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BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

\_\_\_\_\_  
)  
IN THE MATTER OF DETERMINING PRICES )  
FOR UNBUNDLED NETWORK ELEMENTS (UNEs) )  
IN QWEST CORPORATION'S STATEMENT OF )  
GENERALLY AVAILABLE TERMS (SGAT) )  
\_\_\_\_\_ )

CASE NO.  
QWE-T-01-11

EXHIBITS OF

DICK BUCKLEY

QWEST CORPORATION

November 12, 2003

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## Summary of Changes - LoopMod V2.1

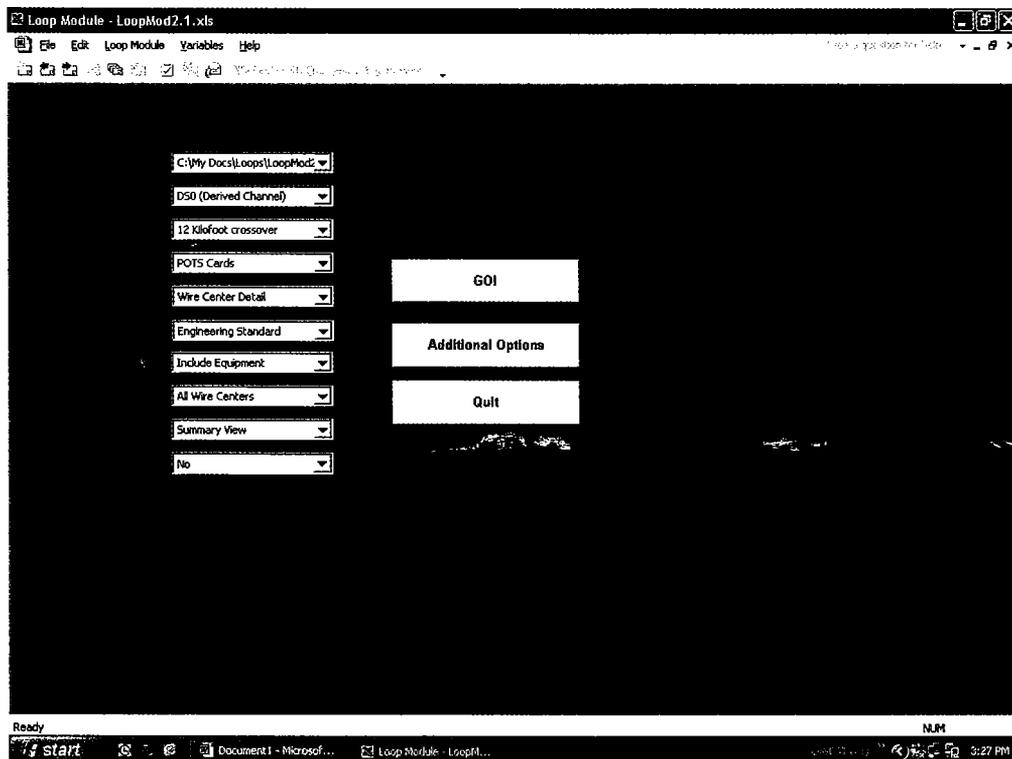
The Loop Module (LoopMod) is an update to the Qwest Corporation (formerly U S WEST) Regional Loop Cost Analysis Program (RLCAP) model that is designed to estimate the investments associated with the provision of the local loop and drop outside plant. The program is a collection of Microsoft Excel based spreadsheets that contain data on the designs and components of the network, the prices for those components and the labor necessary to install them. In addition there is data included as to the dispersion of customers utilizing these local loops.

The Qwest personal computer based loop costing programs were first developed in 1988 and have evolved over the years in order to reflect the current outside plant technologies and Qwest network guidelines. In addition to the normal updates that take place during the life of a model (prices, technology changes, line counts, etc.), LoopMod includes changes to the user interface that ease adjustments to the myriad of network inputs used by the model. Listed below are summaries of these changes and the rationale behind them.

### 1. Updated user screens.

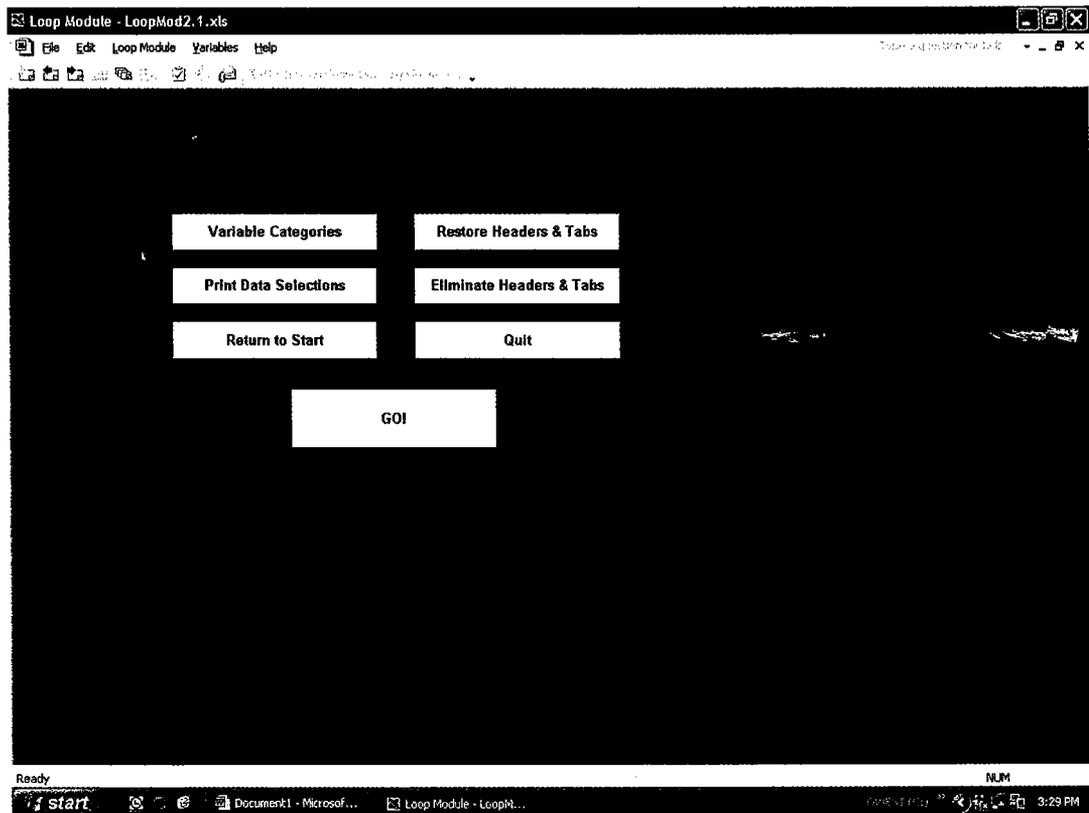
Earlier versions of the loop programs required the user to “baby-sit” the program and hit a button at several points during the processing to reach a final result. These intermediate steps have been removed so that after the user makes the appropriate selections and starts the run, the program will process to completion. The Start screen or first screen that the user encounters contains all of the standard items that would be required for a typical loop and drop investment run. For most situations runs can be completed from this location in a matter of minutes. These selections are discussed detail in the attached “LoopMod V2.1 Default Values”. Below are brief descriptions of each screen.

#### **Start screen**



## Additional Options Screen

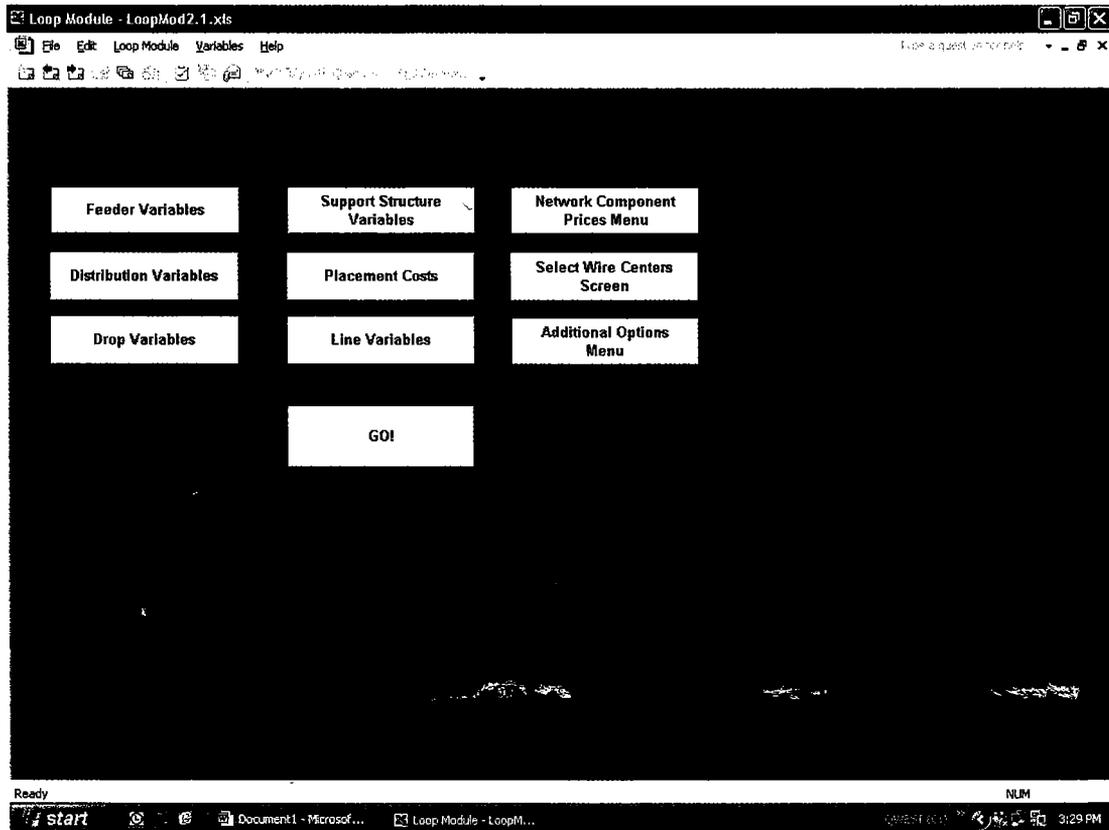
When a user wants to make more detailed adjustments, there is an “Additional Options” button that will take them to another screen. This screen contains options that allow the user to start the program processing, exit the program, return to the initial screen, restore or eliminate headers and tabs, print the data selections and select another screen for editing various inputs. This screen is used for making changes to default data included in standard runs.



After printing the data selections or making changes at the Variables Categories screen level the user can start the program processing from this location. If the “Return to Start” button is pressed a message box will come up with a warning that all non-default data will be overwritten. The user then has the option to cancel the return and run with the settings or continue with the return to start.

## Variable Categories screen

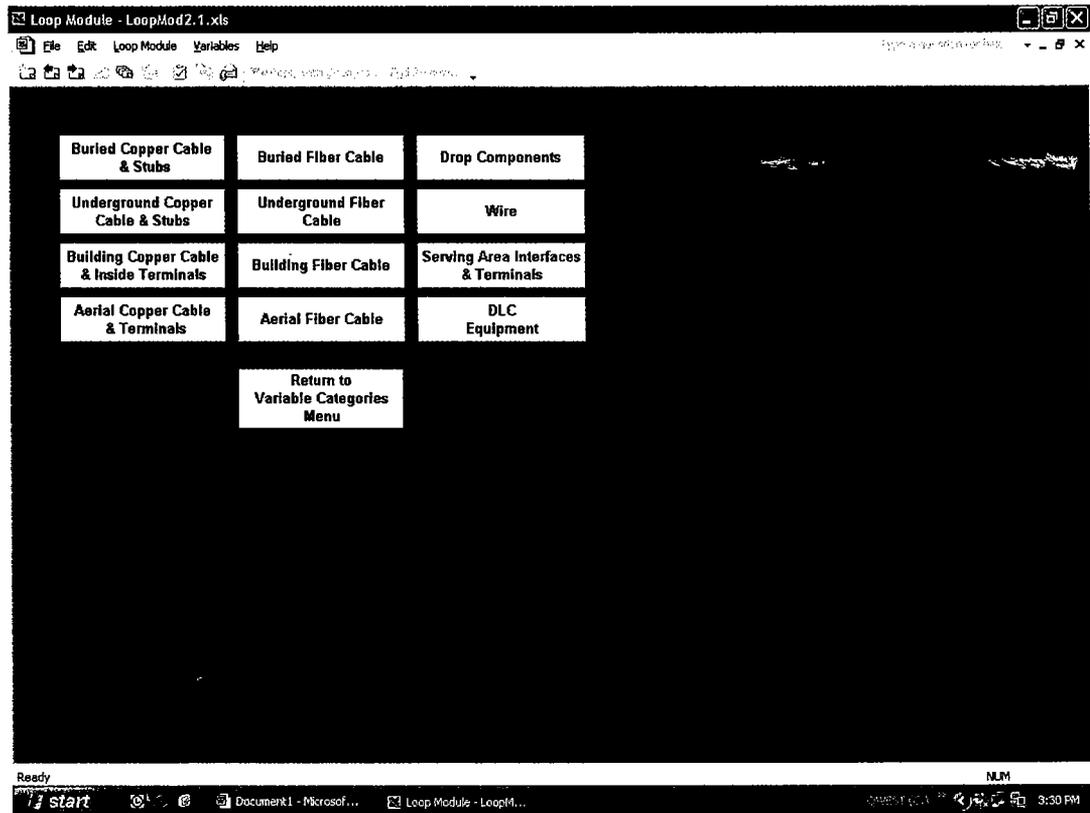
The Variables Categories screen is where the user will input the majority of the adjustments to the default settings. Input data such as cable and equipment prices, line counts, drop lengths, sharing percentages, and wire center lists are all accessible here.



Once the default inputs are adjusted to the levels desired by the user, the "GO" button can be pressed to run the program or the user can select the "Additional Options Menu" button to return to that screen.

## Network Component Prices screen

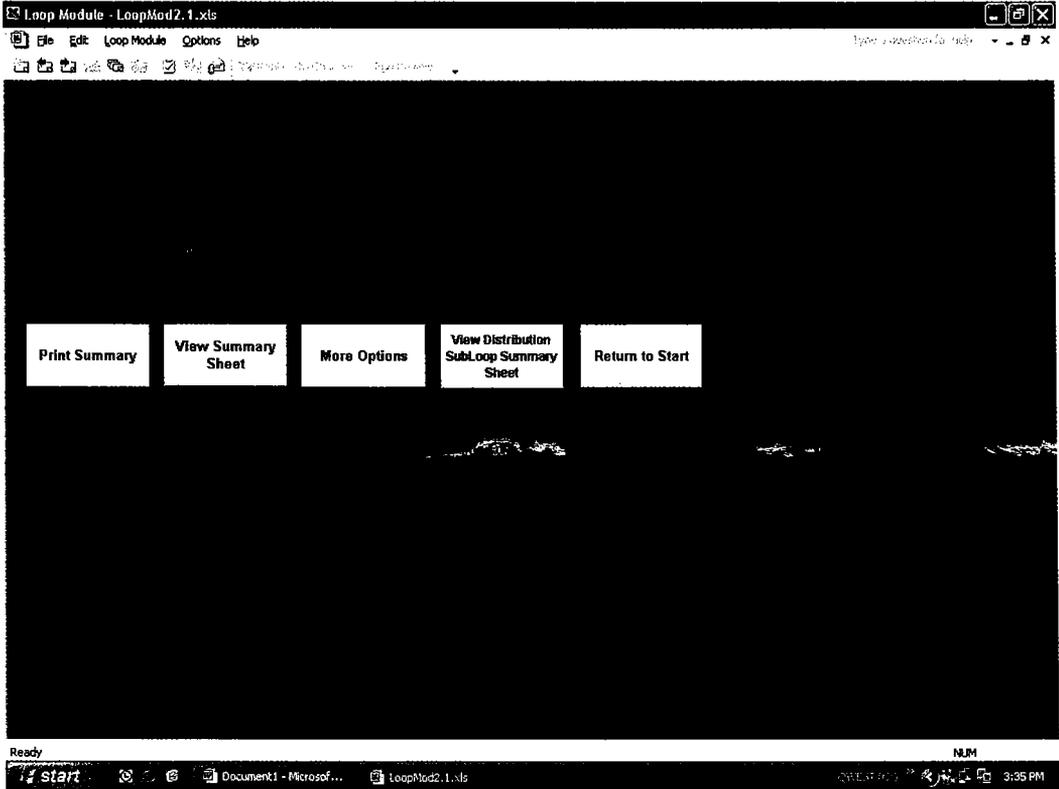
The Network Component screen is where the user will input the price adjustments to the default settings. Input data for cable and equipment prices are accessible through the various buttons on this screen.



Once the default inputs are adjusted to the levels desired by the user, the "Return to Variable Categories Menu" button would be pressed and the run could be initiated from that screen.

**Results screen**

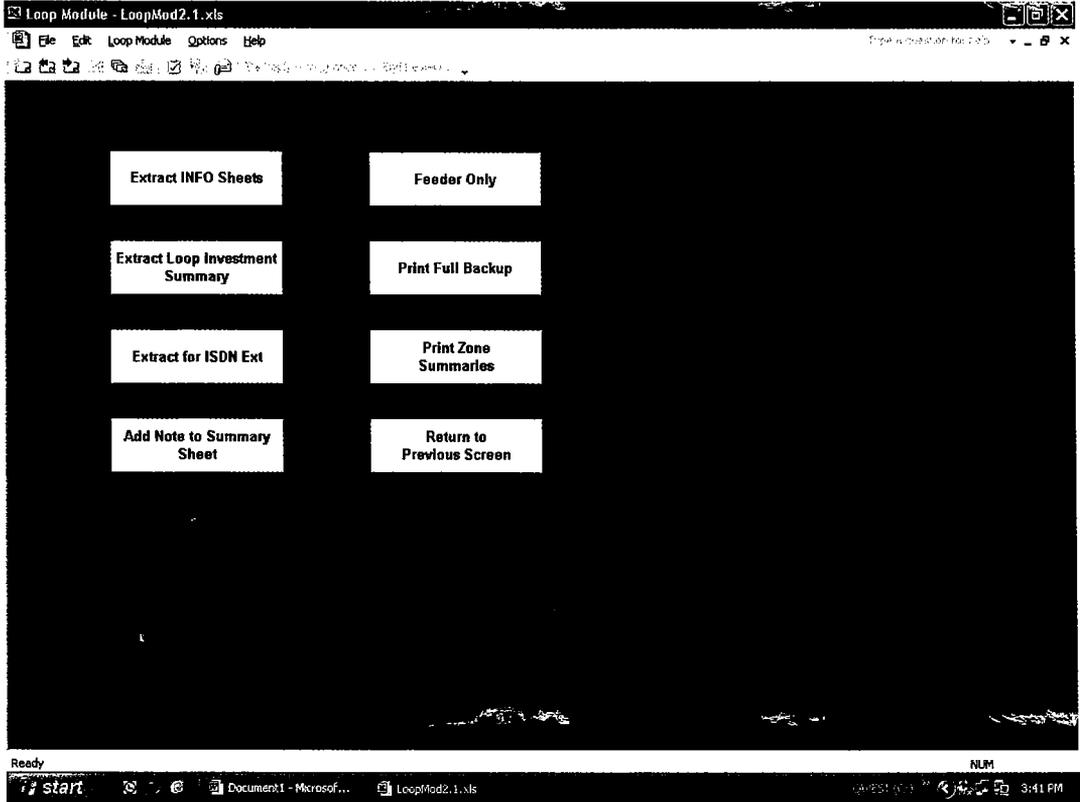
The results screen contains a summary of the loop and drop investments and buttons that enable the user to either view or print the more detailed investment summary sheet. It also contains the "More Options" button that takes the user to another screen with additional extract and printing options.



Once the user is done the "Return to Start" button can be used to start the process over with a different set of selections.

**More Options Screen**

This screen contains various extract buttons to create files for retention of outputs or further analysis. There are also print buttons to backup or lower level results summaries. The "Add Note" button is useful in sensitivity tests for linking results with changes to inputs.



When the user is finished here "Previous Sheet" will return the user to the "Results screen". From there the user can return to the "Start screen" and quit the program or make additional runs.

## **2. Increased input variability**

The variables sheet shown above allows the user a mechanized means of adjusting a variety of inputs that were previously less accessible. Sharing, for instance, can now be accessed through a button on this sheet, as can drop lengths, cable sizing factors, aerial percentages, and the mix of placement activities. There is no longer a need to modify formulas in underlying spreadsheets to make these sorts of adjustments.

## **3. Structure Sharing**

Structure sharing is now an input variable for aerial structure, underground structure, and buried structure. Within buried the user can vary the percent sharing on feeder-urban, feeder-rural, and distribution designs DG1, DG2, DG3, DG4 and DG5. The structure sharing percentages represent the percentage of investment USWC will avoid through sharing of the construction costs for poles, conduit systems or trench. For example, if the Telephone Company is assumed to be responsible for 80% of the cost of trenching for a buried cable, the sharing input for that situation would be 20%.

From an actual application perspective, the aerial and underground structure ratios are reduced by the sharing percentages. The buried structure sharing, because of the variety of activities involved, is a more complex calculation. For example, certain portions are not subject to sharing, lay cable in particular. Consequently, the sharing percentage will apply only to the activities, which can actually be shared.

## **4. Placing cost data**

The latest data from the currently negotiated contracts has been incorporated into the development of cost information for the various placing activities for buried plant. This information is used for both cable and drop placements.

## **5. Disaggregation of placing cost by density**

The mix of buried plant placing activities can now be varied at a distribution Density Group level. In addition the mix can be set differently for urban feeder versus rural feeder. This allows the user to take advantage of lower cost placing methods, such as plowing or cut & restore sod, where density would allow it while still reflecting the costs of placing plant in mature, higher density neighborhoods. The higher density areas would likely require the use of techniques such as directional boring or cut & restore of asphalt or concrete

## **6. Feeder modeling**

The feeder parameters under the Variable Categories menu address cable sizing factor, aerial percentages, mix of placement activities, and sharing percentages. In the feeder model selection box there is an option entitled "Custom Model". This option will allow the user to adjust such inputs as the cross-over points between copper and Digital Loop Carrier (DLC), between underground and buried placement (for either fiber or copper), and between urban and rural placement mix for buried facilities. This screen also provides the user the ability to adjust sizing factors for DLC systems and channel units and to set parameters for distance zones.

## **7. Fill variable distribution design**

The default distribution design reflects particular "pairs per site" type cable sizing. If the user wishes to place cable with a different utilization level, there is an option available that will drive the cable sizing to the desired fills. The calculations underlying the design is that in a pairs per site type design the engineer would allow for 2 or 3 pairs at each site (home) the cable passes. This drives the sizing of the cable, e.g., after passing the 8<sup>th</sup> home in a 3 pair design the cable would move from a 25 (with 24 pairs used) to a 50 pair. The 9<sup>th</sup> home would be assigned pairs 26, 27 and 28 in the 50 pair cable.

In a fill type design the fill percentage will drive the number and fraction of pairs required at each site. For instance, with a 66% fill as each home is passed the design would assume 1 working pair and ½ non-working pair. The net effect of this is that a 25 pair cable will now serve more homes than it did in the 3 pair design. The length of the trench does not change, but the size of the facility within it does. This provides a saving on material (a 25 pair cable is about 75% of the cost of a 50 pair cable) but does not have an impact on the placing or structure cost.

## **8. Drop length data by Density Group**

Drops are utilized in Density Group 3, 4 & 5. One of the primary differences between the three designs is lot size. Drop length would logically vary with lot size. To better relate drops to the designs, a unique length can be input for each of the three designs. Length can also be input separately for aerial versus buried. This provides drop data that more accurately reflects the density differences from one state to another.

## **9. Unit Calculation for Density Groups**

The density group Unit or divisor calculation is based on the number of additional lines and the percentage of idle dedicated lines. Idle dedicated lines are those lines that are primaries at a location and consequently left assigned even when a location is temporarily vacant. An example of this would be an apartment that may be unoccupied for 2 months. It would cause extra labor activity and administrative problems to use that primary pair for another renters additional line demand. It is more efficient to leave it idle and available for the next renter in that unit. The additional line demand would be met with pairs designed for that purpose. In the Unit calculation the designed number of units (400 homes in a subdivision for instance) is adjusted to reflect both the downward effect on utilization of idle dedicated as well as the upward effect of additional line take. The additional line percentage is based on the number of additional lines divided by the total number of residential lines.

## **10. Cost Calculations**

The final results from LoopMod are at the investment level. To maintain consistency with the other Qwest models, the investment outputs are converted to monthly costs within the Integrated Cost Model (ICM). This provides for consistent output format for the various components of complete cost studies and allows the study analyst the ability to make sensitivity runs more easily.

## **Help screen data from LoopMod V2.1**

The following information is also available through the Help menus while running LoopMod.

### **Start Screen**

#### **State Name**

Displays the state for which the investments are run.

#### **Path**

Establishes the computer path on which the program will run.

#### **DS0 Vs Fiber Pair**

Selection will determine the whether investments are calculated on a DS0 or Fiber pair basis.

#### **Feeder Model**

Selection will determine the feeder design.

#### **Channel Card**

Selection will determine the Remote Terminal Channel Unit cost used in the study.

#### **Distribution File**

This selection will determine the Distribution Group file to be used.

#### **Pairs Per Site**

This selection will allow the user to select 1 pair per site, 2 pair per site or Engineering Standard distribution designs. It also allows the user to select Custom and build a set of fill driven designs.

#### **Pair Gain**

Selection will include or exclude the pair gain equipment investments.

#### **Process Group**

Selection will determine which Wire Centers (or group of Wire Centers) will be included in the results.

#### **Report View**

This selection will determine the level of detail in the output.

#### **GO!**

This selection runs the program.

#### **Additional Options**

This selection takes the user to the Additional Options screen.

#### **Quit**

Selecting this option will terminate the program. No user changes will be saved.

**Feeder Model** (Option on Start Screen)

Default Feeder Model is 12 Kilofoot Crossover for fiber

**12 Kilofoot Crossover** is the point at which fiber replaces copper in the feeder.

**Custom Model** will allow changes to:

- Copper / Fiber Crossovers
- Copper Underground / Buried Crossovers
- Fiber Underground / Buried Crossovers
- Urban / Rural Crossovers
- DLC Card and System Fills
- "Distance Zones" Definitions

**Distribution File** (Option on Start Screen)

Default is Wire Center Detail

**Distribution Area Detail**

Each Distribution Area will be individually processed (same result as Wire Center Detail)

**Wire Center Detail**

The Distribution Areas have been condensed to speed up processing. One condensed Distribution Area representing each Distribution Group will be processed (same result as Distribution Area Detail)

**Custom**

Takes user to DAAalyze.mdb. This is a Microsoft Access database that contains the network distribution area (DA) data and the criteria used in mapping DAs to Density Groups

Note on Distribution Groups:

There are five Distribution Groups modeled in LoopMod:

- DG 1 - High Rise buildings (structures with a single entrance facility)
- DG2 - Multi-building/Multi-tenant
- DG3 - Single family Serving Area Concept with standard lot size
- DG4 - Single family Serving Area Concept with large lot size
- DG5 - Very low density

**Pairs Per Site** (Option on Start Screen)

Default is Engineering Standard.

**Engineering Standard**

Designs are 2 pairs per site for DG1 and DG2, 3 pairs per site for DG3 and DG4, and 2 pairs per site for DG5.

**1-Pair per Site**

This selects a set of designs that are 1 pair per site for all Distribution Groups.

**2-Pairs per Site**

This selects a set of designs that are 2 pairs per site for all Distribution Groups.

**Custom Model**

This option will allow the user to select a fill level for distribution cable sizing for each Distribution Group. The fills approximate pairs per site based on one worker per location (33% = 3 pairs per site, 50% = 2 pairs per site.)

**Process Group** (Option on Start Screen)

Default is All Wire Centers

**All Wire Centers**

Includes all Wire Centers in the state

**Specific Wire Centers**

Includes only the Wire Centers selected by the user. The user must go to the "Select Wire Center" menu option or variable category

**MSA Zone 1**

Includes all Wire Centers in the predetermined MSA Zone 1 for the state

**MSA Zone 2**

Includes all Wire Centers in the predetermined MSA Zone 2 for the state

**MSA Zone 3**

Includes all Wire Centers in the predetermined MSA Zone 3 for the state

**Report View** (Option on Start Screen)

Default is Summary View

**Summary View**

All of the Wire Centers selected will be averaged and displayed once.

**Detail View**

Each Wire Centers selected will have it's own investment displayed.

## **Additional Options Screen**

### **Variable Categories**

This selection takes the user to the Variable Categories screen (input edits).

### **Print Data Selections**

This option will print the variable selections identified on the Data sheet.

### **Return to Start**

This option will display a dialog box advising the user that returning to Start will erase any variable changes that have been made to the options presented on the Variables screen below. The user can choose to continue on to the Start screen or remain on the Additional Options screen.

### **Restore Headers & Tabs**

Select this option when access is required to the background worksheets.

### **Eliminate Headers & Tabs**

This option returns the program to its default condition of hidden headers and tabs.

### **Quit**

Selecting this option will terminate the program. No user changes will be saved.

### **GO!**

This selection runs the program.

## **Variable Categories Screen**

### **Feeder Variables**

This option will display all of the variables concerned with Feeder.

### **Distribution Variables**

This option will display all of the variables concerned with Distribution.

### **Drop Variables**

This option will display all of the variables concerned with Drop.

### **Support Structure Variables**

This option will display all of the variables concerned with Support Structure ratios.

### **Placement Costs**

This option provides the opportunity to change the placement activity costs for buried cable (45C) and buried fiber (845C).

### **Line Variables**

This option will display all of the variables concerned with Line counts.

### **Network Component Prices Menu**

Selecting this button will take the user to the Network Component Prices screen. It provides the opportunity to change all material investments including copper cables, load coils, fiber, stubs, pedestals, inside terminals, cross-connects (SAIs), and digital loop carrier systems. Defaults are the network based unit investments by state. English descriptions are located to the right of the data.

### **Select Wire Centers Screen**

This will take the user to a screen that will display all of the Wire Centers available for processing.

### **Return to Additional Options Screen**

Select this button to return to the Additional Options screen.

## **Feeder Variables Screen**

### **“Distance Zones” Boundaries (Feeder Only!)**

This option will create up to 8 Zones within each Wire Center that are based on distance from the Central Office. Pressing the “Feeder Sections” button will take the user to FeederMod.xls – the Feeder pre-processor. The user can then define the “Distance Zones” and create the custom feeder model.

Pressing this button will automatically set the Feeder Model variable on the Start Screen to “Custom”.

The “Distance Zones” should be created for Distribution to match the ones created for Feeder.

### **Feeder Fill Information**

Feeder Fill for Copper Cable is the Copper Cable sizing factor. The default is 80%

Feeder Fill for Fiber Cable is the Fiber Cable sizing factor. The default is 100%.

### **Aerial Feeder Percentages**

Determines the amount of Aerial Copper will be used instead of Buried Copper. The Default is 14%.

### **Placement Activities and Sharing Percentages**

This option provides the opportunity to change the placement activity percentages. The feeder placement activity percentages are segmented by Urban and Rural. The total activity percentage must total 100% for both Urban and Rural feeder!

Sharing percentages for each activity can be specified. The default is 20%.

## **Distribution Variables Screen**

### **Distance Zone Boundaries- (Distribution Only!)**

This option will create up to 8 Zones within each Wire Center that are based on distance from the Central Office. Enter the Upper Limit (outer edge) of each Zone. The last Zone must have an Upper Limit of 999,999! The "Distance Zones" should be created for Feeder to match the ones created for Distribution.

### **Aerial Distribution Percentages**

The user must return to start and select "Custom Model" under Pairs per Site to adjust the Aerial Distribution Percentage

### **Placement Activities and Sharing Percentages**

This option provides the opportunity to change the placement activity percentages. The distribution placement activities are broken out by the five Distribution Groups. The total activity percentage must total 100% for each Distribution Group!

Sharing percentages for each activity can be specified. The default is 20%.

### **Distribution Group Mix**

This option is the same as selecting a custom distribution file. It will take you to DAAnalyze.mdb.

## **Drop Variables Screen**

Drops only occur in Distribution Groups 3, 4, and 5. Distribution Groups 1 and 2 are served by an entrance facility to the building.

### **Sharing Percentages by Distribution Groups for Drops**

The default sharing percentage is 20%. This assumes that 20% of the cost of the drop trench will be avoided.

### **Average Aerial and Buried Drop Lengths**

Average drop lengths are input for Aerial and Buried drops in Distribution Groups 3, 4, and 5. The defaults are 70 feet for DG3, 200 feet for DG4, and 300 feet for DG5.

## **Support Structure Ratios Screen**

The Qwest Factors Group provides the support structure ratios. Multiplying the structure ratio times the investment for the associated copper or fiber cable account develops the investments for poles and conduit.

### **Factor 1-52**

This is the ratio of pole investment (1C) to aerial cable investment (52C).

### **Factor 4-5**

This is the ratio of conduit investment (4C) to underground cable investment (5C).

### **Factor 4-85**

This is the ratio of conduit investment (4C) to underground fiber cable investment (85C).

## **Line Variables Screen**

The line variables address the percentages of additional lines per location and the percentage of idle primary lines. The net of these two numbers is used to calculate the working lines per density group design.

### **Additional Lines**

The additional line quantity represents the current additional lines in service.

### **Idle Dedicated**

The idle dedicated percentage represents the number of primary lines left assigned that are not working. This could be due to churn (vacant apartments, non-occupied houses) or losses to competition where facilities are in place.

## **Network Components Screen**

### **Buried Copper Cable & Stubs**

This option provides the opportunity to change buried copper cable and stub prices. These prices include material investments, and splicing and engineering costs. Placement costs are not included. They are developed from the Placement Costs and Placement Percentages. The Account Code (Field Reporting Code) is 45C.

### **Underground Copper Cable & Stubs**

This option provides the opportunity to change underground copper cable, stub, and load coil prices. These prices include material investments, and splicing, engineering and placing costs. The Account Code (Field Reporting Code) is 5C.

### **Building Copper Cable & Inside Terminals**

This option provides the opportunity to change building copper cable and inside terminal prices. These prices include material investments, and splicing, engineering and placing costs. The Account Code (Field Reporting Code) is 62C.

### **Aerial Copper Cable & Terminals**

This option provides the opportunity to change aerial copper cable and terminal prices. These prices include material investments, and splicing, engineering, and placing costs. The Account Code (Field Reporting Code) is 52C.

### **Buried Fiber Cable**

This option provides the opportunity to change buried fiber cable prices. These prices include material investments, and splicing and engineering costs. Placement costs are not included. They are developed from the Placement Costs and Placement Percentages. The Account Code (Field Reporting Code) is 845C.

### **Underground Fiber Cable**

This option provides the opportunity to change underground fiber cable prices. These prices include material investments, and splicing, engineering, and placing costs. The Account Code (Field Reporting Code) is 85C.

### **Building Fiber Cable**

This option provides the opportunity to change building fiber cable prices. These prices include material investments, and splicing, engineering, and placing costs. The Account Code (Field Reporting Code) is 862C.

**Aerial Fiber Cable**

This option provides the opportunity to change underground fiber cable prices. These prices include material investments, and splicing, engineering, and placing costs. The Account Code (Field Reporting Code) is 852C.

**Drop Components**

This option provides the opportunity to change drop component prices. These prices include material investments, protector and termination labor, and mobilization costs. The drop components are provided for two pair buried drop, three pair buried drop and aerial drop. The Account Codes (Field Reporting Codes) are 35C for Buried Drop and 42C for Aerial Drop.

**Wire**

This option provides the opportunity to change the wire price. This price includes material investments, splicing, engineering, and placing costs. C-Wire is a coarse gauge, high tensile strength, single pair facility used for long runs in low-density areas. The Account Code (Field Reporting Code) is 3C.

**Serving Area Interfaces & Terminals**

This option provides the opportunity to change Serving Area Interface (SAI), pedestal, and encapsulated terminal prices. These prices include material investments, splicing, engineering and placing costs. The SAI is the cross-connect between the feeder cable and the distribution cable. There is one SAI assumed in each design for Distribution Groups 2, 3, 4, and 5. The Account Code (Field Reporting Code) is 45C.

**DLC Optic Equipment**

This option provides the user the ability to change prices for fiber optic based Digital Loop Carrier system components. The prices are engineered, furnished and installed for the central office terminals, remote terminals, and channel units. The Account Code (Field Reporting Code) is 257C.

**Return to Variable Categories Screen**

Select this button to return to the Additional Options screen.

**Select Wire Centers Screen**

This screen lists all of the Wire Centers that are available to process. All of the Wire Centers that will be processed in the current run have an 'X' in the "Selected?" column.

To Add a Wire Center - Place an 'X' in the "Selected?" column next to the Wire Center desired.

To Remove a Wire Center - Remove the 'X' from the "Selected?" column

## **Summary of Loop & Drop Investment (Summary View)**

After running the model with the "Summary View" option selected, the following options are available.

### **Print Summary**

This selection will print a one-page summary of the investments by Account Code and list the Average Loop Length, Number of Loops, Average Feeder Fill, and Percent Digital Loop Carrier. Summary will also itemize the inputs used in this run: Feeder Model, Distribution Group Mix, and Pairs per Site.

### **View Summary Sheet**

This selection allows user to review investment summary.

### **More Options**

This option provides the user with multiple presentation formats and outputs for the cost summary. See "Summary of Loop & Drop Investment (More Options)".

### **Return to Start**

This option will send the user to the Start screen where a new run can be originated or the program can be exited. There is no option from Start to return to the "Summary of Loop & Drop Investment".

## **Summary of Loop & Drop Investment (More Options)**

### **Extract INFO sheets**

Allows the Data, INV, FeederInvestments, DistributionDetail, and Equipment-Investment sheets to be retained in a file in the LoopMod\OUTPUT\ directory for further use.

### **Extract Loop Investment Summary**

Copies the Loop & Drop Investment summary to a file in the LoopMod\OUTPUT\ directory.

### **Extract for ISDN Ext.**

The ISDN Extension cost is the difference between the investments developed with a DLC system using POTS card and the costs developed with an ISDN card. This option will copy the summaries of those two separate runs to a file, ZISDNSUM, where the difference is calculated and summarized.

### **Add Note to Summary Sheet**

This option will create a NOTE box on the summary sheet where the user can add documentation for each specific investment run. Also see "Note Sheet" below.

### **Feeder Only**

This option will zero out the distribution investments and provide a Feeder Only investment summary sheet. This activity is not reversible.

### **Print Full Backup**

This option will print the entire backup documentation required. (Approximately 50 pages)

### **Print Zone Summaries**

This option will print one-page investment summaries for each of the "Distance Zones". This summary of investments is by Account Code and also lists the Average Loop Length, Number of Loops, Average Feeder Fill, and Percent DLC. The summary will also itemize the inputs used in this run: Feeder Model, Distribution File, and Pairs per Site.

**Previous Sheet**

This option will return the user to "Summary of Loop & Drop Investment" screen.

**Summary of Loop & Drop Investment (Detail View)**

After running the model with the "Detail View" option selected, the following options are available.

**Print Summary**

This selection will print the investments by Account Code and list the Average Loop Length, Number of Loops, Average Feeder Fill, and Percent Digital Loop Carrier for each Wire Center. Summary will also itemize the inputs used in this run: Feeder Model, Process Group, and Pairs per Site.

**Extract Wire Center Summary**

Copies the Loop & Drop Investments for each Wire Center to a file in the LoopMod\OUTPUT\ directory.

**Return to Start**

This option will send the user to the Start screen where a new run can be originated or the program can be exited. There is no option from Start to return to the "Summary of Loop & Drop Investment".

# **LOOP MODULE**

## **VERSION 2.1**

**Default Values**

**Idaho**

**Qwest Corporation**

**October 31, 2003**

# LOOP MODULE DEFAULT VALUES

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## **1. Overview**

This section of the Loop Module User Manual includes descriptions of the inputs available to the users and the default values assigned to them. Also included is the source of the data that was used to establish these values. The data is based on the TELRIC economic guidelines. Thus, where current activities are reflective of what would be experienced within the TELRIC structure, that information will be included. Conversely, if the forward-looking equipment/activities/designs are not being implemented on a widespread basis, subject matter experts were consulted to develop an estimate of the appropriate values.

As new or additional data is gathered it will be included in this document.

## 2. Distribution Fill

**Description:** The data included under the distribution fill header is used to calculate the divisor used in each distribution design. The two values are for Idle Dedicated and Additional Lines percentages. The calculation is the design number of housing units plus the net of the idle dedicated percent and the additional lines percent. For example 400 homes plus (12% additional minus 4% idle dedicated) or 400 homes plus 8% or 432 working lines. The investment for the distribution area will then be divided by the 432 working lines. In addition the user has the ability to set utilization levels that will impact the pairs per site routine. Different fills will adjust where cables taper (e.g. 50 pair spliced to a 25 pair). The result is differing footages of the various cables as the total sheath footage will remain the same. The Idle Dedicated and Additional Line percentages can only be edited in the Loop Module. They are not in the ICM edit screens.

### **Default values:**

#### Distribution Fill

Idle Dedicated  
Additional Lines

#### Percentages

4.00%  
15.75%

| <u>Density Group Specific</u> |                    |
|-------------------------------|--------------------|
|                               | <u>Percentages</u> |
| DG1                           | 50%                |
| DG2                           | 50%                |
| DG3                           | 33%                |
| DG4                           | 33%                |
| DG5                           | 50%                |

**Support:** The idle dedicated percentage is calculated by subtracting the additional lines from working and assigned lines, then subtracting working lines from assigned lines and dividing the result by the assigned lines. This information is provided by network from the Utilize database. The additional line percentage is developed from data out of the IFT database. The IFT reports show in-service quantities for products and services. The default input fills are based on Qwest network guidelines of two pairs per site in multi-family and low density and three pairs per site for single family residential.

### **3. Feeder Fill**

**Description:** The feeder fill is the factor by which feeder cable capacity is increased above the size needed to serve a given quantity of demand in order to provide spare pairs for breakage, line administration, and some amount of growth.

**Default values:**

#### **Feeder Fill for Copper Cable**

**Percent**  
80%

**Support:** The effective fill factor that is generated is typically less than the corresponding input feeder fill factor. This is due to discrete cable sizes that will result in a selected cable providing more pairs than the calculation requires.

### **4. Average Drop Lengths**

**Description:** The drop wire is the facility that extends from the nearest distribution terminal to the customer's premises. The lengths for that facility are broken out by aerial versus buried and by distribution density group. Only density groups 3, 4 and 5 use drops. Density groups 1 and 2 would utilize an entrance facility as opposed to a drop wire.

**Default values:**

#### **Average Aerial and Buried Drop Lengths**

|                                      | <b><u>Lengths</u></b> |
|--------------------------------------|-----------------------|
| Aerial Drop Length - Density Group 3 | 70                    |
| Aerial Drop Length - Density Group 4 | 200                   |
| Aerial Drop Length - Density Group 5 | 300                   |
| Buried Drop Length - Density Group 3 | 70                    |
| Buried Drop Length - Density Group 4 | 200                   |
| Buried Drop Length - Density Group 5 | 300                   |

**Support:** The drop lengths are a function of the lot size. These are Qwest wide default lengths. When applied to the state specific mix of density groups they produce a statewide average drop length of approximately 110 to 120 feet. Surveys of existing drops in New Mexico, North Dakota, Minnesota and Wyoming have produced statewide averages from 150 to 180 feet. These averages are conservative as they exclude drops in excess of a certain length.

## 5. Placement Costs

**Description:** The placement costs are the contracted costs for various activities involving placement of buried plant. The placement costs are added to the cost of buried cable on a per cable foot basis. The cost added is a weighted average of the costs of each activity. This weighting is unique to each distribution density group and to urban and rural feeder. The weightings are discussed below in the Placement Percentages section.

### **Default values:**

| <u>Placement Costs</u>  | <u>Costs</u> |
|-------------------------|--------------|
| 2" Directional Bore     | \$11.67      |
| 4" Directional Bore     | \$15.64      |
| Cut & Restore Asphalt   | \$13.77      |
| Lay Cable               | \$0.87       |
| Plow Cable              | \$1.70       |
| Plow Cable - Rocky      | \$14.95      |
| Missile                 | \$11.28      |
| Restore Sod / Gravel    | \$3.01       |
| Fiber Trench            | \$2.65       |
| Hydro Mulch             | \$4.29       |
| Cut & Restore Concrete  | \$12.43      |
| Trench Cable - Hand     | \$5.90       |
| Trench Cable - Rocky    | \$15.10      |
| Trench Cable - Standard | \$1.85       |

**Support:** The costs for the various activities are drawn from the latest contracts the Network department has for placement of buried plant. Where a state has multiple contractors the number is a weighted average of the different prices. The weighting is based on the number of lines in the areas served by each contractor. Where there are variations on a single activity (e.g. plow - 24", 30' & 36"), those prices are weighted together based on their occurrence.

## 6. Placement Percentages

**Description:** The placement percentages are used to weight together the various activities involving placement of buried plant. The cost added to the buried cable is based on this weighting. The weighting is unique to each distribution density group and to urban and rural feeder.

### **Default values:**

#### Placement Percentages - Distribution

|                        | <u>DG1</u> | <u>DG2</u> | <u>DG3</u> | <u>DG4</u> | <u>DG5</u> |
|------------------------|------------|------------|------------|------------|------------|
| Trench & Backfill      | 20%        | 25%        | 25%        | 30%        | 3%         |
| Rocky Trench           | 5%         | 5%         | 5%         | 2%         | 0%         |
| Plow                   | 0%         | 0%         | 0%         | 28%        | 91%        |
| Rocky Plow             | 0%         | 0%         | 0%         | 0%         | 4%         |
| Cut & Restore Concrete | 15%        | 10%        | 5%         | 3%         | 0%         |
| Hand Dig Trench        | 5%         | 5%         | 5%         | 4%         | 0%         |
| Bore Cable             | 20%        | 30%        | 45%        | 20%        | 0%         |
| Cut & Restore Asphalt  | 20%        | 10%        | 10%        | 6%         | 2%         |
| Cut & Restore Sod      | 15%        | 15%        | 5%         | 7%         | NA         |
| Hydro Mulch            | NA         | NA         | NA         | NA         | 0%         |

#### Placement Percentages - Feeder

|                        | <u>Urban</u> | <u>Rural</u> |
|------------------------|--------------|--------------|
| Trench & Backfill      | 30%          | 3%           |
| Rocky Trench           | 5%           | 0%           |
| Plow                   | 0%           | 91%          |
| Rocky Plow             | 0%           | 4%           |
| Cut & Restore Concrete | 15%          | 0%           |
| Hand Dig Trench        | 5%           | 0%           |
| Bore Cable             | 10%          | 0%           |
| Cut & Restore Asphalt  | 20%          | 2%           |
| Cut & Restore Sod      | 15%          | NA           |
| Hydro Mulch            | NA           | 0%           |

**Support:** The activity percentages are a mix of placement methods that would be used to replace the existing network as well as grow it during the current feeder planning period. The percentages are based on the growth rates and interviews with outside plant engineers who were responsible for cable rehab work. The question to the engineers was phrased to address the type of activities that they would expect to use when cable placement is done in mature, existing areas. Data was also drawn from Qwest experience in placing plant for the Broadband trial in Omaha, NE. In addition, a citywide CATV rebuild in one of the Qwest states provided support to the utilization of boring in mature areas.

## **7. Sharing Percentages**

**Description:** The sharing percentages give recognition to the fact that there will be a reduction in placing costs due to either trench provided by a land developer or multiple facility providers using the same poles, trenches or conduit systems. The impact of these two scenarios is decidedly different. With trench provided by a developer, the only cost experienced by the facility provider is the cost of laying the cable in the open trench. With multiple facility providers using a common structure, the question of sharing becomes more complicated. Poles for instance, may be jointly owned or they may be accessed through the use of attachment fees. One constitutes a capital investment, while the other is an annual expense..

### **Default values:**

#### **Sharing Percentages**

|                                       | <b><u>Percentage</u></b> |
|---------------------------------------|--------------------------|
| Aerial - Poles                        | 50%                      |
| Underground- Conduit                  | 5%                       |
| Buried - Urban Feeder                 | 20%                      |
| Buried - Rural Feeder                 | 20%                      |
| Buried - Distribution Density Group 1 | 20%                      |
| Buried - Distribution Density Group 2 | 20%                      |
| Buried - Distribution Density Group 3 | 20%                      |
| Buried - Distribution Density Group 4 | 20%                      |
| Buried - Distribution Density Group 5 | 20%                      |

**Support:** The sharing percentages are an estimate of the portion of the structure cost that will be avoided through a mix of jointly owned structure and developer provided trenching. Certain work activities, such as actually laying a cable in the trench would not be reduced or shared, even if there are multiple facilities in a trench. The percentages are based on historical data, access line growth rates, and the opinions of outside plant subject matter experts.

## 8. Network Component Prices

**Description:** The sections below detail the various components that are used in each of the network categories (cables, terminals, DLC, etc.).

### 8.1 Buried Copper Cable and Stubs

**Description:** The cost per foot for buried copper cables, including material, supply, engineering, and splicing. Pricing for buried is discussed in sections 6 and 7. The cable stub costs are on a per cable basis for a 30 foot stub.

**Default values:**

#### Buried Copper Cables & Stubs

|                            | <u>Cost</u> |
|----------------------------|-------------|
| 25 pair - 22 gauge         | \$0.89      |
| 50 pair - 22 gauge         | \$1.17      |
| 100 pair - 22 gauge        | \$1.66      |
| 200 pair - 22 gauge        | \$2.66      |
| 300 pair - 22 gauge        | \$3.74      |
| 400 pair - 22 gauge        | \$4.82      |
| 600 pair - 22 gauge        | \$7.25      |
| 25 pair - 24 gauge         | \$0.76      |
| 50 pair - 24 gauge         | \$1.00      |
| 100 pair - 24 gauge        | \$1.37      |
| 200 pair - 24 gauge        | \$2.12      |
| 300 pair - 24 gauge        | \$2.88      |
| 400 pair - 24 gauge        | \$3.72      |
| 600 pair - 24 gauge        | \$5.26      |
| 900 pair - 24 gauge        | \$7.67      |
| 1200 pair - 24 gauge       | \$9.88      |
| 1800 pair - 24 gauge       | \$14.42     |
| 600 pair - 26 gauge        | \$5.26      |
| 900 pair - 26 gauge        | \$7.67      |
| 1200 pair - 26 gauge       | \$9.88      |
| 1800 pair - 26 gauge       | \$14.42     |
| 50 pair - 24 gauge - stub  | \$174.34    |
| 100 pair - 24 gauge - stub | \$197.04    |
| 300 pair - 24 gauge - stub | \$340.93    |
| 400 pair - 24 gauge - stub | \$402.17    |
| 600 pair - 24 gauge - stub | \$546.46    |
| 900 pair - 24 gauge - stub | \$673.63    |

**Support:** The cable material costs are provided by the Qwest network organization. They are based on the latest prices Qwest is paying for these components.

## **8.2 Underground Copper Cable and Stubs**

**Description:** The cost per foot for underground copper cables, including material, supply, engineering, placing and splicing. Underground structure is discussed in sections 3. The cable stub costs are on a per cable basis for a 30 foot stub.

### **Default values:**

| <b><u>Underground Copper Cables &amp; Stubs</u></b> | <b><u>Cost</u></b> |
|---|--------------------|
| 25 pair - 22 gauge                                  | \$1.65             |
| 25 pair - 24 gauge                                  | \$1.51             |
| 50 pair - 22 gauge                                  | \$1.92             |
| 100 pair - 22 gauge                                 | \$2.42             |
| 200 pair - 22 gauge                                 | \$3.41             |
| 300 pair - 22 gauge                                 | \$4.50             |
| 400 pair - 22 gauge                                 | \$5.57             |
| 50 pair - 24 gauge                                  | \$1.75             |
| 100 pair - 24 gauge                                 | \$2.12             |
| 200 pair - 24 gauge                                 | \$2.87             |
| 300 pair - 24 gauge                                 | \$3.63             |
| 400 pair - 24 gauge                                 | \$4.47             |
| 600 pair - 24 gauge                                 | \$6.12             |
| 900 pair - 24 gauge                                 | \$8.15             |
| 1200 pair - 24 gauge                                | \$9.87             |
| 1800 pair - 24 gauge                                | \$15.21            |
| 600 pair - 26 gauge                                 | \$5.14             |
| 900 pair - 26 gauge                                 | \$6.87             |
| 1200 pair - 26 gauge                                | \$8.03             |
| 1800 pair - 26 gauge                                | \$11.31            |
| 2400 pair - 26 gauge                                | \$14.06            |
| 3000 pair - 26 gauge                                | \$17.40            |
| 3600 pair - 26 gauge                                | \$20.42            |
| 4200 pair - 26 gauge                                | \$31.16            |
| 900 pair - 24 gauge - stub                          | \$323.48           |

**Support:** The cable material costs are provided by the Qwest network organization. They are based on the latest prices Qwest is paying for these components.

### **8.3 Building Copper Cable and Inside Terminals**

**Description:** The cost per foot for building copper cables, including material, supply, engineering, placing and splicing. The inside terminals and connecting block costs are on a per item basis.

**Default values:**

| <b><u>Building Copper Cables &amp; Inside Terminals</u></b> |                    |
|---|--------------------|
|   | <b><u>Cost</u></b> |
| 25 pair - 24 gauge  | \$1.98             |
| 50 pair - 24 gauge  | \$2.23             |
| 100 pair - 24 gauge   | \$2.59             |
| 600 pair - 24 gauge   | \$6.48             |
| 900 pair - 24 gauge   | \$9.14             |
| 50 pair - Inside Terminal                                   | \$649.92           |
| 100 pair - Inside Terminal                                  | \$659.56           |
| 600 pair - Inside Terminal                                  | \$3,631.39         |
| 900 pair - Inside Terminal                                  | \$5,414.49         |
| 50 pair - Connecting Block                                  | \$89.68            |

**Support:** The cable and terminal material costs are provided by the Qwest network organization. They are based on the latest prices Qwest is paying for these components.

## **8.4 Aerial Copper Cable and Terminal**

**Description:** The cost per foot for aerial copper cables, including material, supply, engineering, placing and splicing. The terminal costs are on a per item basis.

**Default values:**

| <b><u>Aerial Copper Cables &amp; Terminal</u></b> | <b><u>Cost</u></b> |
|---|--------------------|
| 25 pair - 24 gauge                                | \$1.20             |
| 12 pair terminal                                  | \$91.81            |
| 50 pair - 22 gauge                                | \$2.91             |
| 100 pair - 22 gauge                               | \$3.37             |
| 200 pair - 22 gauge                               | \$4.26             |
| 300 pair - 22 gauge                               | \$5.25             |
| 400 pair - 22 gauge                               | \$6.27             |
| 600 pair - 22 gauge                               | \$8.59             |
| 900 pair - 22 gauge                               | \$11.50            |
| 50 pair - 24 gauge                                | \$1.35             |
| 100 pair - 24 gauge                               | \$1.90             |
| 200 pair - 24 gauge                               | \$2.93             |
| 300 pair - 24 gauge                               | \$4.48             |
| 400 pair - 24 gauge                               | \$5.27             |
| 600 pair - 24 gauge                               | \$6.60             |
| 900 pair - 24 gauge                               | \$8.69             |

**Support:** The cable and terminal material costs are provided by the Qwest network organization. They are based on the latest prices Qwest is paying for these components.

## **8.5 Buried Fiber Cable**

**Description:** The cost per foot for buried fiber cables, including material, supply, engineering, and splicing. Placing for buried cables is discussed in sections 6 and 7.

**Default values:**

| <b><u>Buried Fiber Cables</u></b> | <b><u>Cost</u></b> |
|-----------------------------------|--------------------|
| 2 fiber cable                     | \$1.68             |
| 4 fiber cable                     | \$1.73             |
| 6 fiber cable                     | \$1.77             |
| 12 fiber cable                    | \$1.92             |
| 24 fiber cable                    | \$2.21             |
| 36 fiber cable                    | \$2.57             |
| 48 fiber cable                    | \$2.88             |
| 72 fiber cable                    | \$3.51             |
| 96 fiber cable                    | \$4.28             |
| 144 fiber cable                   | \$5.65             |
| 216 fiber cable                   | \$7.54             |

**Support:** The cable and terminal material costs are provided by the Qwest network organization. They are based on the latest prices Qwest is paying for these components.

## **8.6 Underground Fiber Cable**

**Description:** The cost per foot for underground fiber cables, including material, supply, engineering, placing, and splicing. Underground structure is discussed in sections 3.

**Default values:**

| <b><u>Underground Fiber Cables</u></b> | <b><u>Cost</u></b> |
|--|--------------------|
| 2 fiber cable                          | \$1.06             |
| 4 fiber cable                          | \$1.10             |
| 6 fiber cable                          | \$1.14             |
| 12 fiber cable                         | \$1.25             |
| 24 fiber cable                         | \$1.49             |
| 36 fiber cable                         | \$1.70             |
| 48 fiber cable                         | \$1.92             |
| 72 fiber cable                         | \$2.40             |
| 96 fiber cable                         | \$2.89             |
| 144 fiber cable                        | \$3.86             |
| 216 fiber cable                        | \$5.31             |

**Support:** The cable material costs are provided by the Qwest network organization. They are based on the latest prices Qwest is paying for these components.

## **8.7 Building Fiber Cable**

**Description:** The cost per foot for building fiber cables, including material, supply, engineering, placing, and splicing. No structure cost is included, as the duct or raceway would be provided by the building owner.

**Default values:**

| <b><u>Building Fiber Cable</u></b> | <b><u>Costs</u></b> |
|------------------------------------|---------------------|
| 12 fiber cable                     | \$1.92              |
| 24 fiber cable                     | \$2.15              |

**Support:** The cable material costs are provided by the Qwest network organization. They are based on the latest prices Qwest is paying for these components.

## 8.8 Drop Wire, NID and Placement

**Description:** The cost per foot for the drop wire, cost per foot for the placing, the labor for the placing of the protector and the termination of the wires, the cost for the protector material, and the trip or mobilization charge.

### **Default values:**

| <u>Drop Wire</u>                | <u>Costs</u> |
|---------------------------------|--------------|
| Buried 2 pair Drop -            |              |
| Placing per foot under 100 feet | \$0.72       |
| Placing per foot over 100 feet  | \$0.77       |
| Protector & Termination Labor   | \$31.92      |
| Drop material                   | \$0.09       |
| Protector material              | \$14.89      |
| Mobilization                    | \$33.35      |
| Buried 3 pair Drop -            |              |
| Placing per foot under 100 feet | \$0.72       |
| Placing per foot over 100 feet  | \$0.77       |
| Protector & Termination Labor   | \$31.92      |
| Drop material                   | \$0.11       |
| Protector material              | \$14.89      |
| Mobilization                    | \$33.35      |
| Aerial 2 pair Drop -            |              |
| Placement per drop              | \$61.47      |
| Protector & Termination Labor   | \$31.92      |
| Drop material                   | \$0.28       |
| Protector material              | \$14.89      |

**Support:** The drop material and placement costs are from the latest contracts Qwest has with outside vendors for the provision of drop facilities. The mobilization charge is divided by 14 in the calculation of buried drop costs to reflect the placement of multiple drops per visit as would be likely in a scorched node or network rebuild scenario.

## **8.9 Serving Area Interfaces and Terminals**

**Description:** The cost per item for Serving Area Interfaces (SAI) or cross-connect boxes and distribution terminals or pedestals. The SAI is the connection point between feeder cables and distribution cables and provides flexibility in assignment of pairs. The terminals are the connection point between distribution cables and the drops.

### **Default values:**

#### **SAIs and Terminals**

|                                      | <b><u>Costs</u></b> |
|--------------------------------------|---------------------|
| 10 pair pedestal terminal            | \$69.42             |
| 12 pair encapsulated splice terminal | \$55.17             |
| 600 pair SAI                         | \$2,259.76          |
| 1200 pair SAI                        | \$3,424.51          |
| 1800 pair SAI                        | \$4,722.47          |
| 2700 pair SAI                        | \$6,129.34          |
| Splice Closure                       | \$38.36             |

**Support:** The SAI and terminal costs are provided by the Qwest network organization. They are based on the latest prices Qwest is paying for these components.

## **8.10 C Rural Wire**

**Description:** The cost per wire foot for C-Rural Wire, including material, supply, engineering, and placing. C Wire is a high tensile, single pair facility that is used in low density or rural applications.

### **Default values:**

#### **C- Rural Wire**

|             | <b><u>Costs</u></b> |
|-------------|---------------------|
| 1 pair wire | \$0.62              |

**Support:** The wire material costs are provided by the Qwest network organization. They are based on the latest prices Qwest is paying for these components.

## **8.11 Fiber Optic Equipment**

**Description:** The cost for central office and remote channel and terminal equipment for the fiber based Digital Loop Carrier systems. The costs include material, supply and installation.

### **Default values:**

#### **Fiber Optic Equipment**

|                                  | <u>Costs</u> |
|----------------------------------|--------------|
| 1344 Line Remote Terminals       |              |
| C.O. Terminal                    | \$16,850.43  |
| Remote Terminal                  | \$84,254.02  |
| Quad POTS Channel Unit           | \$277.88     |
| Quad ISDN Channel Unit           | \$928.22     |
| 672 Line Remote Terminals        |              |
| C.O. Terminal                    | \$8,425.21   |
| Remote Terminal                  | \$54,732.68  |
| Quad POTS Channel Unit           | \$277.88     |
| Quad ISDN Channel Unit           | \$928.22     |
| 32 Line Remote Terminals         |              |
| C.O. Terminal (HDT)              | \$29,773.44  |
| Remote Terminal                  | \$23,232.28  |
| Quad POTS C.O. Channel Unit      | \$256.29     |
| ISDN C.O. Channel Unit           | \$311.07     |
| Quad POTS Remote Channel Unit    | \$289.08     |
| ISDN Remote Channel Unit         | \$311.06     |
| 96 Line Remote Terminals         |              |
| C.O. Terminal 1 (1st RT)         | \$6,678.14   |
| C.O. Terminal 2 (Additional RTs) | \$4,291.04   |
| Remote Terminal                  | \$31,649.87  |
| Quad POTS Channel Unit           | \$157.79     |
| Quad ISDN Channel Unit           | \$863.09     |
| 192 Line Remote Terminals        |              |
| C.O. Terminal 1 (1st RT)         | \$10,969.18  |
| C.O. Terminal 2 (Additional RTs) | \$4,291.04   |
| Remote Terminal                  | \$32,288.91  |
| Quad POTS Channel Unit           | \$157.79     |
| Quad ISDN Channel Unit           | \$863.09     |

**Support:** The system costs are provided by the Qwest network organization. They are based on the latest prices Qwest is paying for these components.

## **9. Additional Options**

**Description:** There are several options on the first screen, which are essentially driven by the type of study being done. For instance, the Process Group option allows the user to select All Wire Centers, Specific Wire Centers or one of three MSA zone wire center groups. Two items, though, are Qwest defaults that are used across all studies. These selections are Feeder Model and Pairs Per Site. The Feeder Model selection allows the user to select the 12 kilofoot standard shift from physical copper to a Digital Loop Carrier or build a custom feeder model. The Pairs Per Site allows the user to select the number of pairs engineered to each living unit.

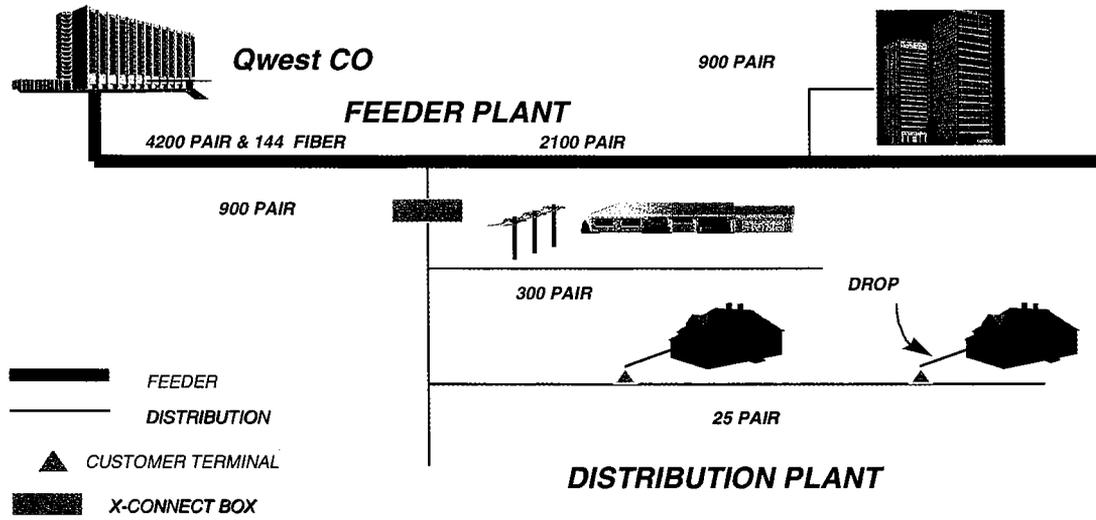
**Default values:**

Feeder Model - 12 kilofeet

Pairs Per Site - Engineering Standard (2 pairs for DG1, 2 & 5; 3 pairs for DG3 & 4)

**Support:** The 12 kilofoot crossover is based on guidelines from the Qwest network group. The objective is to minimize facility cost as well as assure that all plant will support both voice and advanced (xDSL) services. The Engineering Standard Pairs Per Site selection is supported, once again, by network guidelines to furnish enough facilities to allow for timely response to customer requests for service, while minimizing construction expenditures.

**Basic Configuration of the Local Loop Outside Plant Network**



Examples of types of areas served by Density Group (DG) designs



Density Group 1

Examples of types of areas served by Density Group (DG) designs

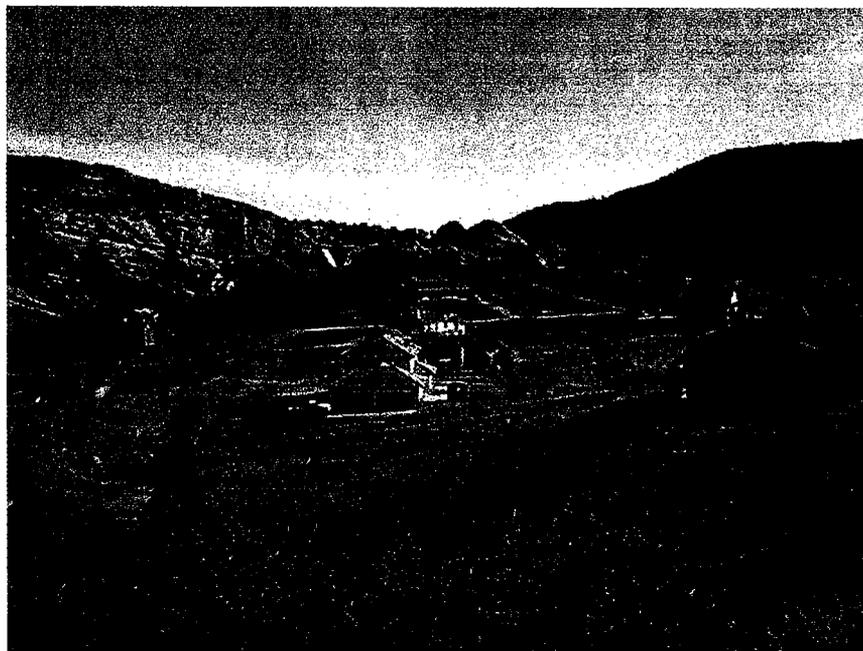


Density Group 2



Density Group 3

Examples of types of areas served by Density Group (DG) designs



Density Group 4

