 - A) 7/16 DIN PRECISION SHORT TERMINATION
 - B) 7/16 DIN PRECISION OPEN TERMINATION
 - C) 7/16 DIN PRECISION MATCHED LOAD TERMINATION
- 6) N TYPE PRECISION SHORT TERMINATION (AT GPS FREQUENCIES)
- 7) TORQUE WRENCH WITH INCREMENTS DOWN TO 5 IN-LBS (NOTE: WHEN USING THE ANRITSU SITE MASTER YOU MUST BE AWARE OF WHAT YOU HAVE THE SITE MASTER MODE SET-UP TO MEASURE. IF THE SITE MASTER MODE IS SET-UP TO MEASURE RETURN LOSS YOU MUST DIVIDE THE PEAK AND VALLEY MEASUREMENTS BY (4) TO GET THE CORRECT INSERTION LOSS. IF THE SITE MASTER MODE IS SET-UP TO MEASURE CABLE LOSS YOU MUST DIVIDE THE PEAK AND VALLEY MEASUREMENTS BY (2) TO GET THE CORRECT INSERTION LOSS.

THE MATHEMATICAL MODEL FOR RL OF EACH CABLE ASSEMBLY (JUMPER, OR MAIN LINE) IS PROVIDED BELOW:

- 1) CONVERT ALL COMPONENTS VSWR'S TO REFLECTION COEFFICIENT:

$$REFL\ COEFF = \frac{(VSWR-1)}{(VSWR+1)}$$
- 2) CALCULATE FEEDER ATTENUATION FACTOR:

$$ATT\ FACTOR = EXP(-(ATTENUATION\ (DB/100FT) * LENGTH\ (FT) / 434.3)$$
- 3) COLLECT CONTRIBUTING REFLECTIONS AT BOTTOM OF SYSTEM
- 4) MULTIPLY REFLECTION COEFFICIENTS OF TOP COMPONENTS BY ATTENUATION FACTOR FROM STEP 2
- 5) REFLECTION COEFFICIENTS OF BOTTOM COMPONENTS ARE UNCHANGED
- 6) DETERMINE RSS (ROOT SUM OF THE SQUARES) OF REFLECTIONS FROM STEP 3

$$RF = \sqrt{(REF1^2 + REF2^2 + REF3^2 + \dots)}$$
- 7) CALCULATE EXPECTED SYSTEM VSWR AND RETURN LOSS:

$$VSWR = \frac{(1+RF)}{(1-RF)} \quad RET\ LOSS = -20 * LOG\ 10(RSS)$$

TEST EQUIPMENT SUITS	
OPTION A	OPTION B
WILTRON SITEMASTER S331 CABLE AND ANTENNA ANALYZER OR EQUIVALENT EQUIPMENT	SPECTRUM ANALYZER WITH PLOT STORAGE CAPABILITY (800MHz-2.1 GHz RANGE) OR APPROVED EQUAL
SPECTRUM ANALYZER (FOR PORT-TO-PORT TESTING)	SIGNAL GENERATOR (800MHz-2.1 GHz RANGE)
SIGNAL GENERATOR (FOR PORT-TO-PORT TESTING)	DIRECTIONAL COUPLER (40 dB DIRECTIVITY OR BETTER)
	EITHER FFT CAPABILITY FOR THE SPECTRUM ANALYZER OR TDR EQUIPMENT

SWEEP TEST PROCEDURE:

PRELIMINARY VISUAL INSPECTION

PRIOR TO TRANSMISSION LINE TESTING, A VISUAL INSPECTION IS TO BE PERFORMED TO VERIFY THAT THE CELL SITE IS PROPERLY CONFIGURED AND READY FOR SWEEP TESTING. THIS INSPECTION VERIFIES THAT PROPER TRANSMISSION LINE CABLES ARE INSTALLED, THAT ALL JUMPERS HAVE BEEN CONNECTED, AND THAT THE CABLES HAVE NO NOTICEABLE STRUCTURAL PROBLEMS.

TEST PREPARATION

VERIFY THAT ALL TEST PERSONNEL AND EQUIPMENT ARE PRESENT, INCLUDING TOWER CREW FOR ANTENNA MAST ACCESS.

TESTING SEQUENCE

- 1) VERIFY THAT THE CORRECT BOTTOM JUMPER IS PRESENT (IF APPLICABLE) AND OF THE PROPER LENGTH AND NOTE IN THE CHECK-OFF SHEET
- 2) VERIFY THAT THE CORRECT TOP JUMPER IS PRESENT (IF APPLICABLE) AND OF THE PROPER LENGTH AND NOTE IN THE CHECK-OFF SHEET.
- 3) VISUALLY CHECK FOR ANY EXCESSIVE JUMPER STRESS CAUSED BY THE BEND RADIUS AT EITHER TOP OR BOTTOM JUMPER, AND NOTE ANY PROBLEMS IN THE CHECK-OFF SHEET.
- 4) VERIFY THAT THE CORRECT ANTENNA(S) ARE INSTALLED FOR EACH SECTOR.
- 5) VISUALLY VERIFY THAT CONNECTIONS BETWEEN JUMPERS AND MAIN FEED LINE ARE MATED.
- 6) VISUALLY CHECK FOR DENTS, KINKS, OR OTHER OBVIOUS STRUCTURAL PROBLEMS WITH THE FEED-LINE OR JUMPERS.

EXIT CRITERIA

VERIFY THAT THE CABLE AND ANTENNA ARE PROPERTY INSTALLED AND FREE FROM ANY OBVIOUS DEFECTS.

FEED LINE INSERTION LOSS TEST:

TEST

THE INSERTION LOSS VALUES ARE TO BE OBTAINED OVER THE ENTIRE BLOCK ASSIGNED FREQUENCY RANGE (TO AVOID RE-CALIBRATION FOR DISTANCE-TO-FAULT TEST).

TEST PREPARATION

- 1) INSTALL A 7/16 DIN SHORTED LOAD INTO THE CONNECTOR AT THE ANTENNA END OF THE TRANSMISSION FEED LINE TOP JUMPER.
- 2) VERIFY THE TORQUE SETTING OF THE FEED LINE CONNECTOR WITH THE SHORTED LOAD MATCHES THE MANUFACTURER'S RECOMMENDATIONS.
- 3) SET THE TEST EQUIPMENT TO SWEEP THE FREQUENCY RANGE IN USE IN YOUR MARKET.
- 4) IF THE FIELD ENGINEER PREFERS, THE TOWER GROUNDING AND THE FEED-LINE GROUNDING CAN BE DONE AT THIS POINT. THIS STEP IS THE FIELD ENGINEER'S PREROGATIVE.
- 5) SET TRANSMIT POWER TO TEST EQUIPMENT DEFAULT
- 6) CALIBRATE THE TEST EQUIPMENT ACCORDING TO TEST EQUIPMENT MANUFACTURER'S EQUIPMENT.
- 7) VERIFY THAT THE DISPLAY WILL SHOW INSERTION LOSS (CALLED CABLE LOSS ON THE SITE MASTER); OR MEASURE RETURN LOSS THEN DIVIDE BY 2.
- 8) CONNECT THE TEST EQUIPMENT TO THE BOTTOM JUMPER'S CONNECTOR AND ADJUST TO THE PROPER TORQUE SETTING. (SEE MANUFACTURER'S RECOMMENDATION)
- 9) PERFORM SETUP AND MEASUREMENTS FOR ALL REMAINING TRANSMISSION LINES.

EXIT CRITERIA

ALL TRANSMISSION LINES IN ALL SECTORS HAVE INSERTION LOSS LESS THAN OR EQUAL TO THE MAXIMUM ALLOWABLE THRESHOLD.

CABLE ATTN. (dB/FT)	CABLE LENGTH (FT)	INSERTION LOSS (dB)
BOTTOM JUMPER: _____	X _____	= _____
MAIN FEEDLINE: _____	X _____	= _____
TOP JUMPER: _____	X _____	= _____

# CONNECTOR PAIRS	ATTEN. PER PAIR (dB)	INSERTION LOSS (dB)
_____	X 0.14	= _____

BOTTOM JUMPER LOSS (dB)	MAIN FEEDLINE LOSS (dB)	TOP JUMPER LOSS (dB)	CONNECTOR LOSS (dB)	MAX. INSERTION LOSS (dB)
_____	_____	_____	_____	_____

IF TOP AND BOTTOM JUMPERS ARE NOT APPLICABLE TO YOUR CABLE CONFIGURATION, ENTER (0) LOSS FOR THESE

FEED LINE DISTANCE-TO-FAULT TEST:

ANY DISCONTINUITY (CONNECTOR CONTACT, KINKED CABLE, DAMAGED CABLE, OR OTHER ANOMALY) IN A TRANSMISSION CABLE RESULTS IN THE REFLECTION OF SOME OF THE TRANSMITTED POWER. THIS REFLECTION IS A LOSS OF THE INTENDED TRANSMIT POWER AND IS CALLED "THE RETURN LOSS" BY MEASURING THE TIME REQUIRED FOR THE SIGNAL TO TRAVEL TO THE POINT OF ANOMALY AND BACK, ONE CAN DETERMINE THE ANOMALY'S DISTANCE FROM THE POINT OF ORIGIN OF THE SIGNAL.

THE RETURN LOSS VALUES OF THE FEED LINE COMPONENTS ARE TO BE OBTAINED OVER THE ENTIRE BLOCK ASSIGNED FREQUENCY BAND. THIS TEST USES DISTANCE TO FAULT MEASUREMENTS TO DETERMINE THE RETURN LOSS ASSOCIATED WITH EACH CONNECTOR PAIR AND CABLE COMPONENT OF THE TRANSMISSION FEED LINE. THESE VALUES SHOULD BE REFERENCED TO THE THRESHOLD VALUES LISTED BELOW. IF THE VALUE OF THE RETURN LOSS DOES NOT MEET THIS VALUE, THEN THE APPLICABLE ANTENNA TRANSMISSION LINE SYSTEM FAILS. BY USING THIS TEST THE SUSPECT COMPONENT CAN BE LOCATED AND CORRECTED. THE DTF MEASUREMENT CAN THEN BE REPEATED TO VERIFY ADHERENCE TO SPECIFICATIONS.

ENTRANCE CRITERIA

- PASSED PRELIMINARY VISUAL INSPECTION
- PASSED FEED LINE INSERTION LOSS TEST

TEST PREPARATION

- 1) INSTALL A 7/16 DIN 50 MATCHED LOAD INTO THE CONNECTOR AT THE ANTENNA END OF TRANSMISSION FEED LINE TOP JUMPER
- 2) VERIFY THE TORQUE SETTING OF THE FEED LINE CONNECTOR WITH THE MATCHED LOAD MATCHES THE MANUFACTURER'S RECOMMENDATIONS
- 3) SET THE TEST EQUIPMENT FREQUENCY SWEEP RANGE FOR THE ASSIGNED FREQUENCY BAND USED IN THE MARKET. ENSURE THAT THE TRANSMITTED SWEEP FALLS WITHIN THE AUTHORIZED BAND FOR THE MARKET. FREQUENCIES USED ARE _____ MHZ OTHER FUTURE FREQUENCIES THAT REQUIRE SWEEPING ARE _____ MHZ
- 4) CALIBRATE THE TEST EQUIPMENT ACCORDING TO TEST EQUIPMENT MANUFACTURER'S EQUIPMENT
- 5) VERIFY THAT THE TEST EQUIPMENT IS CONFIGURED TO MEASURE DISTANCE TO FAULT
- 6) CONNECT THE TEST EQUIPMENT TO THE BOTTOM JUMPER'S CONNECTOR AND ADJUST TO THE PROPER TORQUE SETTING

TESTING SEQUENCE

NOTE MEASUREMENTS OF THE RETURN LOSS AND THE DISTANCE CORRESPONDING TO EACH CONNECTOR PAIR. ALSO NOTE THE LOWEST RETURN LOSS VALUE AND CORRESPONDING DISTANCE FOR EACH CABLE (WHERE PRACTICAL; USUALLY CABLES >=6'-0" IN LENGTH). IF THE MEASURED RETURN LOSS FOR ANY COMPONENT IS LESS THAN THE APPROPRIATE VALUE FROM THE TABLE BELOW, THE TEST HAS FAILED. REPLACE ANY FAILED COMPONENTS AND RE-TEST THE TRANSMISSION LINE FROM THE BEGINNING OF THE ATP. PERFORM THE SETUP AND MEASUREMENTS FOR ALL REMAINING LINES

EXIT CRITERIA

ALL TRANSMISSION LINE COMPONENTS IN ALL SECTORS HAVE RETURN LOSS GREATER THAN OR EQUAL TO THE MINIMUM ALLOWABLE THRESHOLD.

MINIMUM COMPONENT RETURN LOSS VALUES	
COMPONENT	RETURN LOSS (dB)
CONNECTORS	> 30
CABLE	> 45

ANTENNA SUBSYSTEM RETURN LOSS TEST:

THE RETURN LOSS VALUES OF THE ANTENNA SUBSYSTEM COMPONENT (NOT TO INCLUDE TRANSMISSION FEED LINE CONTRIBUTIONS) ARE TO BE OBTAINED FOR THE COMPANY'S ASSIGNED FREQUENCIES IN YOUR MARKET. THESE VALUES SHOULD BE REFERENCED TO THE THRESHOLD VALUES CALCULATED FOR YOUR SPECIFIC ANTENNA. IF THE VALUE OF THE RETURN LOSS IS LESS THAN THE THRESHOLD VALUE, THEN THE ANTENNA FAILS AND NEEDS TO BE ANALYZED AND CORRECTED BEFORE REPEATING THIS TEST. THIS TEST MUST BE REPEATED FOR EACH CARRIER FREQUENCY IN USE AT THE SITE.

ENTRANCE CRITERIA

- VERIFY THAT THE FREQUENCY CHANNELS ARE CLEAR BY REFERENCING THE ANTENNA SWEEP ANALYSIS FOR YOUR MARKET BY CONTACTING RF ENGINEERING.
- PASSED PRELIMINARY VISUAL INSPECTION
- PASSED FEED LINE INSERTION LOSS TEST
- PASSED FEED LINE DISTANCE-TO-FAULT TEST

TEST PREPARATION - BTS RECEIVE FREQUENCY TEST

- CONNECT THE TEST EQUIPMENT TO THE BOTTOM JUMPER'S CONNECTOR AND ADJUST TO THE PROPER TORQUE SETTING. (SEE MANUFACTURER'S RECOMMENDATION)
- SET THE TEST EQUIPMENT FREQUENCY SWEEP RANGE TO THE BASE STATION RECEIVE FREQUENCIES USED IN YOUR MARKET.
- 1) CALIBRATE THE TEST EQUIPMENT WITH RESPECT TO THE END OF THE TOP JUMPER ACCORDING TO MANUFACTURER'S INSTRUCTION. (CALIBRATE WITH AN OPEN, SHORT AND 50 OHM LOAD)
 - 2) VERIFY THAT THE DISPLAY WILL SHOW RETURN LOSS VALUES.
 - 3) REMOVE THE CALIBRATION LOAD FROM THE TOP JUMPER CONNECTOR AND CONNECT THE ANTENNA TO THE FEED LINE TOP JUMPER.
 - 4) VERIFY THE TORQUE SETTING OF THE FEED LINE CONNECTOR WITH THE ANTENNA MATCHES THE MANUFACTURER'S RECOMMENDATIONS.

TEST EQUIPMENT CONNECTION

TESTING SEQUENCE - BTS RECEIVE FREQUENCY TESTS
TAKE MEASUREMENT OF THE LOWEST RETURN LOSS VALUE OVER THE FREQUENCY BAND AND RECORD THE VALUE. IF THE MEASURED RETURN LOSS FOR THE ANTENNA IS LESS THAN THE THRESHOLD VALUE CALCULATED, THEN THE TEST HAS FAILED.

TEST PREPARATION - BTS TRANSMIT FREQUENCY TESTS

- 1) SET THE TEST EQUIPMENT FREQUENCY SWEEP RANGE TO THE BASE STATION TRANSMIT FREQUENCIES USED IN YOUR MARKET.
- 2) SET TRANSMIT POWER TO TEST EQUIPMENT DEFAULT.
- 3) CALIBRATE THE TEST EQUIPMENT WITH RESPECT TO THE END OF THE TOP JUMPER ACCORDING TO MANUFACTURER'S INSTRUCTIONS. (CALIBRATE WITH AN OPEN, SHORT, AND 50 OHM LOAD).
- 4) VERIFY THAT THE DISPLAY WILL SHOW RETURN LOSS.

TESTING SEQUENCE - BTS TRANSMIT FREQUENCY TESTS

TAKE MEASUREMENT OF THE LOWEST RETURN LOSS VALUE OVER THE FREQUENCY BAND AND RECORD THE VALUE IN THE PROVIDED WORKSHEET IF THE MEASURED RETURN LOSS FOR THE ANTENNA IS LESS THAN THE THRESHOLD VALUE CALCULATED, THEN THE TEST IS FAILED.

PERFORM THE ABOVE SETUP AND MEASUREMENTS FOR ALL REMAINING TRANSMISSION LINES.

EXIT CRITERIA

ALL ANTENNAS IN ALL SECTORS HAVE RETURN LOSS GREATER THAN OR EQUAL TO THE MINIMUM ALLOWABLE THRESHOLD.

TRANSMISSION SYSTEM RETURN LOSS TEST:

THE RETURN LOSS VALUE FOR THE AGGREGATE TRANSMISSION LINE AND ANTENNA SYSTEM (INCLUDING WEATHER PROOFING) IS TO BE OBTAINED FOR BOTH THE BASE STATION TRANSMIT AND RECEIVE FREQUENCIES ASSIGNED AND CLEARED IN YOUR MARKET. THESE VALUES SHOULD BE REFERENCED TO THE THRESHOLD VALUE. IF THE VALUE OF THE RETURN LOSS IS LESS THAN THE DESIGNED VALUE, THEN THE SYSTEM FAILS AND NEEDS TO BE ANALYZED AND CORRECTED BEFORE REPEATING THE ATP.

ENTRANCE CRITERIA

- VERIFY THAT THE FREQUENCY CHANNELS ARE CLEAR BY CONTACTING RF ENGINEERING
- PASSED PRELIMINARY VISUAL INSPECTION
- PASSED FEED LINE INSERTION LOSS TEST
- PASSED FEED LINE DISTANCE-TO-FAULT TEST

TEST PREPARATION - BTS RECEIVE FREQUENCY TESTS

- 1) VERIFY THAT ANTENNAS ARE CONNECTED TO THE APPROPRIATE FEED LINE AS DESIGNATED IN THE COLOR CODING SCHEME (SEE CONSTRUCTION SPECIFICATIONS)
- 2) DETERMINE THE RETURN LOSS VALUE OF THE ANTENNA
- 3) VERIFY THE TORQUE/CRIMPING SETTING OF THE FEED LINE CONNECTOR, MATCHES THE MANUFACTURER'S RECOMMENDATIONS.
- 4) APPLY WEATHER PROOFING TO EACH ANTENNA/CONNECTOR INTERFACE. AVOID BLOCKING ANY WEEP HOLES ON THE ANTENNA.
- 5) CONNECT THE TEST EQUIPMENT TO THE BOTTOM JUMPER'S CONNECTOR AND ADJUST TO THE PROPER TORQUE SETTING. (SEE MANUFACTURER'S RECOMMENDATION).
- 6) SET THE TEST EQUIPMENT FREQUENCY SWEEP RANGE TO THE BASE STATION RECEIVE RF FREQUENCIES USED IN YOUR MARKET.
- 7) CALIBRATE THE TEST EQUIPMENT ACCORDING TO TEST EQUIPMENT MANUFACTURER'S EQUIPMENT.
- 8) VERIFY THAT THE DISPLAY WILL SHOW RETURN LOSS.

THE SWEEP TESTS PROVIDE A MEANS OF DETERMINING THE CONDITION OF THE TRANSMISSION SYSTEM. IT IS IMPORTANT TO MAINTAIN A VALUE OF RETURN LOSS THAT IS AS LOW AS POSSIBLE TO MAINTAIN THE SYSTEM INTEGRITY. IT IS ALSO VITALLY IMPORTANT TO REALIZE THE PROPER TEST CONDITIONS WHEN ANALYZING THE SYSTEM. THE BEST RETURN LOSS FIGURES WILL ALWAYS OCCUR WHEN THERE IS A 50 OHM LOAD PRESENT AT THE END OF THE TRANSMISSION LINE RATHER THAN AN ANTENNA. IT IS ALSO IMPORTANT TO COMPARE SWEEP RESULTS USING THE SAME EXACT SETUP. THAT IS IF THE MEASUREMENT WAS MADE WITH AN ANTENNA THE COMPARED RESULTS MUST BE MADE WITH THE SAME ANTENNA OR ONE WITH VERY SIMILAR RETURN LOSS CHARACTERISTICS. IF THE RESULTS WERE OBTAINED WITH A 50 OHM LOAD THEY MUST BE COMPARED WITH A 50 OHM TERMINATION.

TESTING SEQUENCE - BTS RECEIVE FREQUENCY TESTS

TAKE MEASUREMENT OF THE LOWEST RETURN LOSS VALUE OVER THE FREQUENCY BAND AND RECORD THE VALUE. IF THE MEASURED RETURN LOSS FOR THE TRANSMISSION SYSTEM IS LESS THAN THE THRESHOLD VALUE, THEN THE TEST HAS FAILED. IF A FAILURE OCCURS, PERFORM A DISTANCE TO FAULT MEASUREMENT AND REPLACE THE SUSPECT COMPONENT. (NOTE: AT THIS POINT, IF ALL OF THE PREVIOUS TESTS HAVE BEEN PERFORMED, THE ANTENNA CONNECTION IS MOST LIKELY FAULTY). IF REPAIRS INVOLVE COMPONENTS OTHER THAN THE ANTENNA/ANTENNA CONNECTION RE-TEST THE TRANSMISSION LINE FROM THE BEGINNING OF THE ATP.

TEST PREPARATION - BTS TRANSMIT FREQUENCY TESTS

- SET THE TEST EQUIPMENT FREQUENCY SWEEP RANGE TO THE BASE STATION TRANSMIT RF FREQUENCIES USED IN YOUR MARKET
- SET TRANSMIT POWER TO TEST EQUIPMENT DEFAULT
- CALIBRATE THE TEST EQUIPMENT ACCORDING TO TEST EQUIPMENT MANUFACTURER'S EQUIPMENT
- VERIFY THAT THE DISPLAY WILL SHOW RETURN LOSS
- VERIFY RETURN LOSS VALUES

TESTING SEQUENCE - BTS TRANSMIT FREQUENCY TESTS

TAKE MEASUREMENT OF THE LOWEST RETURN LOSS VALUE OVER THE FREQUENCY BAND AND RECORD THE VALUE. IF THE MEASURED RETURN LOSS FOR THE ANTENNA IS LESS THAN THE THRESHOLD VALUE, THEN THE TEST HAS FAILED. IF A FAILURE OCCURS, PERFORM A DISTANCE TO FAULT MEASUREMENT AND REPLACE THE SUSPECT COMPONENT. (NOTE: AT THIS POINT, IF ALL OF THE PREVIOUS TESTS HAVE BEEN PERFORMED, THE ANTENNA CONNECTION IS MOST LIKELY FAULTY). IF REPAIRS INVOLVE COMPONENTS OTHER THAN THE ANTENNA/ANTENNA CONNECTION, RE-TEST THE TRANSMISSION LINE FROM THE BEGINNING OF THE ATP

- PERFORM THE ABOVE SETUP AND MEASUREMENTS FOR ALL REMAINING TRANSMISSION LINES

EXIT CRITERIA

- ALL ANTENNAS AND COMPONENTS IN ALL SECTORS HAVE RETURN LOSS GREATER THAN OR EQUAL TO THE MINIMUM ALLOWABLE THRESHOLD VALUE.
- PASSED PRELIMINARY VISUAL INSPECTION
- PASSED FEED LINE INSERTION LOSS TEST
- PASSED FEED LINE DISTANCE-TO-FAULT TEST
- PASSED ANTENNA SUBSYSTEM RETURN LOSS TEST

FINAL VISUAL INSPECTION:

ENTRANCE CRITERIA
PASSED ALL ELECTRICAL TESTS.

TESTING SEQUENCE

- 1) VERIFY THAT THE RADOMES ON ALL ANTENNAS ARE SEALED AND DO NOT HAVE ANY CRACKS, INCLUDING GPS
- 2) CHECK THE ANTENNA MOUNTING
- 3) MEASURE ANTENNA ORIENTATION TO WITHIN 2 DEGREE RELATIVE TO MAGNETIC NORTH. MEASURE MECHANICAL DOWN-TILT TO WITHIN 0.25 DEGREE FROM HORIZONTAL FOR EACH ANTENNA IN EACH SECTOR. RECORD DOWN-TILT AND ORIENTATION ON THE VISUAL INSPECTION CHECK-OFF SHEET.
- 4) VERIFY THAT ANTENNA IS VERTICAL IN THE NON-TILT PLANE, I.E., NO SIDE TILT, (AZIMUTH PLANE IS HORIZONTAL) TO WITHIN 0.25 DEGREES AND RECORD AS PASS OR FAIL ON THE VISUAL INSPECTION CHECK-OFF SHEET.
- 5) VERIFY THE COAXIAL COLOR CODING MATCHES THE CORRECT ANTENNA AND SECTOR AND INDICATE AS PASS OR FAIL ON THE VISUAL INSPECTION CHECK-OFF SHEET. (SEE CONSTRUCTION SPECIFICATION FOR ANTENNA CABLE COLOR CODING SCHEME).
- 6) VERIFY THAT APPROPRIATE TAGS ARE ATTACHED TO THE TOP AND BOTTOM OF THE FEED LINE SYSTEM AND INDICATE PASS OR FAIL ON THE VISUAL INSPECTION CHECK-OFF SHEET.
- 7) VERIFY THAT CONNECTOR WEATHER PROOFING IS COMPLETE AND INDICATE ON THE VISUAL INSPECTION CHECK-OFF SHEET.
- 8) CAREFULLY CHECK ALL ANTENNA FEED LINES FOR DENTS AND KINKS AND OTHER ANOMALIES AND INDICATE OBSERVATIONS ON THE VISUAL INSPECTION CHECK-OFF SHEET
- 9) RECORD ALL INFORMATION IN THE SITE LOG BOOK AND THE SITE SPREADSHEET

EXIT CRITERIA

SUCCESSFUL COMPLETION OF THE ANTENNA SWEEPING ATP

CONNECTORS P/E

- SECTOR #1 _____
- SECTOR #2 _____
- SECTOR #3 _____

WEATHER PROOFING P/E

- SECTOR #1 _____
- SECTOR #2 _____
- SECTOR #3 _____

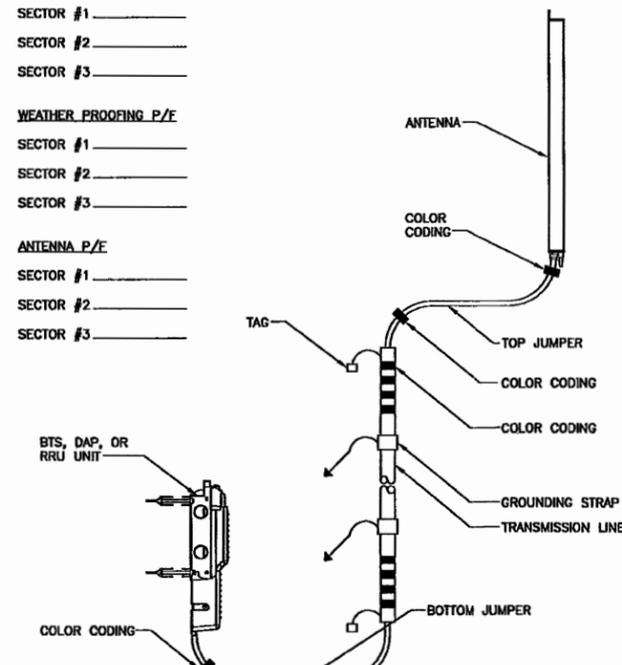
WEATHER PROOFING P/E

- SECTOR #1 _____
- SECTOR #2 _____
- SECTOR #3 _____

ANTENNA P/E

- SECTOR #1 _____
- SECTOR #2 _____
- SECTOR #3 _____

ANTENNA DOWN TILT AND ORIENTATION				
SECTOR	ANTENNA	DOWN-TILT	ORIENTATION	SIDE TILT
SECTOR 1	TXO/RXO RX1			
SECTOR 2	TXO/RXO RX1			
SECTOR 3	TXO/RXO RX1			



COAX COLOR CODE P/E

- SECTOR #1 _____
- SECTOR #2 _____
- SECTOR #3 _____

COAX CABLE P/E

- SECTOR #1 _____
- SECTOR #2 _____
- SECTOR #3 _____

GROUNDING

- SECTOR #1 _____
- SECTOR #2 _____
- SECTOR #3 _____

clear wire®
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PTS

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Phone: (206) 342-9000 Fax: (206) 903-8513

REGISTERED ARCHITECT
RICHARD B. HALL
STATE OF WASHINGTON
EXPIRATION DATE OF THE LICENSE: 09/01/10

BRIDAL TRAILS UTILITY ON I16TH
WA-SEA0491-C
3724 116TH AVE NE
BELLEVUE, WA 98004

REVISIONS			
NO.	DATE	DESCRIPTION	INITIAL
1	10-07-09	PRELIMINARY CONSTRUCTION DRAWINGS	CRK
2	10-14-09	FINAL CONSTRUCTION DRAWINGS	PHD
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6	02-02-10	REVISED/FINAL CONSTRUCTION DRAWINGS	PHD

NOT FOR CONSTRUCTION UNLESS LABELED AS CONSTRUCTION SET

SHEET TITLE
SWEEP TEST

SHEET NUMBER
RF-2

P65-18-XXW2-R Dual High Broadband Cross Polarized

POLARIZATION: XX-Pol
 FREQUENCY (MHz): 2496-2690
 HORIZONTAL BEAM WIDTH (°): 65
 GAIN (dBi/dBd): 18/15.9
 TILT: Integrated Electrical Tilt (RET)
 LENGTH: 1.2M (46")

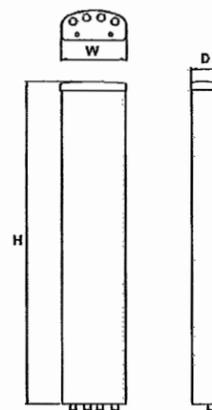
PRELIMINARY

ELECTRICAL SPECIFICATIONS*

Frequency range (MHz)	2496-2690
Frequency band (MHz)	2496-2690
Gain (dBi/dBd)	18/15.9
Polarization	Dual Linear ± 45°
Nominal Impedance (Ω)	50
VSWR	<1.4:1
Horizontal beam width, -3 dB (°)	65
Vertical beam width, -3 dB (°)	5.5
Electrical down tilt (°)	0-10
Side lobe suppression, vertical 1st upper (dB)	<15, 18, 15 @ 0.5, 10°
Isolation between inputs (dB)	>30
Inter band isolation (dB)	
Tracking, horizontal plane ±60° (dB)	<2.0
First null fill (dB)	>-24 Typical >-18
Vertical beam squint (°)	0.5
Front to back ratio (dB)	>27
Front to back ratio, total power (dB)	>25
Cross polar discrimination (XPD) 0° (dB)	>15
Cross polar discrimination (XPD) ±60° (dB)	>10
Far field coupling	
IM3, 2xTx@43dBm (dBc)	<-153
Power handling, average per input (W)	250
Power handling, average total (W)	1000

MECHANICAL SPECIFICATIONS*

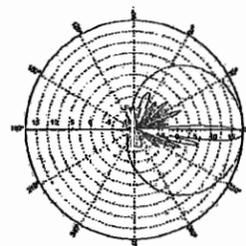
Connector	4x7/16 DIN Female
Connector position	Bottom
Dimensions, HxWxD, mm (ft)	1219x343x89.5 (4x1'1"x3")
Mounting	Pre-mounted heavy duty brackets
Weight, with brackets, kg (lbs)	14.6 (32)
Weight, without brackets, kg (lbs)	9.1 (20)
Wind load, frontal/lateral/rear side 42 m/s Cd=1.6 (N)	1093
Maximum operational wind speed, m/s (mph)	42 (93)
Survival wind speed, m/s (mph)	55 (123)
Lightning protection	.DC Grounded
Radome material	ASA
Radome colour	Light Grey
Package size, HxWxD, mm (ft)	1430x400x200 (4'8"x1'3"x8")
Shipping weight, kg (lbs)	18.6 (41)
Brackets	7256.00, 7454.00, 2210.10



*All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data.

ANTENNA PATTERNS*

For detailed patterns visit <http://www.powerwave.com/rpa/>.



Typical Horizontal and Vertical Pattern for Above Antenna



RICHARD B. HALL
 STATE OF WASHINGTON
 EXPIRATION DATE OF THE LICENSE 02/01/10

BRIDAL TRAILS UTILITY ON 116TH

WA-SEA0491-C

3724 116TH AVE NE
 BELLEVUE, WA 98004

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SHEET TITLE
 ANTENNA SPECIFICATIONS

SHEET NUMBER
RF-3

GROUNDING KEYED NOTES:

- ① INTERNAL SITE SUPPORT CABINET GROUND BUSS BAR. SEE DETAIL 5/E-2 FOR GROUND BAR CONSTRUCTION AND 9/E-2 FOR GROUND WIRE CONNECTIONS
- ② INTERNAL SITE SUPPORT TELCO BOX GROUND BUSS BAR. SEE DETAIL 5/E-2 FOR GROUND BAR CONSTRUCTION AND 9/E-2 FOR GROUND WIRE CONNECTIONS
- ③ MAIN GROUND BAR MOUNTED AT CABINET MOUNTING SHELF. SEE DETAIL 5/E-2 FOR GROUND BAR CONSTRUCTION AND 9/E-2 FOR GROUND WIRE CONNECTIONS
- ④ #2 EXTERNAL GROUND RING. SEE DETAIL 12/E-2.
- ⑤ GROUND ROD SPACED 6'-0" APART. SEE DETAIL 10/E-2.
- ⑥ TEST WELL. SEE DETAIL 11/E-2.
- ⑦ CAD WELD. SEE DETAIL 3/E-2.
- ⑧ #2 AWG GROUND FROM TELCO BOX GROUND BUSS BAR TO SITE SUPPORT CABINET GROUND BUSS BAR SEE DETAIL 9/E-2
- ⑨ #6 AWG GROUND FROM BREAKER BOX TO THE TELCO BOX GROUND BUSS BAR SEE DETAIL 9/E-2
- ⑩ #6 AWG GROUND FROM BREAKER BOX TO THE TELCO BOX
- ⑪ #2 AWG GROUND FROM TOWER MOUNTED SITE SUPPORT CABINET GROUND BUSS BAR TO MAIN GROUND BAR (TYP OF (2) PLACES) SEE DETAIL 9/E-2
- ⑫ #2 AWG GROUND FROM MAIN GROUND BAR TO EXTERNAL GROUND RING (TYP OF (2) PLACES) SEE DETAIL 12/E-2
- ⑬ ANTENNA GROUND BUSS BAR AT ANTENNA LEVEL OF TOWER WITH COAX GROUND KIT. SEE DETAIL 5/E-2 FOR GROUND BAR CONSTRUCTION, 9/E-2 FOR GROUND WIRE CONNECTIONS, AND 2/E-2 FOR COAX GROUNDING.
- ⑭ TOWER GROUND BUSS BAR AT BOTTOM OF TOWER WITH COAX GROUND KIT. SEE DETAIL 5/E-2 FOR GROUND BAR CONSTRUCTION, 9/E-2 FOR GROUND WIRE CONNECTIONS, AND 2/E-2 FOR COAX GROUNDING.
- ⑮ #6 AWG ANTENNA MOUNT GROUND TO ANTENNA GROUND BUSS BAR (TYP). SEE DETAIL 4/E-2.
- ⑯ #2 AWG GROUND FROM ANTENNA GROUND BUSS BAR TO TOWER GROUND BUSS BAR (TYP OF (2) PLACES). SEE DETAIL 9/E-2.
- ⑰ #6 AWG GROUND FROM GPS ANTENNA MOUNT TO EXTERNAL GROUND RING SEE DETAIL 12/E-2
- ⑱ #6 AWG GROUND FROM POWER METER TO ISOLATED GROUND ROD SEE DETAIL 10/E-2.
- ⑲ #2 AWG GROUND FROM TOWER GROUND BUSS BAR TO EXTERNAL GROUND RING (TYP OF (2) PLACES) SEE DETAIL 12/E-2.

ABBREVIATIONS

- AWG AMERICAN WIRE GAUGE
- BCW BARE COPPER WIRE
- DWG DRAWING
- EMT ELECTRICAL METALLIC TUBING
- GEN GENERATOR
- IGR INTERIOR GROUND RING (HALO)
- IMC INTERMEDIATE METALLIC CONDUIT
- MGB MASTER GROUND BAR
- PCS PERSONAL COMMUNICATION SYSTEM
- PTS POWER TRANSFER SWITCH
- PVC RIGID (SCH. 40) POLYVINYL CHLORIDE CONDUIT
- RGS RIGID GALVANIZED STEEL
- RWY RACEWAY
- TYP TYPICAL

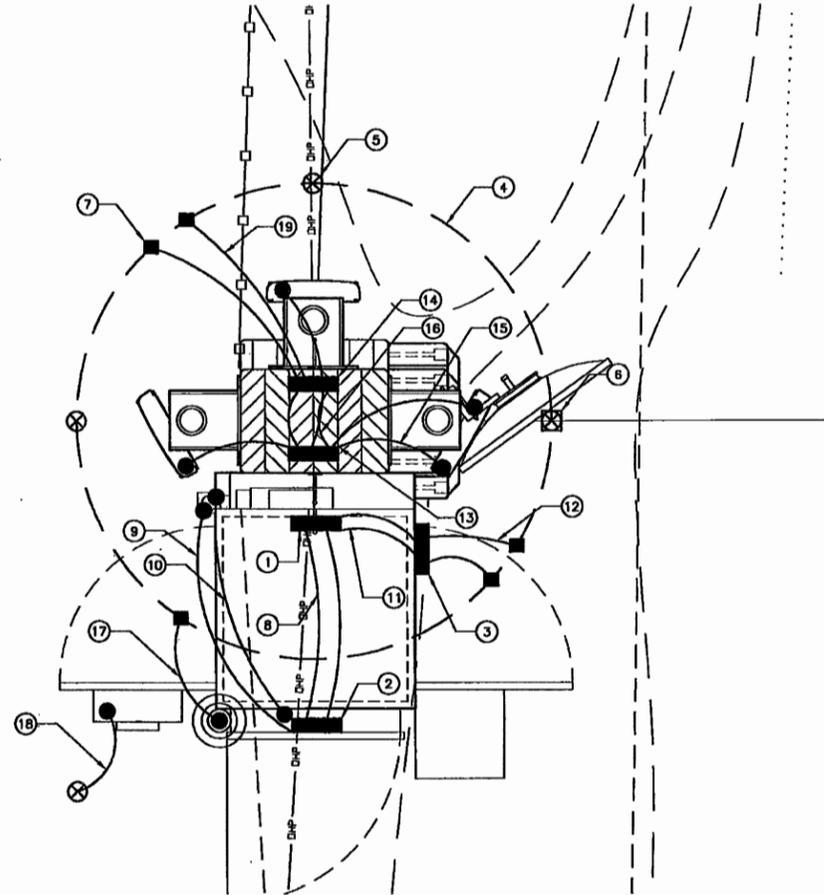
ELECTRICAL SYMBOLS

- GROUND BAR
- GROUND ROD WITH ACCESS
- CHEMICAL GROUND ROD
- GROUND ROD
- DISCONNECT SWITCH
- METER
- CIRCUIT BREAKER
- CADWELD TYPE CONNECTION
- COMPRESSION TYPE CONNECTION
- GROUNDING WIRE
- REPRESENTS DETAIL NUMBER
- REFERENCE SHEET NUMBER

GROUNDING NOTES:

1. CONTRACTOR SHALL CAREFULLY REVIEW GROUNDING NOTES AND CONSULT WITH TOWER OWNER FOR SITE SPECIFIC CONDITIONS IF THERE SHOULD BE ANY FURTHER CLARIFICATIONS NEEDED
2. CLEARWIRE GROUNDING LEADS COMING FROM BOTH ANTENNAS AND COAX GROUND KITS SHALL BE DIRECTED TO A DEDICATED CLEARWIRE BUSS BARS AND SHALL BE LOCATED UP ON A GIVEN POLE OR TOWER NEAR THE BOTTOM OF ANTENNAS BEING DIRECTLY FASTENED TO THE STEEL STRUCTURE WITH STAINLESS STEEL HARDWARE AND / OR ANGLE ADAPTERS (E.G. PIROD / VALMONT GROUNDING BUSS BAR PART NUMBER B29B1 [CLEARWIRE CONSTRUCTION MANAGER SHALL CONFIRM BUSS BAR PART PRIOR TO CONTRACTOR PURCHASE OF PART] BEING ANCHORED TO A MOUNTING BRACKET KIT FOR B2372 OR EQUIVALENT OR BEING MOUNTED WITH UNIVERSAL CLAMP NUMBER B1852 OR EQUIVALENT [W/O CHERRY INSULATORS]).
3. ANCHORING OF CLEARWIRE UPPER BUSS BAR SHALL NOT EMPLOY THE USE OF DRILLING, WELDING OR CUTTING INTO THE EXISTING POLE OR TOWER (ALL NEW ATTACHMENT BRACKETS SHALL BE CLAMPED OR MECHANICALLY FASTENED TO POLE OR TOWER).
4. CLEARWIRE ANTENNA AND COAX GROUND LEADS SHALL TERMINATE AT UPPER BUSS BAR W/O INSULATORS AT THE NEAR ANTENNA LOCATION WITH LEADS NOT CONTINUING DOWN THE POLE SHAFT OF TOWER LEG (TOWER STRUCTURE SHALL SERVE AS GROUNDING MEDIUM IN ORDER TO ENSURE THAT ALL EQUIPMENT ON THE TOWER IS ON THE SAME GROUND POTENTIAL MAINTAINING ONE COMMON GROUND PLANE).

5. A SECOND CLEARWIRE BUSS BARS WITH STAND OFF INSULATORS (E.G. PIROD / VALMONT GROUNDING BUSS BAR PART NUMBER B29B1 [CLEARWIRE CONSTRUCTION MANAGER SHALL CONFIRM BUSS BAR PART PRIOR TO CONTRACTOR PURCHASE OF PART] BEING ANCHORED TO A MOUNTING BRACKET KIT FOR B2372 OR EQUIVALENT OR BEING MOUNTED WITH UNIVERSAL CLAMP NUMBER B1852 OR EQUIVALENT [WITH STANDOFF CHERRY INSULATORS]) SHALL BE ADDED AT THE BASE OF THE TOWER TO CAPTURE ANY ADDITIONAL TOWER SURFACE LIGHTNING RESIDUAL SHEETING WITH A DEDICATED CLEARWIRE GROUND LEAD BEING DIRECTED TO GROUND AND ATTACHED TO THE EXISTING TOWER GROUND RING (FINAL LOCATION OF BOTTOM OF TOWER GROUND BUSS BAR SHALL BE APPROVED BY TOWER REPRESENTATIVE PRIOR TO INSTALLATION).
6. CLEARWIRE GROUND LEAD FROM LOWER CLEARWIRE BUSS BAR SHALL BE NO. 2 OR 2/0 AWG WIRE AND SHALL ATTACHED TO EXISTING POLE / TOWER GROUND RING WITH PARALLEL THRU WIRE MOLD (E.G. PIROD / VALMONT PART NUMBER 171791 OR EQUIVALENT).
7. CLEARWIRE GROUND LEADS MAY NOT BE ATTACHED TO EXISTING GROUND RINGS WITH ANY CONFIGURATION OTHER THAN THE "PARALLEL THRU WIRE MOLD" WITH THE LEAD SWEEPING INTO THE GROUND RING IN THE CONFIGURATION SHOWN ON THE GROUNDING PLAN.
8. CLEARWIRE GROUND LEADS FROM BOTH ANTENNAS AND COAX GROUND KITS WHERE THERE IS AN ESTABLISHED GROUND BUSS BAR POSITIONED AT THE TOP OF A NONCONDUCTIVE POLE OR STRUCTURE (E.G. WOOD UTILITY POLES, PRE-CAST CONCRETE POLES, BUILDINGS, FIBERGLASS STRUCTURES, ETC.) SHALL EMPLOY THE USE OF SEPARATE GROUND LEAD CONDUCTORS RUNNING DOWN THE POLE OR STRUCTURE TO A BUSS BAR AT THE BASE OF THE POLE OR STRUCTURE AND FURTHER RUNNING INTO AN EXISTING GROUND RING.



24"x36" SCALE: 1" = 1'-0"
 11"x17" SCALE: 1/2" = 1'-0"

THE INFORMATION CONTAINED IN THIS SET OF CONSTRUCTION DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO CARRIER SERVICES IS STRICTLY PROHIBITED.

GROUNDING PLAN | 1

clear wire®

4400 CARILLON POINT
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PTS

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 LLC

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 Phone: (206) 342-9000 Fax: (206) 303-8513

REGISTERED ARCHITECT

RICHARD B. HALL
 STATE OF WASHINGTON

EXPIRATION DATE OF THE LICENSE: 09/30/18

BRIDAL TRAILS UTILITY ON I16TH

WA-SEA0491C

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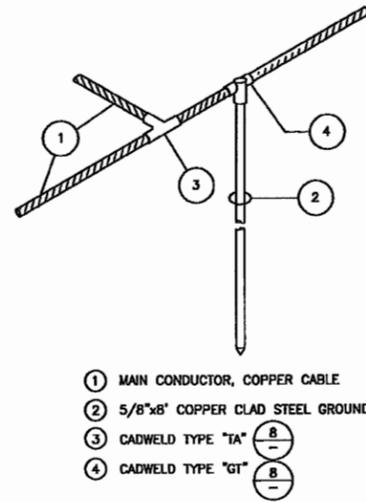
NOT FOR CONSTRUCTION UNLESS LABELED AS CONSTRUCTION SET

SHEET TITLE
 GROUNDING PLAN

SHEET NUMBER

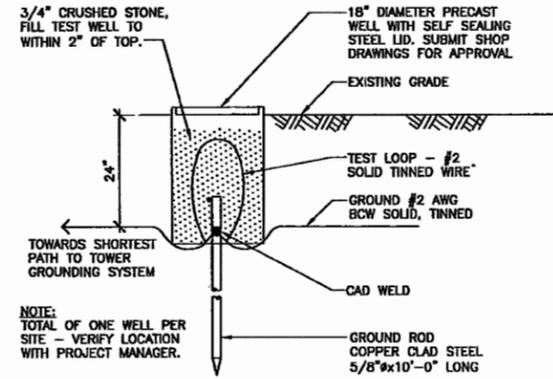
E-1





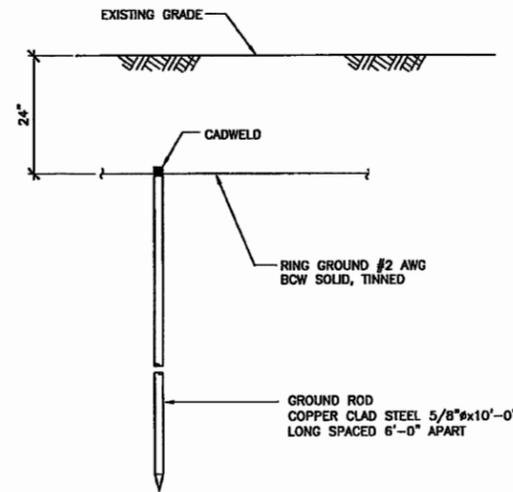
- 1 MAIN CONDUCTOR, COPPER CABLE
- 2 5/8"x8" COPPER CLAD STEEL GROUND ROD
- 3 CADWELD TYPE "TA"
- 4 CADWELD TYPE "GT"

GROUND RING BONDING 12
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

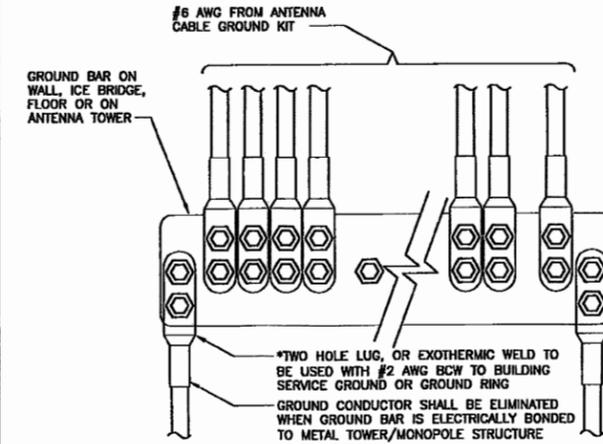


NOTE:
TOTAL OF ONE WELL PER SITE - VERIFY LOCATION WITH PROJECT MANAGER.

TEST WELL 11
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

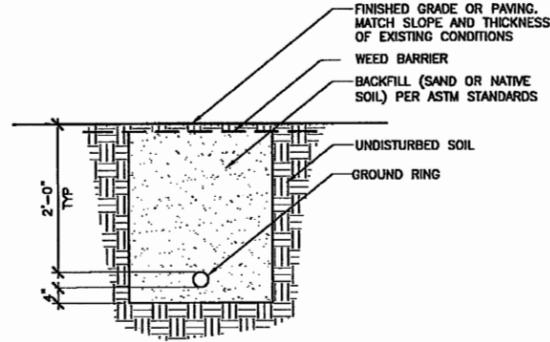


GROUND ROD 10
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE



NOTE:
GROUND BARS AT BOTTOM OF TOWERS/MONOPOLES SHALL ONLY USE EXOTHERMIC WELDS.

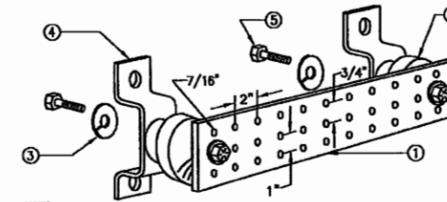
GROUND WIRE INSTALLATION 9
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE



GROUND RING TRENCH 8
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

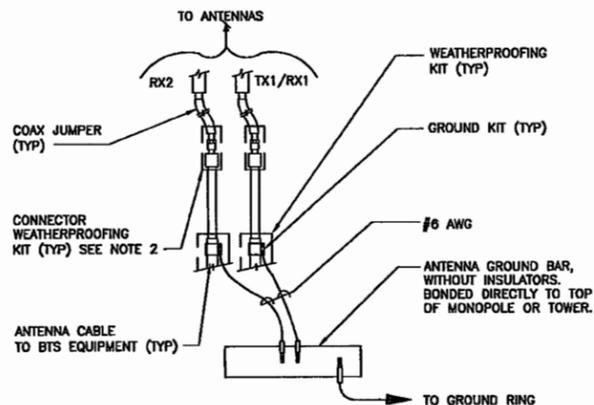
NOT USED 7
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

NOT USED 6
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE



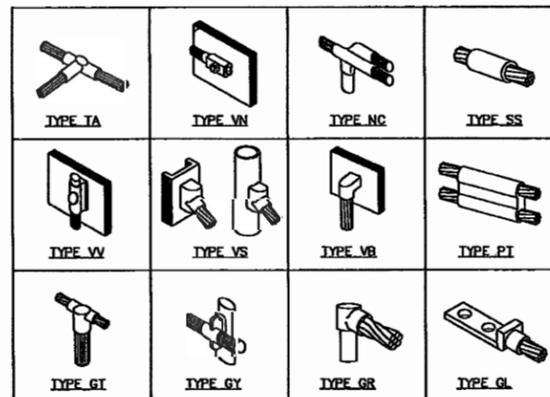
- NOTE:
- 1) COPPER GROUND BAR, 1/4"x 4"x 20", NEWTON INSTRUMENT CO. CAT. NO. B-6142 OR APPROVED EQUAL. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION. (ACTUAL GROUND BAR SIZE WILL VARY BASED ON NUMBER OF GROUND CONNECTIONS)
 - 2) INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4 OR APPROVED EQUAL
 - 3) 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-3 OR APPROVED EQUAL
 - 4) WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT. NO. A-6056 OR APPROVED EQUAL
 - 5) 5/8-11 X 1" HHCS BOLTS, NEWTON INSTRUMENT CO. CAT. NO. 3012-1 OR APPROVED EQUAL
 - 6) INSULATORS SHALL BE ELIMINATED WHEN BONDING DIRECTLY TO TOWER/MONOPOLE STRUCTURE. CONNECTION TO TOWER/MONOPOLE STRUCTURE SHALL BE PER MANUFACTURERS RECOMMENDATIONS.

TYPICAL GROUND BAR 5
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

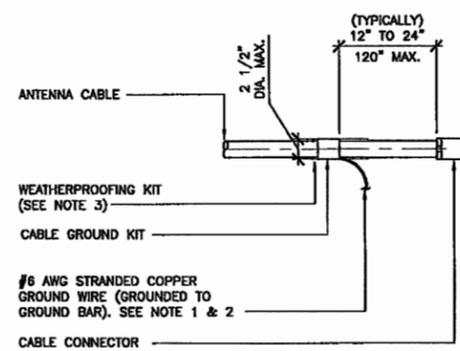


NOTES:
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

GROUND CABLE CONNECTIONS 4
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

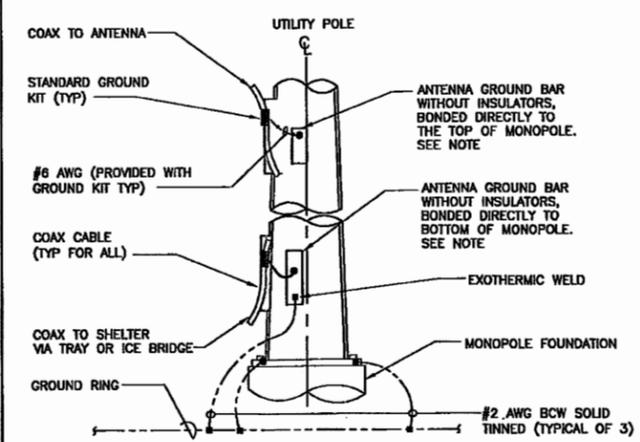


CADWELD GROUNDING CONNECTIONS 3
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE



- NOTES:
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
 2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
 3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

CABLE GROUND KIT CONNECTION 2
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE



NOTE:
NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF MONOPOLE, ANTENNA LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.

ANTENNA CABLE GROUND 1
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

clear wire®
4400 CARILLON POINT
KIRKLAND, WA 98033

PTS
PACIFIC TELECOM SERVICES, LLC
568 First Avenue S., Suite 650
Seattle, WA 98104
Phone: (206) 342-9900 Fax: (206) 903-8513

REGISTERED ARCHITECT
RICHARD B. HALL
STATE OF WASHINGTON
EXPIRATION DATE OF THE LICENSE: 09/30/19

BRIDAL TRAILS UTILITY ON I16TH
WA-SEA0491C
3724 116TH AVE NE
BELLEVUE, WA 98004

REVISIONS			
NO.	DATE	DESCRIPTION	INITIAL
1	10-07-08	PRELIMINARY CONSTRUCTION DRAWINGS	CSK
2	10-11-08	FINAL CONSTRUCTION DRAWINGS	PHD
3	10-28-08	REVISED FINAL CONSTRUCTION DRAWINGS	PHD
4	11-01-08	REVISED FINAL CONSTRUCTION DRAWINGS	PHD
5	11-13-08	REVISED FINAL CONSTRUCTION DRAWINGS	CSK
6	02-02-09	REVISED FINAL CONSTRUCTION DRAWINGS	PHD

NOT FOR CONSTRUCTION UNLESS LABELED AS CONSTRUCTION SET

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
E-2

clear wire®

4400 CARILLON POINT
KIRKLAND, WA 98033

PTS

PACIFIC TELECOM SERVICES, LLC

568 First Avenue S., Suite 650
Seattle, WA 98104
Phone: (206) 342-9000 Fax: (206) 903-8513

REGISTERED ARCHITECT

RICHARD B. HALL
STATE OF WASHINGTON

EXPIRATION DATE OF THE LICENSE: 06/30/17

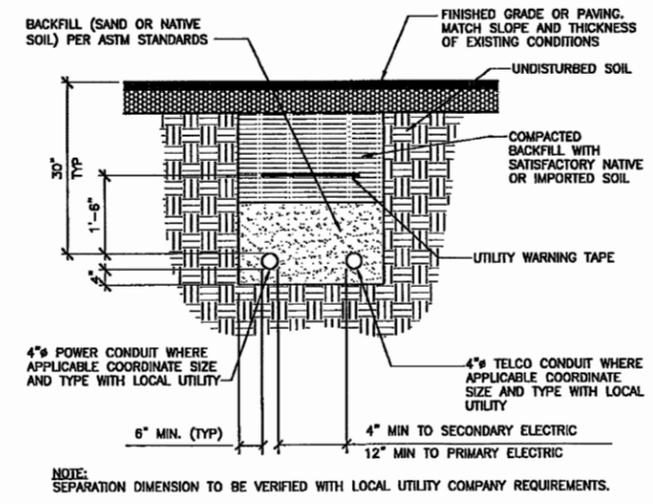
BRIDAL TRAILS UTILITY ON I16TH
WA-SEA0491-C
3724 116TH AVE NE
BELLEVUE, WA 98004

REVISIONS			
NO.	DATE	DESCRIPTION	INITIAL
1	10-07-08	PRELIMINARY CONSTRUCTION DRAWINGS	CBK
2	10-14-08	FINAL CONSTRUCTION DRAWINGS	PHD
3	10-28-08	REVISED FINAL CONSTRUCTION DRAWINGS	PHD
4	11-04-08	REVISED FINAL CONSTRUCTION DRAWINGS	PHD
5	11-13-08	REVISED FINAL CONSTRUCTION DRAWINGS	CBK
6	02-02-10	REVISED FINAL CONSTRUCTION DRAWINGS	PHD

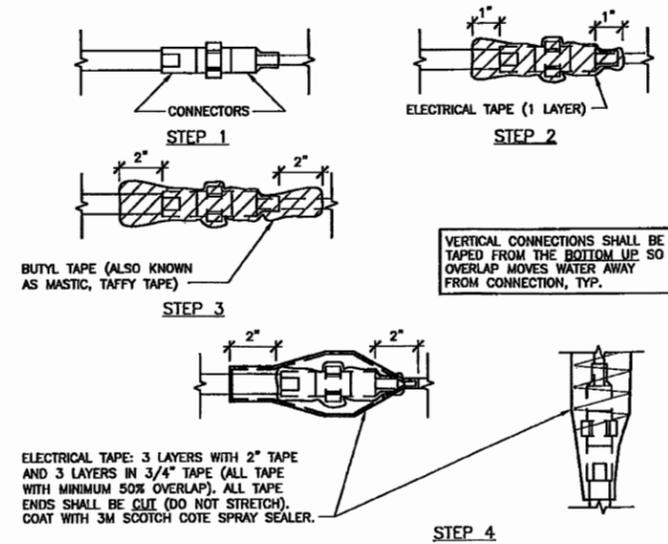
NOT FOR CONSTRUCTION UNLESS LABELED AS CONSTRUCTION SET

SHEET TITLE
ELECTRICAL DETAILS

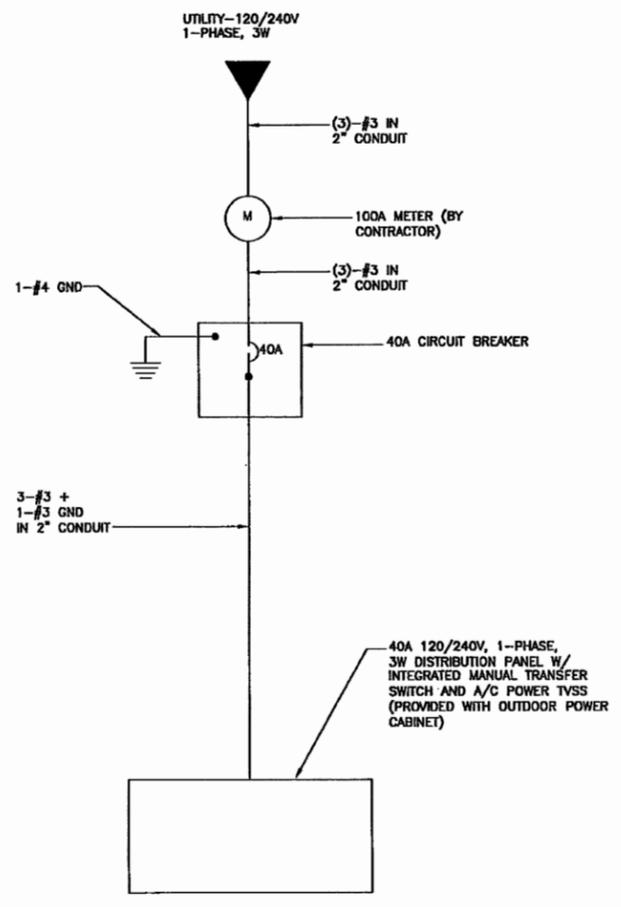
SHEET NUMBER
E-3



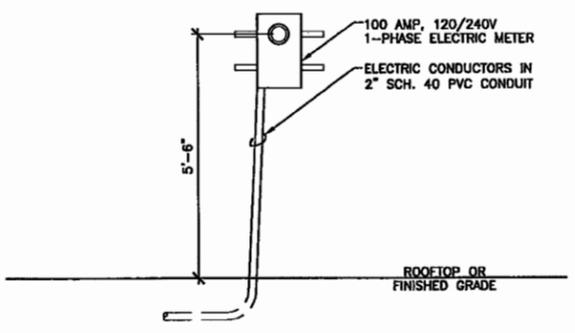
POWER / TELCO TRENCH 6
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE



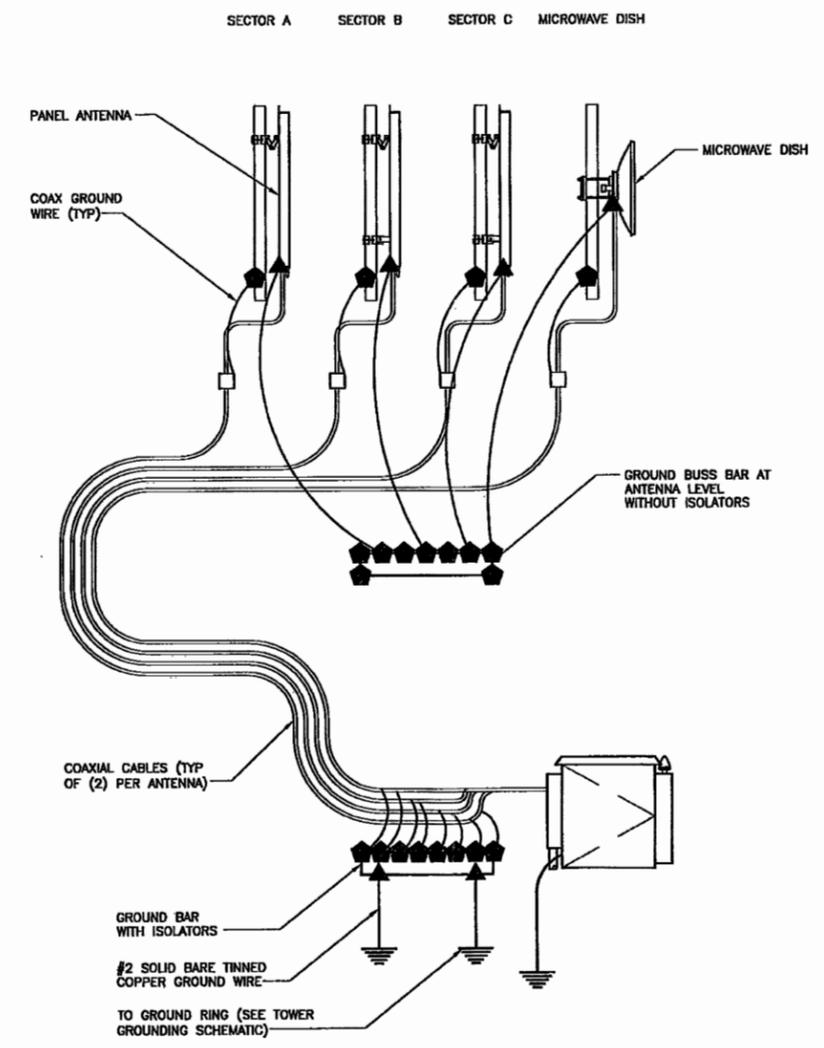
WEATHERPROOFING DETAIL 5
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE



ONE LINE DIAGRAM 4
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE



METER BASE DETAIL 3
24"x36" SCALE: 1/2" = 1'-0"
11"x17" SCALE: 1/4" = 1'-0"



ANTENNA GROUNDING DIAGRAM 1
24"x36" SCALE: 1/2" = 1'-0"
11"x17" SCALE: 1/4" = 1'-0"

NOT USED 2
24"x36" SCALE: NOT TO SCALE
11"x17" SCALE: NOT TO SCALE

Fish: bass, salmon, cut, herring, shellfish, other:

b. List any threatened or endangered species known to be on or near the site.

None

c. Is the site part of a migration route? If so, explain.

Not that applicant is aware of

d. Proposed measures to preserve or enhance wildlife, if any:

Wildlife protection guidelines with respect to wireless facilities favor monopole design, with flush mounting if feasible. The proposed design is substantially the preferred design.

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy need? Describe whether it will be used for heating, manufacturing, etc.

This facility only requires electricity.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No

c. What kinds of energy conservation features are included in the plans of the proposal? List other proposed measures to reduce or control energy impacts, if any:

No large expenditures of energy associated with the facility. No specific features identified.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

No

(1) Describe special emergency services that might be required.

Remote possibility of fire services.

(2) Proposed measures to reduce or control environmental health hazards, if any.

No health hazards identified, no measures proposed.

b. Noise

(1) What types of noise exist in the area which may affect your project (for example, traffic, equipment, operation, other)?

Ambient traffic noise.

(2) What types and levels of noise would be created by or associated with the project on a short-term or long-term basis (for example, traffic, construction, operation, other)? Indicate what hours noise would come from the site.

The noise study indicates that the closest residence is at least 60' from the proposed facility, and that the noise level will not exceed 35 dB(A) at that distance, which is well within the acceptable limits. Additionally, ambient noise levels are already at 64-72 dB(A).

(3) Proposed measures to reduce or control noise impacts, if any:

None needed, none proposed.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?

RoW with public facilities, surrounding use is Residential.

b. Has the site been used for agriculture? If so, describe.

No

c. Describe any structures on the site.

Existing 65' utility pole

d. Will any structures be demolished? If so, what?

Existing 65' utility pole

e. What is the current zoning classification of the site?

R-1

f. What is the current comprehensive plan designation of the site?

Single Family Residential

g. If applicable, what is the current shoreline master program designation of the site?

Not applicable

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

Not that applicant is aware of.

i. Approximately how many people would reside or work in the completed project?

0

j. Approximately how many people would the completed project displace?

0

k. Proposed measures to avoid or reduce displacement impacts, if any:

None needed, none proposed.

i. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: **Utilizing an existing power pole, and swapping out with a taller pole that meets separation requirements between the power lines and the antennas falls within the hierarchy of preferred sites under the City's wireless communications facility code section. The antennas and equipment cabinet will be painted brown to match the replacement pole, and all wires/cables will be internal to the pole.**

9. Housing

- a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

0

- b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

0

- c. Proposed measures to reduce or control housing impacts, if any:

None needed, none proposed.

10. Aesthetics

- a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

81'. Pole will be a glue-lam material.

- b. What views in the immediate vicinity would be altered or obstructed?

The existing RoW has numerous trees aligning the edge. No views will be obstructed by the addition of 15' to the existing utility pole's height of 66'

- c. Proposed measures to reduce or control aesthetic impacts, if any:

Applicant is proposing to increase the height by only 15', the minimum necessary to achieve coverage objective. The antennas will be flush-mounted to the pole and painted brown to match. The equipment cabinet will also be painted brown to match. Coax/Wiring will be internal to the pole.

11. Light and Glare

- a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

None

- b. Could light or glare from the finished project be a safety hazard or interfere with views?

No

c. What existing off-site sources of light or glare may affect your proposal?

None

d. Proposed measures to reduce or control light or glare impacts, if any:

None needed, none proposed.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

Bridle Trails State Park and Pikes Peak Greenbelt are just north of the site.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Locating equipment on a replacement utility pole in the RoW and painting to match.

13. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

No

b. Generally describe any landmarks or evidence of historic, archeological, scientific, or cultural importance known to be on or next to the site.

None

c. Proposed measures to reduce or control impacts, if any:

Locating equipment on a replacement utility pole in the RoW and painting to match.

14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

Facility is in RoW of 116th Ave. NE, between NE 36th Place and NE 39th Street.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

Yes – closest stop is at NE 34th Street

c. How many parking spaces would be completed project have? How many would the project eliminate?

None

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

No

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

After construction complete, site will be visited 1-2 times per YEAR for maintenance.

g. Proposed measures to reduce or control transportation impacts, if any:

None

15. Public Services

a. Would the project result in an increased need for the public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

No

b. Proposed measures to reduce or control direct impacts on public services, if any.

None

16. Utilities

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

All available – only electricity required for the facility.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

PSE will provide electricity directly from the pole on which the equipment is located.

Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.



Signature.....

Date Submitted..... **12/10/09**

