4.2.5 Private Line Services (L.34.1.4.6, M.2.1.2)

Qwest's Private Line Service leverages our next-generation optical infrastructure to deliver a highly reliable, proven capability for the support of Agency needs.

Qwest's Private Line Service (PLS) provides dedicated duplex transmission connectivity between two or more designated Agency end points. Our PLS is managed, fully interoperable, and scalable. Qwest PLS rides the multi-ring Qwest Four-Fiber Bi-directional Line-Switched Ring (4F-BLSR) Synchronous Optical Network (SONET) and Wavelength networks to provide highly reliable transport from subrate DS-0 up through OC-192. Qwest's PLS comprises local access, backbone network, including wavelengths, and appropriate Service Enabling Devices (SEDs). Qwest's PLS seamlessly carries a variety of protocols, including Asynchronous Transfer Mode (ATM), Frame Relay (FR), Internet Protocol (IP), and Ethernet. Qwest delivers these services transparently from end-to-end.

Qwest complies with all of the PLS performance requirements. Qwest's proven performance monitoring and measurement systems, procedures, and evaluation methods enable us to exceed the POP-to-POP and the SDP-to-SDP availability requirements for both Routine and Critical Service levels.

Qwest PLS supports all of the capabilities, features, and interfaces required for Networx PLS service. Qwest's PLS is a low-risk solution for the Government because our existing network is fully capable of supporting all transport requirements today. Qwest will make minor modifications to our monitoring capabilities to expand direct visibility to SDP telemetry. Qwest's network capacity will easily accommodate the forecasted PLS traffic loads now and in the coming decade. Qwest has more than 40 years of experience providing PLS to numerous Fortune 500 clients and Agencies.

4.2.5.1 Reserved (L.34.1.4.6 (a))

4.2.5.2 Reserved (L.34.1.4.6 (b))

4.2.5.3 Satisfaction of PLS Requirements (L34.1.4.6 (c))

Qwest satisfies all of the specifications for PLS. The following three sub-sections describe how Qwest fully supports the capabilities, features, and interfaces requirements of the RFP.

4.2.5.3.1 Satisfaction of PLS Capabilities Requirements (L.34.1.4.6 (c), C.2.5.1.1.4)

Figure 4.2.5-1 provides a brief description of Qwest's technical approach to fully meet the Government's capabilities requirements for PLS. Qwest fully complies with all mandatory stipulated and narrative capabilities requirements for PLS. The text in Figure 4.2.5-1 is intended to provide the technical description required per L.34.1.4.6(c) and does not limit or caveat Qwest's compliance in any way.

Figure 4.2.5-1. Qwest Technical Approach to PLS Capabilities

ID #	Name of Capability	Qwest's Technical Approach
1	Protocol Transparency	By utilizing Qwest's 4F-BLSR SONET network, PLS provides transparency for any protocol used by an Agency.
2	Data Transparency	Qwest's SONET network ensures that PLS provides transparency to all bit sequences.
(a)	DS0	Qwest supports all industry-standard electrical circuit structure and channelization. Qwest uses Digital Access and Cross-connect System (DACS) capabilities to subdivide larger capacity circuits on our SONET 4F-BLSR network and cross-connects them with local access systems. The DACS equipment provides 100 percent non-blocking matrix switching for cross-connect functionality. Our service approach provides flexibility in regard to the provisioning of Plesiochronous Digital Hierarchy (PDH), Synchronous Optical Network (SONET), and Synchronous Digital Hierarchy (SDH) services. PDH services include subrate DS-0s, analog private line, DS-0s, full and fractional T-1s and T-3s, and E-1 and E-3. ITU-TSS V.35, EIA RS-449 and EIA RS-530 services can be implemented as Fractional T-3 or NxT-1s. EIA RS-232 will be implemented as subrate DS-0. Non-domestically, Qwest's suppliers provide identical functionality to provide channelized and concatenated/ unchannelized E-1, E-3, SONET and SDH PLS.
(b)	T1	
(c)	Fractional T1	
(d)	T3	
(e)	Fractional T3	
(f)	E1 [Optional]	
(g)	E3 [Optional]	
(h)	SONET OC-1 [Optional]	Optional. Not Proposed.
(i)	SONET OC-1 VT [Optional]	Optional. Not Proposed.

ID #	Name of Capability	Qwest's Technical Approach
(j)	SONET OC-3 [Optional]	Qwest's SONET services include STS-1 and OC-3 through OC-192 and are offered domestically where required by the RFP. Qwest plans to offer OC-768 in late 2007. Qwest's SDH services include E-1, E-3, and STM-1 through STM-64 and are offered non-domestically where required by the RFP.
(k)	SONET OC-12 [Optional]	
(l)	SONET OC-48 [Optional]	
(m)	SONET OC-192 [Optional]	
(n)	Subrate DS0 [Optional]	Qwest's 4F-BLSR SONET infrastructure fully supports the subrate DS0 payload data rates of 4, 8, 9.6 and 19.2 Kbps required for PLS.
(o)	Analog [Optional]	Qwest's 4F-BLSR SONET infrastructure fully supports the analog four (4) kHz bandwidth required for PLS.

Qwest's PLS portfolio provides all required capacity and bandwidths for transport of the Government's voice, video, and data traffic, using and conforming to American National Standards Institute (ANSI)/ Telcordia/International Telecommunications Union (ITU) and Internet Engineering Task Force (IETF) standards. To ensure scalability, interoperability, and high availability, Qwest monitors and manages end-to-end PLS solutions. The Qwest SONET BLSR network and the Qwest optical transport network are built on Qwest's standards-based backbone, consisting of domestic and international fiber networks to ensure widely available service. As necessary, Qwest completes PLS solutions using our international and local access suppliers.

Qwest proposes a fully compliant PLS solution that meets all service requirements specified by the Networx RFP. Qwest personnel have the required technical knowledge and resources—including pre-sales engineering, network planning, provisioning, operations groups, and field support—to engineer and implement an optimal solution for the PLS requirements of Agencies.

Qwest manages PLS from our Network Operations Center (NOC) in Thornton, CO on a 24x7x365 basis. Qwest has backup NOCs in Denver, CO

and Hong Kong. Qwest interfaces with our supplier NOCs to monitor and manage PLS end-to-end to assure our PLS customers of highly reliable and highly available service. Qwest manages at a NOC-to-NOC level with our international suppliers to achieve high levels of availability and reliability.

Qwest's SONET and wavelength networks are extended through a footprint of POPs distributed throughout the U.S. Hundreds of aggregation points expand the network reach to virtually every city in the U.S.

Figure 4.2.5-2 depicts Qwest's extensive CONUS network. Qwest uses Digital Access and Cross-connect Systems (DACS) and a variety of multiplexers to ensure cost-effective utilization of transport services. We also use these devices to monitor and manage the services. Multiplexing and concatenation are standard features of the network included in the current network deployment, with no modifications required to deliver the specified

Figure 4.2.5-2. Qwest's CONUS Network Infrastructure. *Qwest's CONUS network infrastructure, based on our state-of-the-art 4F-BLSR architecture, will transport highly reliable PLS for Agencies.*

service features and requirements. Qwest's PLS is based on and conforms to industry standards, so that service interoperability and interface requirements of the RFP are met.

Qwest's PLS portfolio includes all of the bandwidths specified by the Government, including analog services, PDH, SONET, and SDH services including:

- subrate DS-0
- DS-0
- T-1 (channelized, unchannelized, and fractional T-1)
- T-3 (channelized, unchannelized, and fractional T-3)
- E-1, and E-3 (channelized and unchannelized)
- OC-3 through OC-192 (channelized and concatenated)
- STM-1 through STM-64

Qwest's established relationships with many service providers enable us to offer and implement cost-effective, end-to-end PLS to Agencies in 32 countries. Our suppliers include Inter-Exchange Carriers (IXCs), Incumbent Local exchange Carriers (ILECs), Competitive Local Exchange Carriers (CLECs), and alternate access providers. For example, Qwest has relationships with British Telecom (BT), KDD, Telstra, AT&T, Verizon, Time Warner, and Cox. These relationships allow Qwest to fully meet current and future Networx PLS requirements. Qwest's OC-48 through DS-0 services are supported on our SONET BLSR network (see Figure 4.2.5-2.) Qwest's OC-192 offering is supported on our wavelength network. Analog conditioning, subrate DS-0, and low-bit-rate voice services are offered on a DS-0 in combination with the appropriate SED to support the required subrate DS-0 bandwidth. Diversity is a standard Qwest product feature and includes flexibility to avoid locations or routes specified by the Agency. Qwest works with local access providers to

deliver all services below the DS-0 level. Analog conditioning, subrate, and low-bit-rate voice transport are dependent on local availability of those services (usually from the ILEC).

Qwest works with local access providers and other network providers to engineer and implement an end-to-end service. While Qwest is a Global SONET/SDH Service provider, it is also the franchised ILEC in 14 western states. Using these capabilities and relationships, Qwest brings the benefits of broad network connectivity to Agencies for quick provisioning and service upgrades, including increased bandwidth, fast turn-ups, and fast response time. Agencies benefit from a single, seamless solution.

Qwest has many options at our disposal for delivering service internationally, including the last mile through local access relationships, on-net facilities, and custom builds. As previously noted, the company has interconnection agreements and physical connectivity with Postal Telephone and Telegraphs (PTTs), CLECs, ILECs, and fiber providers to deliver outstanding service anywhere Agencies require service.

Figures 4.2.5-3 and 4.2.5-4 show some of Qwest's global network suppliers and routes that allow us to deliver PLS to Agencies worldwide.

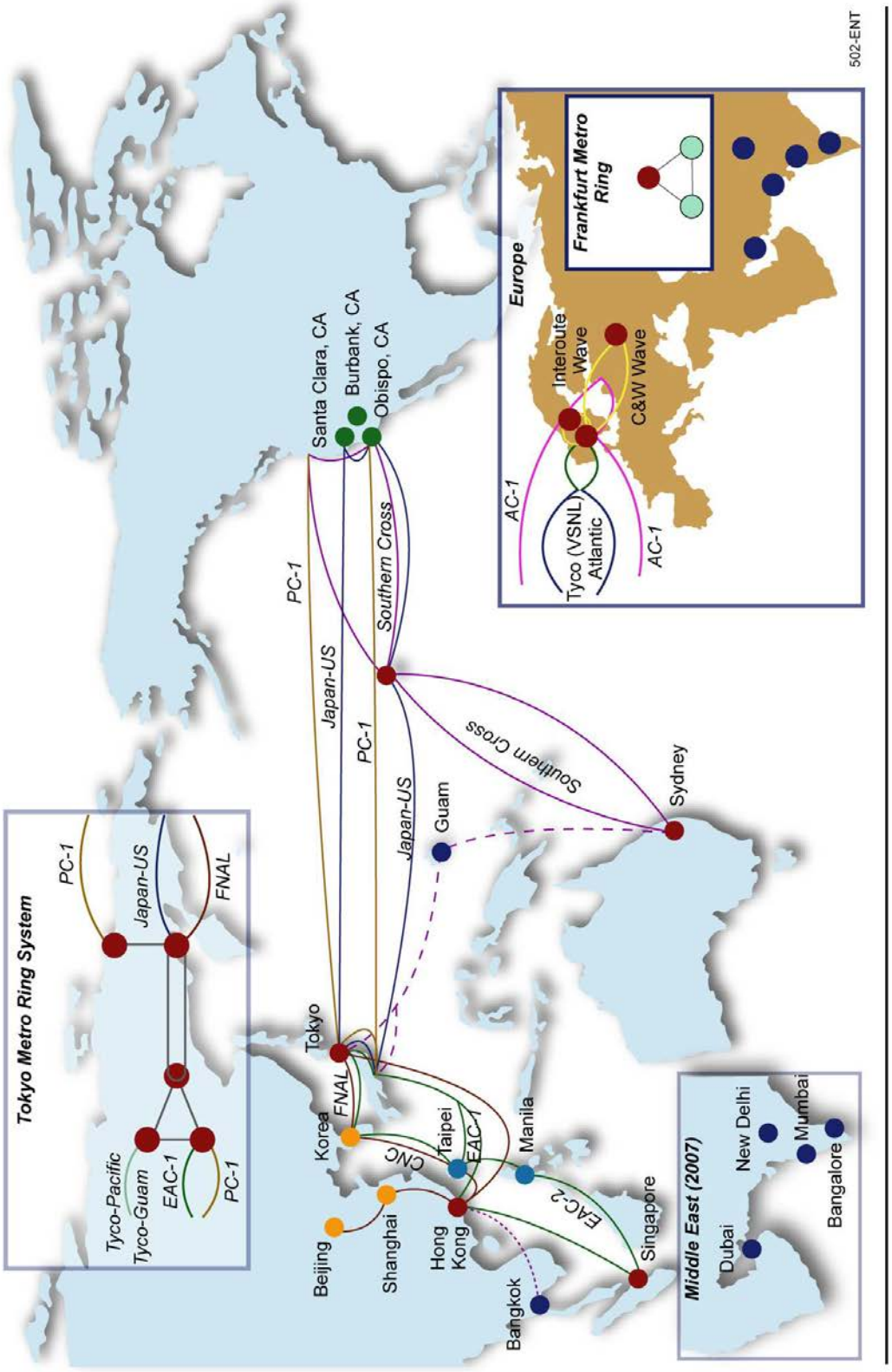


Figure 4.2.5-3. Qwest Non-Domestic Transport Facilities and Assets. *Qwest extends its network reach through strategically placed facilities and assets around the world.*

Figure 4.2.5-4 Qwest's Global Supplier Providers

	Europe	Asia Pacific	Canada	South America
Providers	T-Systems BT Cable & Wireless Interoute	Telstra PCCW Chinatelcom Japan Telecom	Telus Teleglobe Rogers BCE Nexxia	Telefonica Global Crossing Bestel

Qwest supports all of the capabilities, features, and interfaces required for the Networx PLS service. Qwest's PLS network infrastructure enables a broad range of point-to-point and point-to-multi-point transport service technical capabilities and supports all required technical capabilities for PLS. Qwest delivers these services via its nationwide 4F-BLSR SONET network. The SONET network is self-healing, based on ring architecture. This architecture runs on Dense Wavelength Division Multiplexing (DWDM) equipment capable of up to 96 wavelengths per fiber. Qwest uses DACS capabilities to subdivide larger capacity circuits on our SONET 4F-BLSR network and cross-connects them with local access systems. The DACS equipment provides 100 percent non-blocking matrix switching for cross-connect functionality. This approach simplifies provisioning and eliminates back-to-back network elements such as T-1 to T-3 multiplexers, SONET Add-Drop Multiplexers (ADMs) and Digital Signal Cross Connect patch panels, leading to higher reliability.

The SONET BLSR network is built on Qwest's domestic 24,000 mile fiber-optic network and Qwest's non-domestic network infrastructure. The SONET BLSR fiber optic network utilizes separate fibers for the working and protection channels, virtually eliminating service disruptions. The architecture that is used to support OC-192 service utilizes diverse wavelength paths that are switched by Agency equipment or a Qwest-deployed SED.

Qwest's Optical Wavelength service supports 2.5 Gig (OC-48) and 10 Gig (OC-192) wavelengths. It was deployed as a "dual-rail" system, which provides a redundant pathway for Qwest to restore service more quickly when needed. As a full-service provider, we were among the first to build our networks over a DWDM infrastructure. We are fully interconnected with AT&T's, Verizon's, and BellSouth's Intra-LATA PLS networks, as well as many CLECs and foreign Postal Telephone and Telegraphs for local access. Internationally, Qwest's suppliers provide similar functionality to Qwest to provide channelized and unchannelized E-1 and E-3 PLS.

The Qwest Team's SONET services include, OC3, OC12, and OC-48. Qwest will offer higher speeds as demand develops. Qwest Team's SDH services include E-1, E-3, and STM-1 through STM-64, available globally.

4.2.5.3.2 Satisfaction of PLS Feature Requirements (L34.1.4.3(a), C.2.5.1.2)

Figure 4.2.5-5 provides a brief description of Qwest's technical approach to fully meet the Government's feature requirements for PLS. Qwest fully complies with all mandatory stipulated and narrative feature requirements for PLS. The text in Figure 4.2.5-5 is intended to provide the technical description required per L.34.1.4.3(a) and does not limit or caveat Qwest's compliance in any way.

Figure 4.2.5-5. Qwest's Approach to Satisfaction of PLS Features Requirements

ID#	Feature	Qwest's Technical Approach
1	Multi-point Connection [Optional]	1. Branch-Off: Qwest's proposed PLS will provide a transparent service for Agencies. The Agency's equipment will be connected at the end points with no changes to the data stream. As such, this equipment will be able to autonomously send and receive data. The service will be supported via Qwest's existing ADMs and/or DACS infrastructure. Qwest will support Agency equipment functionality such as master/slave mode of operation. 2. Drop-and-Insert: Drop and insert functionality is provided by a Qwest ADM at the Qwest POP or at an Agency location.

ID#	Feature	Qwest's Technical Approach
2	Special Routing	Qwest's engineering and circuit provisioning procedures provide this function. 1. Transport Diversity: Qwest's proposed PLS includes circuit diversity, routing, and ring diversity. 2. Transport Avoidance: Qwest will provide a standardized diversity offering that includes avoidance of a geographic location along the circuit path. Qwest electronically marks diverse circuits during the provisioning process. Qwest maintains system controls to ensure that routine grooming and network enhancement activities do not disrupt any diversity relationships or avoidance paths. At least 30 calendar days in advance of implementation, Qwest will provide a written notification to the Agency (with a copy to the PMO) requesting approval of any proposed reconfiguration of routes that were previously configured for transport diversity or avoidance. Qwest will also provide the required route documentation (diagrams and maps) to display the proposed diversity and/or avoidance within 30 days. As the local access carriers frequently upgrade their networks, Qwest will work with these carriers to ensure that diversity and avoidance of routes are maintained.
3	Analog Line Conditioning [Optional]	Qwest's proposed PLS includes voice grade C and D analog line conditioning in accordance with Telcordia Pubs TR-NWT-000335 and 000965.
4	Low Bit Rate Voice [Optional]	Qwest's proposed PLS supports low bit rate voice services at 4.8 Kbps, 8 Kbps, and 32 Kbps. Qwest will deploy required equipment to support these services. Qwest service fully complies with the applicable requirements of ANSI and ITU-TSS standards including G.721.
5	7.5 KHz Audio [Optional]	Qwest's PLS supports 7.5 kHz audio. Qwest will deploy the required equipment to compress the signal over a DS0. Qwest will ensure that the audio quality will not be less than what is available using Adaptive Differential Pulse Code Modulation (ADPCM). Qwest's service fully complies with the applicable requirements of ITU standards including G.726.

4.2.5.3.3 Satisfaction of PLS Interface Requirements (L34.1.4.3(a), C.2.5.1.3)

Figure 4.2.5-6 lists equipment that Qwest deploys as SEDs to fully meet the PLS interface requirements. Qwest fully complies with all mandatory stipulated and narrative interface requirements for PLS. The text in Figure 4.2.5-6 is intended to provide the technical description required per L.34.1.4.3(a) and does not limit or caveat Qwest's compliance in any way.

Figure 4.2.5-6. Qwest-Provided PLS Interfaces at SDP

UNI Type	Interface Type and Standard	Payload Data Rate or Bandwidth	SED Make and Model (or equivalent)
1	ITU-TSS V.35	Up to 1.92 Megabits Per Second (Mbps)	Adtran TSU ACE, Model 1202295L1
2	EIA RS-449	Up to 1.92 Mbps	Kentrox DataSMART E1 Max, GDC Innox 553
3	EIA RS-232	Up to 19.2 Kbps	Adran Data Service Unit (DSU) III AR, Model 1202011L1
4	EIA RS-530	Up to 1.92 Mbps	Kentrox DataSMART E1 MAX, GDC Innox 553
5	T1 (with ESF) [Std: Telcordia SR-TSV-002275; ANSI T1.403}	Up to 1.536 Mbps	Adtran TSU ACE, Model 1202295L1

UNI Type	Interface Type and Standard	Payload Data Rate or Bandwidth	SED Make and Model (or equivalent)
6	T3 [Std: Telcordia GR-499 CORE]	Up to 43.008 Mbps	Adtran T3SU 300
7 [Optional]	E1 [Std: ITU-TSS G.702]	Up to 1.92 Mbps	Adtran ESU LT Cisco 1760 w/ VWIC-1MFT-E1 card)
8 [Optional]	E3 [Std: ITU-TSS G.702]	Up to 30.72 Mbps	Cisco 7204 VXR w/ PA-E3 card
9 [Optional]	Optical: SONET OC-1 (Std: ANSI T1.105 and 106)	49.536 Mbps	Optional. Not Proposed.
10 [Optional]	Electrical: SONET STS-1/EC-1 (Std: ANSI T1.105 and 106)	49.536 Mbps	Optional. Not Proposed.
11 [Optional]	SONET OC-3 (Std: ANSI T1.105 and 106)	148.608 Mbps	ADC FL1000 Fiber Termination Panel
12 [Optional]	SONET OC-3c (Std: ANSI T1.105 and 106)	148.608 Mbps	ADC FL1000 Fiber Termination Panel
13 [Optional]	SONET OC-12 (Std: ANSI T1.105 and 106)	594.432 Mbps	ADC FL1000 Fiber Termination Panel
14 [Optional]	SONET OC-12c (Std: ANSI T1.105 and 106)	594.432 Mbps	ADC FL1000 Fiber Termination Panel
15 [Optional]	SONET OC-48 (Std: ANSI T1.105 and 106)	2.377728 Gbps	ADC FL1000 Fiber Termination Panel
16 [Optional]	SONET OC-48c (Std: ANSI T1.105 and 106)	2.377728 Gbps	ADC FL1000 Fiber Termination Panel
17 [Optional]	SONET OC-192 (Std: ANSI T1.105 and 106)	9.510912 Gbps	ADC FL1000 Fiber Termination Panel
18 [Optional]	SONET OC-192c (Std: ANSI T1.105 and 106)	9.510912 Gbps	ADC FL1000 Fiber Termination Panel
19 [Optional]	RJ-x (e.g. RJ-11/45)	4/7.5 KHz Bandwidth	[Optional] Not Proposed.

4.2.5.4 PLS Quality of Service (L.34.1.4.6 (d))

Qwest understands and meets or exceeds all of the Government's performance metrics, as shown in ***Figure 4.2.5-7***. Qwest's PLS solution for Critical Service Level requirements employs two access circuits from the SDP to Qwest's POP(s) to meet Critical Service Level requirements. Qwest's definition of performance indicators is comparable to the Government's requirement for PLS.

Figure 4.2.5-7. Qwest Compliance with Performance Metrics. *Qwest fully meets or exceeds Government-specified performance metrics for PLS.*

Key Performance Indicator	Service Level	Performance Standard (Threshold)	Acceptable Quality Level (AQL)	Qwest Performance Metric
Availability (POP to POP) [Optional]	Routine	99.8%	≥ 99.8%	≥ 99.9%
	Critical [Optional]	99.98%	≥ 99.98%	≥ 99.99%
Availability (SDP to SDP)	Routine	99.4%	≥ 99.4%	≥ 99.9%
	Critical [Optional]	99.98%	≥ 99.98%	≥ 99.99%
Time to Restore	With Dispatch	8 hours	≤ 8 hours	≤ 8 hours
	Without Dispatch	4 hours	≤ 4 hours	≤ 4 hours

Qwest's availability metrics are measured using the same standard formula and definitions of service availability as those described in RFP Section C.2.5.1.4.1, including the revised definition and the calculation methodology for Availability provided by the Government in Section C.2.5.1.4.1. The Qwest network is designed to meet a performance metric of 99.999 percent availability and is currently delivering 99.9996 percent availability POP-to-POP network-wide. Qwest's PLS is delivered through the SONET network and therefore takes advantage of the built-in resiliency of that network. Qwest deploys advanced Forward Error Correction techniques that deliver a virtually error-free transmission with a Bit Error Rate of 10^{-13}.

4.2.5.5 Qwest's PLS Exceeds Service Requirements (L.34.1.4.6 (e))

Qwest proposes to exceed the PLS technical capabilities by offering the following optional capabilities:

- E1 (For Non-U.S. Use)
  - Channelized E1
  - Unchannelized E1
- E3 (For Non-U.S. Use)
  - Channelized E3

  - Unchannelized E3
- SONET OC-3
  - Channelized OC-3
  - Concatenated OC-3c
- SONET OC-12
  - Channelized OC-12
  - Concatenated OC-12c
- SONET OC-48
  - Channelized OC-48
  - Concatenated OC-48c
- SONET OC-192
  - Channelized OC-192
  - Concatenated OC-192c
- Subrate DS0
- Analog

Qwest proposes to exceed the PLS features by offering the following optional features:

- Multi-point Connection
  - Branch-Off
  - Drop-and-Insert
- Analog Line Conditioning
- Low Bit Rate Voice
- 7.5 Khz Audio

Qwest proposes to exceed the PLS interface requirements by offering the following optional PLS interfaces:

- UNI Type 7 – E1
- UNI Type 8 – E3

- UNI Type 11 – SONET OC-3
- UNI Type 12 – SONET OC-3c
- UNI Type 13 – SONET OC-12
- UNI Type 14 – SONET OC-12c
- UNI Type 15 – SONET OC-48
- UNI Type 16 – SONET OC-48c
- UNI Type 17 – SONET OC-192
- UNI Type 18 – SONET OC-192c

Qwest exceeds the performance metrics for the PLS solution for both Routine and Critical Performance Service Levels. Our robust architecture supports performance metrics higher than required by the Government. In addition, Qwest consistently exceeds requirements for circuit provisioning intervals, enabling Agencies to minimize scheduling risks.

Qwest continuously evaluates new technologies in our laboratories to support new and emerging services and applications. This approach keeps Qwest current with the Agency demands and service requirements. Qwest will work with the Government to identify any emerging service requirements and features. We will submit proposals to add these new solutions to meet Agency requirements.

4.2.5.6 Experience with PLS Delivery (L.34.1.4.6 (f))

Qwest has extensive experience delivering PLS as required by the RFP. As summarized in ***Figure 4.2.5-8***, Qwest already serves many Government Agencies at the federal, state, and local levels, and also serves thousands of large enterprise customers, including 95 percent of Fortune 500 companies.

Figure 4.2.5-8. Qwest Experience with Private Line Service Delivery

Number of Customers	More than 4,000
Number of years in service	9 as Qwest (with more than 40 through Bell System)
Other Federal Government customers	FAA, Department of Defense (DoD), Department of Energy (DOE),, NASA
Large commercial customers served	JPMorgan Chase, US Bank, KeyBank, Microsoft, and more than 95% of the Fortune 500 customers use Qwest

Qwest's long legacy of service to Agencies extends beyond the Qwest experience of the past nine years when we were formerly known as US West. We also have experience doing business as Pacific Northwest Bell, Mountain Bell, and Northwestern Bell. The Federal Aviation Administration (FAA), the Department of Defense (DoD), and the Department of Energy (DOE) have utilized Qwest's network for many years.

Qwest is unique in that we are both a local exchange carrier (LEC) and an IXC. This perspective provides unique insight into the purchasing of local access and delivery of service to customers in both market segments. Agencies will benefit from Qwest's experience by obtaining the most value for every dollar spent on combined local and long haul services.

4.2.5.7 Characteristics and Performance of Access Arrangements (L.34.1.4.6 (g))

Qwest has numerous access methods to reach our PLS backbone, including ILECs, CLECs, Qwest Local, and Special Access. We have procedures in place to provide real-time monitoring and performance statistics of these methods. We have strict guidelines on how we connect to LECs—dual entrance facilities, OC-48 capacity, and operations agreements.

Qwest realizes that a key differentiator is the ability to ensure robust access not only to the traditional ILECs, but also to the emerging diversity of CLECs. This combination enables Qwest to leverage itself (as an ILEC in 14

states in the western U.S.), the other ILECs, and the CLECs to provide robust access solutions that meet our customers' needs.

To ensure the service quality and reliability of these access services, Qwest applies the same discipline and approach that is used to maintain our own facilities-based portions of the service. In high-traffic locations, Qwest typically considers extending SONET facilities into the site to provide the highest functionality for the lowest cost. For locations with high concentrations of Agencies, Qwest analyzes the cost-benefits of building local SONET facilities. If a local build-out is not cost-effective, Qwest obtains cost-effective high-capacity access systems from local ILECs or CLECs, orders the service into the Qwest POP, and assigns Agency circuits to the facility. Agencies benefit from lower prices for SONET and PLS and can look forward to lower costs over time for many access services.

As a result to our customer-focused approach to delivering communications services, Qwest's standard access engineering has provided over 99.99 percent end-to-end service availability for our Government customers. Qwest has the staff and procedures to engineer extremely high-availability access arrangements. For these, Qwest has averaged more than 99.999 percent over the past three years. ***Figure 4.2.5-9*** shows how Qwest has maintained access delivery excellence for our Government customers over a long interval. Our operational procedures have also enabled a time to repair of less than four hours measured over the past four years.

Agencies should expect the best possible provisioning intervals to get their services up and running. Qwest has a long and excellent track record in on-time delivery service with reliable service delivery intervals. As shown in ***Figure 4.2.5-10***, Qwest has maintained a best-in-class service delivery interval for our Government customers. Figure 4.2.5-9 represents actual service turn-up from the customer's perspective—including all aspects of

access, provisioning, demarcation extension, and equipment installation for a major Government department nationwide network.

This performance has direct benefits to Agencies. It means that Qwest has the ability to define aggressive timelines for service transitions. For example, Qwest transitioned the entire Department of Housing and Urban Developments' network, more than 100 sites, in less than seven weeks. Qwest is the right choice for Agencies who want to take advantage of a leading-edge provider with a converged next-generation network now. Qwest will make the transition smooth and minimize costs by reducing the time that two networks—the old and the new—need to be operating simultaneously.

Qwest's access agreements, provisioning procedures, and program management have maintained best-in-class access and service turn-up for our Government customers.

Figure 4.2.5-9. Highly Reliable Service Delivered to the Government Customer. *Qwest's high-quality backbone, access agreements, processes, procedures, and operational discipline means highly reliable end-to-end services are delivered to our customers.*

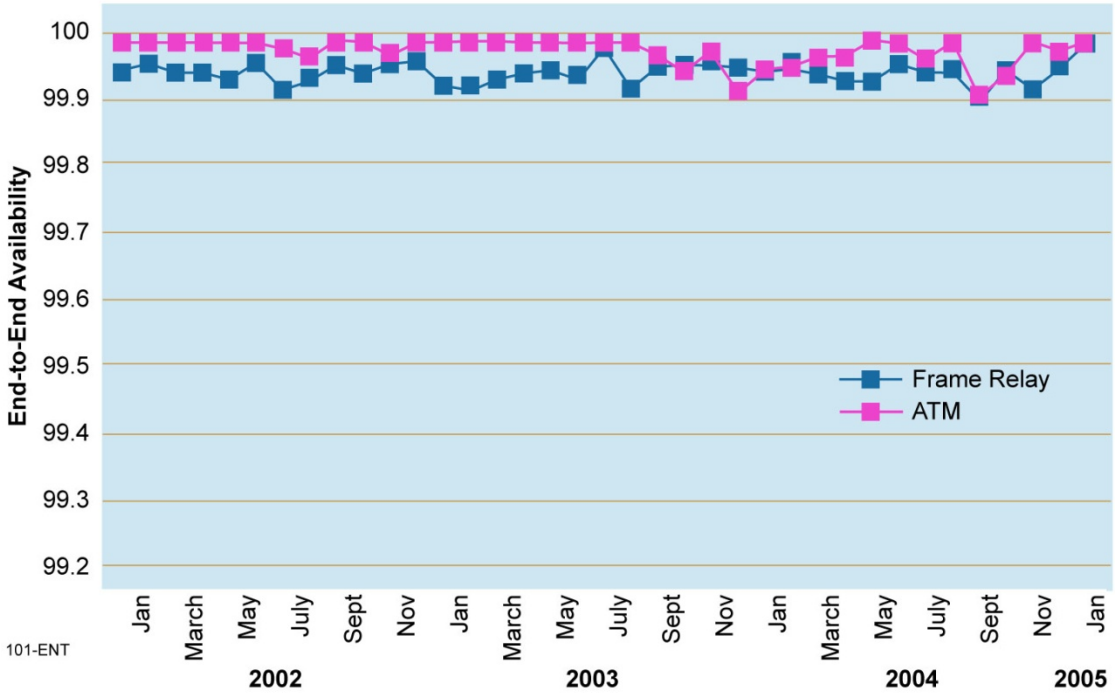
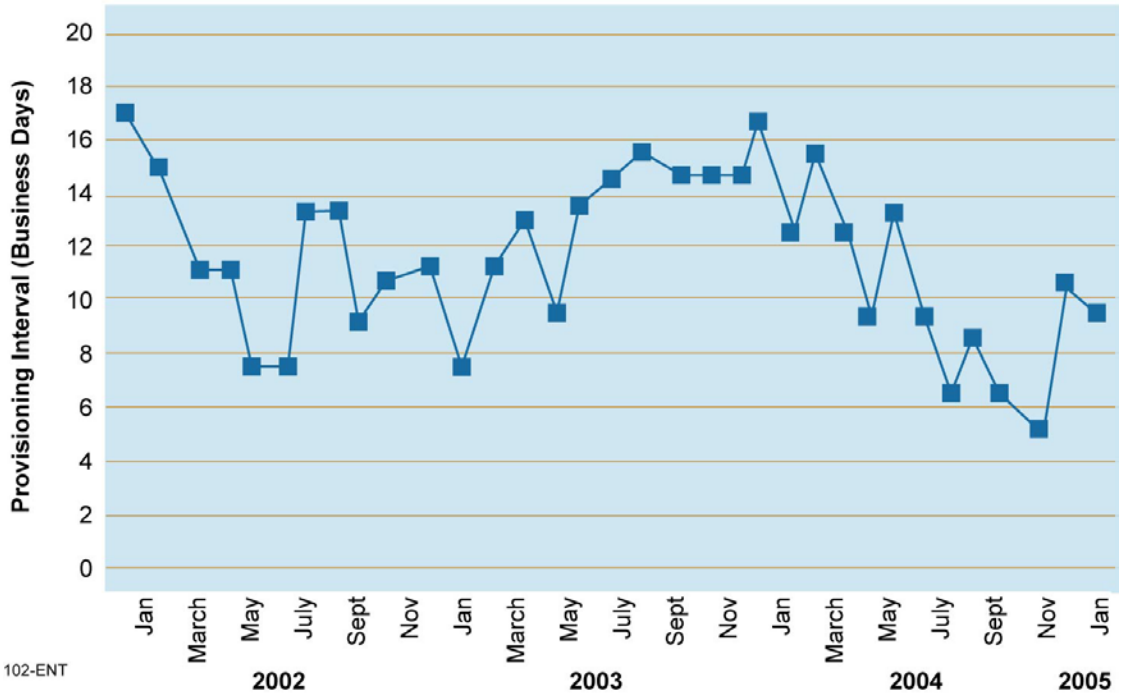


Figure 4.2.5-10. Qwest's Access Excellence Means Rapid Service Delivery for Agencies. *Qwest's access agreements, provisioning procedures, and program management has maintained best-in-class access and service turn-up for our Government customers.*



To provide access services, Qwest has a broad variety of agreements with local carriers to ensure flexibility, quality, and reliability. Qwest has strict quality standards for how we connect with other carriers to maintain this high level of performance.

Dedicated Access Facilities

Qwest uses our own and leased access facilities to connect Agency locations to Qwest network services. Qwest uses a variety of technologies—everything from dark fiber to emerging standards such as Worldwide Interoperability for Microwave Access (WiMAX). In each case, Qwest network engineering and planning ensures that the access from our backbone to the

Agency's location meets our standards and provides highest quality and reliable services.

Dedicated Access has the following characteristics:

- Protected and unprotected DS0, FT1, T-1, DS3, OC-3, OC-12, OC-48, OC-192, Gigabit Ethernet, and 10G Ethernet LAN PHY
- Qwest covers every LATA in every state with dedicated access
- Qwest requires all ILECs and CLECs to have diverse entrance facilities into our backbone POPs
- All off-net backhaul providers are also required to provide protected SONET services and meet Qwest POPs with route-diverse entrance facilities
- Qwest access providers and backhaul providers must agree to Qwest's stringent operations requirements for installation, technical performance and trouble management
- Qwest requires that all access arrangements run error-free for up to 72 hours before acceptance
- Bit error rate acceptable standards are
  - DS3 – 10^{-11}
  - OC-3/OC-12 – 10^{-13}
  - OC-48 – 10^{-13}

All Qwest backbone services monitor the availability and condition of our access providers. Qwest transport services, such as Internet Protocol Service (IPS), Asynchronous Transfer Mode Service (ATMS), Frame Relay Service (FRS), Network Based Internet Protocol Virtual Private Network Services (NBIP-VPNS) and others, create proactive and automatically generated trouble tickets when access link errors are detected. These trouble tickets are worked by our NOCs. Chronic access problems are easily

identified, and we work with our access providers to redesign or re-engineer these circuits to restore acceptable service levels.

4.2.5.8 Approach for Monitoring and Measuring PLS KPIs and AQLs (L.34.1.4.6 (h))

For PLS, the Network Elements (NEs) capture and maintain performance data on equipment and circuits. Qwest uses Spirent's performance management tool to collect performance data from the NEs on a pre-established time cycle (e.g., once a day, every 15 minutes, etc.) and store the data in a server for monitoring and reporting. Qwest uses this data in several ways:

- We compare performance results to the performance thresholds that we set to trigger alarms.
- Results can create auto-generated trouble tickets in our trouble ticketing system based on defined alarm thresholds.
- Results are calculated and displayed on the network scorecard. Required Key Performance Indicators (KPIs) and Acceptable Quality Level (AQL) measurement can be viewed in the Qwest Control Networx Portal.

Qwest monitors on a 24x7x365 basis all NEs of the PLS and SEDs. This monitoring includes, but is not limited to:

- General NE requirements validation: System turn-up, Element Management System / Network Management System Craft interfaces, security, software management, electrical and mechanical compliance, alarming, safety, systems connectivity, fault management, performance management
- PLS requirements validation: performance monitoring, card replacement, loop-backs, synchronization management, protection

and restoration, alarm reporting, cross-connect functionality (if applicable), multiplexing functionality (including VT1.5, if applicable), and optical interfaces

- Validate Network Equipment Building Systems (NEBS): GR-63-CORE (transportation and storage stress, operating temperature and humidity, heat dissipation, equipment shock, vibration, and acoustic noise) and GR-1089-CORE (Electrostatic Discharge (ESD), Electromagnetic Interference (EMI), Electromagnetic Compatibility (EMC), electrical safety, corrosion, bonding and grounding)

Qwest maintains a central data repository for key network performance information. These performance indicators are generated by a combination of system-specific statistics. Logs and traps are generated by our network management system and sent to the Network Monitoring Team for instant responses. Data is analyzed, formatted, and sent to operations, engineering, and planning for pro-active network enhancement and capacity planning.

For all services we use the NTM Remedy® trouble ticketing system. NTM Remedy is a trouble ticketing system that is an industry-leading commercial-off-the-shelf application that we have customized to make more effective for our needs. From this system, we collect many useful metrics that we use internally to evaluate and improve our processes including Time to Restore (TTR). The calculation for TTR uses the same business rules that the Government requires for its services.

Qwest's network performance monitoring and measurement procedures substantiate our delivery of industry-leading network availability, reliability, and the following additional benefits:

- End-to-end service visibility across technology/layers

- Impact analysis showing correlation between facility/equipment faults and Agency circuits
- Integration with trouble ticketing system and repair processes
- Customer-focused Quality of Service (QoS)/AQL management and Web access
- Customization to fit current and future operational needs
- Qwest uses Threshold Crossing Alarms that alert technicians when Qwest-defined performance thresholds are crossed. The technicians respond by eliminating potential sources of trouble in network elements. Qwest proactively identifies potential performance problems and therefore achieves higher availability and faster resolution of network problems.

4.2.5.9 PLS Support of Time-Sensitive Traffic (L.34.1.4.6 (i))

Qwest's PLS is a dedicated service that provides fixed bandwidth and a standardized availability of 99.9% or better. The service platforms introduce minimal latency and jitter (well within the KPIs required by Networx). As a consequence, it is ideal for supporting time-sensitive traffic as degradations to voice and video quality are minimal. Various SEDs provide different mechanisms for addressing load conditions.

4.2.5.10 PLS Support for Integrated Access (L.34.1.4.6 (j))

Qwest's PLS provides a single high-bandwidth interface to the customer. Integrated access for PLS may be implemented through different SEDs or by bundling with another service. Inherent SED capabilities can be leveraged in combination with PLS service features. For example, multi-point connections provide flexibility to route different containers to different service platforms within Qwest or at multiple customer locations.

For PLS access Qwest provides multiplexing on T-1, DS-3, and OC-n dedicated access circuits. As an example, the homogeneous nature of our SONET network allows Qwest to:

- Take groups of Nx64 Kbps time slots on a T-1 and transmit them to different Qwest services such as voice, public port IP/Multi-Protocol Label Switching (MPLS) for Internet services (for example, IPS and CIPS), private port IP/MPLS for MPLS VPN services (NBIP-VPNS), dedicated circuits (PLS and SONETS), and ATMS or FRS.
- Divide DS-3 access to a customer into multiple T-1s, with each T-1 going to one or more Qwest services. For data, this includes single and NxT-1 access to the ATM/FR network and private and public IP services including VoIP. T-1s can be used for dedicated access to ISDN services for voice as well as for dedicated circuits.
- Divide an OC-3 into multiple DS-3s, each mapped to separate Qwest services, or further multiplexed down to multiple T-1s for connection to network services.

In all cases, Time Division Multiplexing (TDM) provides fixed and guaranteed performance to each service provided over the dedicated access to the customer's location. The Agency can define the size of access to each network service to match the different performance requirements of their applications.

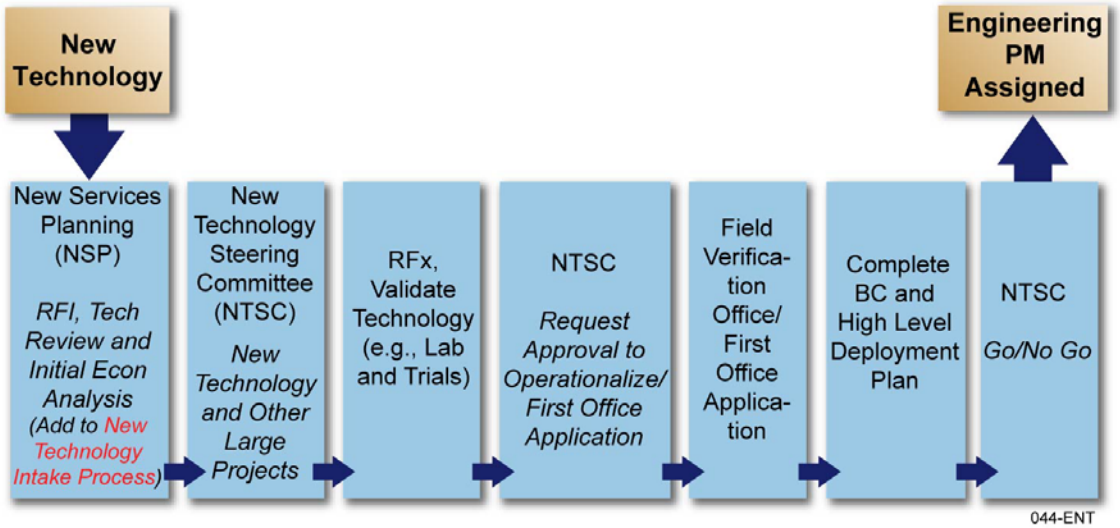
One drawback of TDM access is that allocation is static and in discrete quantities, such as Nx64 Kbps or T-1 (1.5 Mbps), and changes require circuit provisioning. In general, TDM access also requires additional multiplexing equipment on the customer's site to enable the break-out of the different services. Additional units, such as DSU/CSUs, may be necessary to take advantage of Nx64 Kbps allocation in T-1 circuits.

TDM access is provided throughout the world using both Qwest and Qwest supplier facilities. In Asia, Qwest owns and operates POPs that enable access to all Qwest services. For Guam, Puerto Rico, and the U.S. Virgin Islands, Qwest uses our own leased capacity and a series of suppliers that enable us to provide seamless connectivity to Qwest services. Services to Europe are provided through Qwest-owned capacity across the Atlantic and then through our primary selected suppliers. With an active competitive environment in Europe, Qwest's use of several quality providers enables Qwest to provide high-quality TDM access to all of Qwest's services.

4.2.5.11 Infrastructure Enhancements and Emerging Services (L.34.1.4.6 (k))

Qwest has mature processes that enable us to envision, research, evaluate, engineer, deploy, and operate new or emerging services. Driven initially by the Chief Technology Office, headed by the Qwest Chief Technology Officer, Qwest evaluates new products and technologies for incorporation into the Qwest network, in partnership with Qwest Product Management. Qwest can satisfy all mandatory service requirements for PLS without enhancing the network. Some optional services, such as virtual concatenated interface support, may require some modification or enhancement. The processes governing introduction of these and future services are detailed in ***Figure 4.2.5-11***.

Figure 4.2.5-11. Qwest New Technology and Services Process. *Qwest has well-defined processes for the incorporation of new technology into the Qwest network, and for the development of new service offerings.*



Qwest has well-defined processes for the incorporation of new technology into the Qwest network and for the development of new service offerings.

The core element of Qwest's process for incorporating network enhancements is the New Technology Steering Committee (NTSC). Figure 4.2.5-11 also shows the role of the NTSC in the product and technology management process. The NTSC determines the steps necessary to evaluate the viability of the technology by issuing vendor requests for information and performing integration laboratory tests. A rigorous certification process is completed prior to system release from the lab to the field. The goal of this certification is to accurately recreate and test the proposed network configuration prior to field installation. The culmination of the certification is a risk analysis that explicitly addresses risks and mitigations for known issues. This allows Qwest to objectively determine if the system is ready for the field.

Once the NTSC approves the risk analysis, a Field Verification Office (FVO) explores actual in-network issues. If the FVO is successful, Qwest develops a plan for full deployment, which includes a business case covering all aspects of the product (such as equipment, operations and maintenance, Information Technology (IT) cost and revenue projections). Once approved by NTSC's executive committee, various engineering and IT resources are engaged to develop and deploy the fully developed product.

4.2.5.12 Approach for Network Convergence (L.34.1.4.6 (l))

PLS is based upon standardized interfaces, and as such, readily supports implementing converged and integrated services. PLS is evolving rapidly and will support convergence through the continued adoption of Virtual Concatenation (VCAT), Generic Framing Procedure (GFP) and Link Capacity Adjustment Scheme (LCAS). By incorporating these features and using the technology introduction processes outlined in 4.2.5.11, Qwest will provide cost-effective, flexible, and highly available PLS-based transport for Ethernet, storage area network, and other converged services. Since this is done using the Qwest SONET network, converged customer networks using PLS will continue to enjoy high availability.

In the future, many customers may transition to a more data-oriented network paradigm. The Qwest network is already enabling migration toward a packet-centric infrastructure. As the network evolves, our converged packet-centric network will comprise three domains:

- A physical domain, consisting of optical connectivity
- An IP/MPLS domain, consisting of a converged Layer 2 and 3 cloud
- An application/control domain that consists of an intelligent control plane, and Layer 7 features and functionality

Services will be delivered to Agencies from each of these domains. The primary design goals for migration to packet include enabling high-capacity bandwidth and providing increased self-management capability to the end user to support the delivery of any interface to any location. Qwest's network converges data services with different characteristics to provide maximum commonality based on service requirements such as privacy and QoS.

On our converged network, the Private MPLS-only core network provides data transport for all of our IP services. Layered onto the MPLS core are edge-provided services that provide private MPLS VPNs, Internet services, and Public Switched Telephone Network (PSTN) VoIP backbone bandwidth.

Qwest recognizes that converged customer care and support will be a major challenge that impacts processes, systems, and people. Convergence extends and impacts every facet of the traditional telecommunications value chain.

4.2.5.13 IP-PSTN Interoperability (L.34.1.4.6 (m))

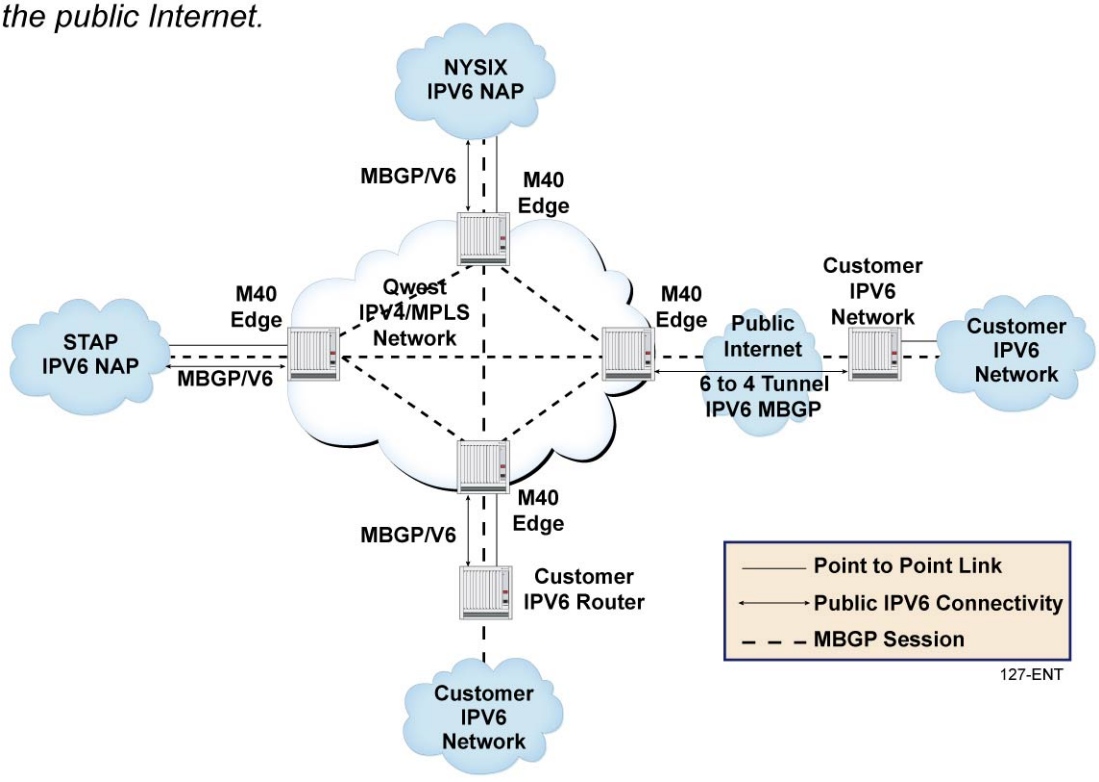
As described above, PLS channels can be used to access other services such as IPS or VOIPTS where IP and PSTN interoperability would be applicable. Section 3.3.5 further describes our IP-to-PSTN inoperability strategy.

4.2.5.14 Approach for IPv4 to IPv6 Migration (L.34.1.4.6 (n))

Qwest is well positioned to migrate our network from IPv4 to IPv6. ***Figure 4.2.5-12*** demonstrates Phase 1. By creating an IPv6 Public Access Architecture, Qwest's private MPLS core can be used to provide labeled switched paths between edge routers running IPv6 protocol stacks. This provides basic IPv6 routing capabilities with routing tables established using Multi-protocol Border Gateway Protocol. Connectivity to the existing IPv6 networks will be established at the 6TAP IPv6 network access point, among others. Agencies with IPv6 networks will be able to peer with the Qwest IPv6 network by tunneling IPv6 over the current IPv4 Internet, as well as running native IPv6 across existing access circuits.

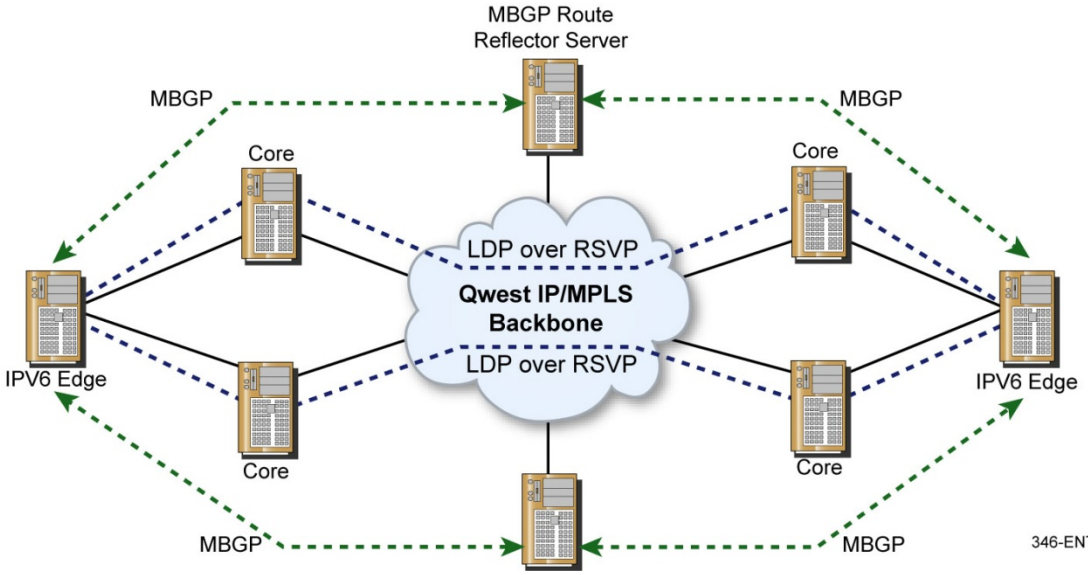
Figure 4.2.5-13 shows how IPv6 signaling is fully incorporated into a native IPv6 core network. Qwest's MPLS core architecture enables us to

Figure 4.2.5-12. Phase 1 – Creating an IPv6 Public Access Architecture.
Qwest's private MPLS core and its edge routers are already capable of providing IPv6 capabilities today, using tunneling to access IPv6 sites over the public Internet.



provide multiple services at the same time, including IPv4 and IPv6 for public and private IP services.

Figure 4.2.5-13. Phase 2 – Public IPv6 Control Plane. *The second phase fully incorporates IPv6 signaling in the core and edge and enables public route distribution and full IPv6 routing.*



4.2.5.15 Satisfaction of NS/EP Requirements (L.34.1.4.6 o)

Qwest uses a structured multi-layered approach to supporting National Security and Emergency Preparedness (NS/EP) that is designed to address each required function. Qwest has organizationally and strategically integrated risk management and security to encompass information technology and physical security. Our priorities are to protect our customers from the physical layer up through the entire OSI stack, including all facets of cyber security.

Our approach ensures that Qwest complies with and provides priority for the Government's telecommunications requirements for NS/EP survivability, interoperability, and operational effectiveness during an emergency threat whether caused by natural hazards, manmade disasters, infrastructure failures, or cyber events. Our approach consists of multiple

levels of NS/EP support including the assignment of a full-time dedicated liaison, established TSP policies and procedures, implementation of the basic NS/EP telecommunications functional requirements, and our robust redundant network architecture in the National Capital Region.

Specifically, in accordance with RFP Section C.5.2.2.1, *NS/EP Basic Functional Requirements Matrix for Networx Services*, Qwest supports the following basic functional requirements for PLS:

- Enhanced Priority Treatment (C.5.2.1(1)) – PLS supporting NS/EP missions are provided preferential treatment over other traffic.
- Secure Networks (C.5.2.1(2)) – PLS supporting NS/EP missions have protection against corruption of, or unauthorized access to, traffic and control including expanded encryption techniques and user authentication as appropriate.
- Non-Traceability (C.5.2.1(3)) – PLS users are able to use NS/EP services without risk of usage being traced (that is, without risk of user or location being identified).
- Restorability (C.5.2.1(4)) – Should a service disruption occur, PLS supporting NS/EP missions are capable of being re-provisioned, repaired, or restored to required service levels on a priority basis.
- International Connectivity (C.5.2.1(5) – PLS will provide access to and egress from international carriers.
- Interoperability (C.5.2.1(6)) – PLS will interconnect and interoperate with other Government or private facilities, systems, and networks that will be identified after contract award.
- Mobility (C.5.2.1(7)) – The PLS infrastructure supports transportable, re-deployable, or fully mobile voice and data

communications (i.e., Personal Communications Service (PCS), cellular, satellite and High Frequency (HF) radio.

- Nationwide Coverage (C.5.2.1.(8)) – PLS is readily available to support the national security leadership and inter- and intra-Agency emergency operations, wherever they are located.
- Survivability/Endurability (C.5.2.1(9)) – Qwest's PLS is designed to support surviving users under a broad range of circumstances, from the widespread damage of a natural or man-made disaster up to and including nuclear war.
- Voice Band Service (C.5.2.1(10)) – According to RFP Section C.5.2.2.1, this requirement is not applicable to ATMS.
- Broadband Service (C.5.2.1(11)) – PLS provides broadband service in support of NS/EP missions (e.g., video, imaging, Web access, multimedia).
- Affordability (C.5.2.1(13)) – PLS leverages network capabilities to minimize cost (for example, use of existing infrastructure, commercial off-the-shelf technologies, and services).
- Reliability/Availability (C.5.2.1(14)) – The PLS performs consistently and precisely according to RFP design requirements and specifications and is usable with high confidence.

Details of how Qwest supports all 14 basic functional requirements listed in RFP Section C.5.2.2.1 are provided in Section 3.5.1, *Approach to Satisfy NS/EP Functional Requirements*, in this Technical Volume.

4.2.5.16 Support for Signaling and Command Links (L.34.1.4.6 p)

This requirement is not applicable to PLS, as circuits do not touch the Signaling System 7 (SS7) network or satellite command links. However, Section 3.5.2 presents our approach to protecting our SS7 network.

Qwest's teammate for the SatAA, SES Americom, maintains total control of all traffic to-and-from the satellite from earth stations. As required by DOD Directive 8581.1 to ensure commercial satellite command and control security of spacecraft carrying United States Government traffic, SES Americom, has employed the required NSA Type-1 CARIBOU KG encryption chip set onboard each geostationary satellite prior to launch, and its remote ground station counterpart at the corresponding Satellite Operations Center (SOC). Caribou key features include built-in authentication, electronic codebook operation modes and interface compatibility resident to the solution. Satellite uplink commands are encrypted and authenticated to assure legitimate control of the satellite and its operation and to protect them from interception and compromise.

4.2.5.17 Service Assurance in the National Capital Region (L.34.1.4.6 (q)

As discussed in Section 3.2, *Approach to Ensure Service Quality and Reliability*, Qwest provides network services in the National Capital Region (NCR) with a robust network architecture designed and engineered to support PLS and ensure service continuity in the event of significant facility failures or catastrophic impact. Qwest will continue to engineer critical services to meet each Agency's requirements to eliminate potential single points of failure or overload conditions that may impact their network service performance.

Qwest has an active, compliant NS/EP plan. Qwest has been providing Telecommunications Service Priority (TSP) services locally for decades and nationally for more than five years with an excellent track record of meeting critical emergency requirements. Qwest also provides functionality that enables Government Emergency Telecommunications Service (GETS) priority calling mechanisms.

Qwest will provide full NS/EP Functional Requirements Implementation Plan (FRIP) documentation upon contract award when requested to proceed

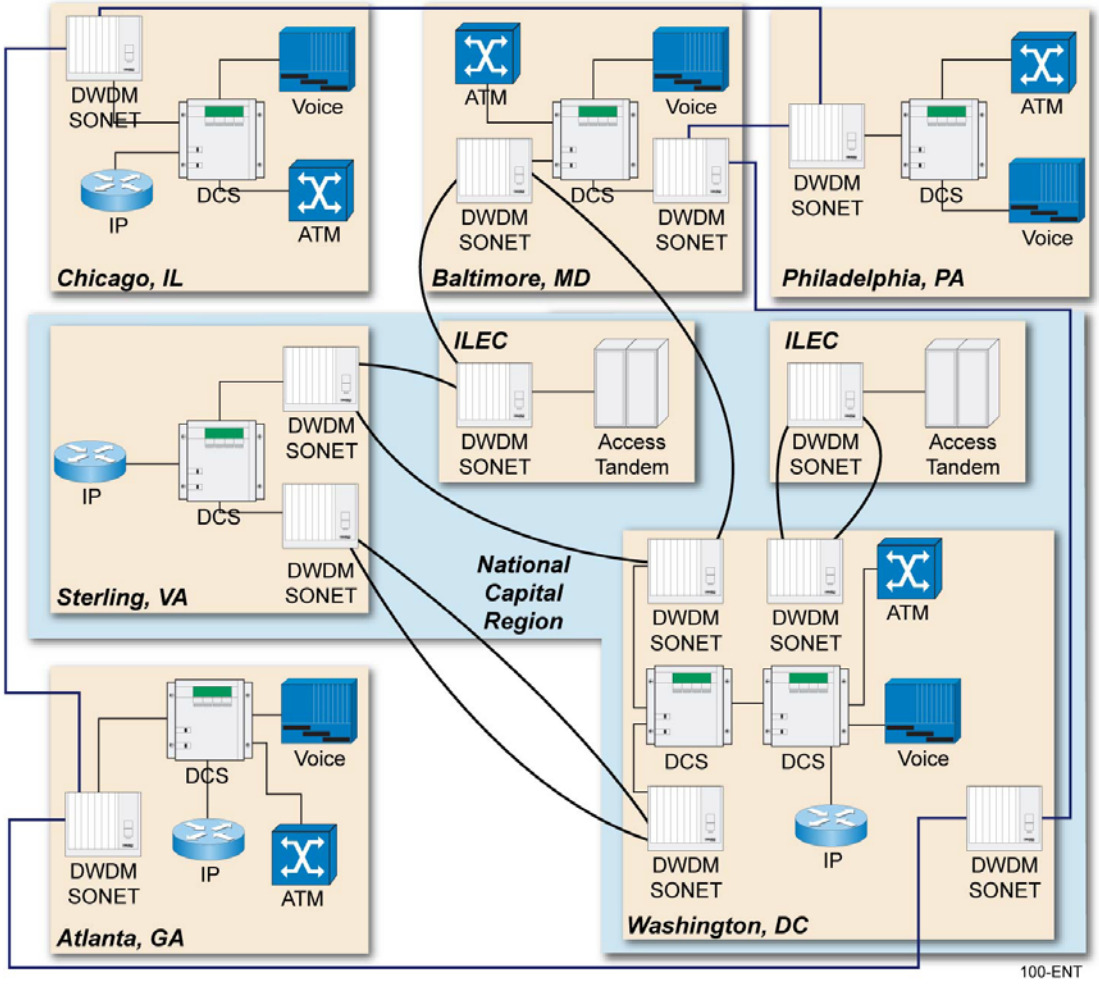
with plan delivery. Qwest will update plans, including Part B, addressing our strategy for supporting Agency NCR requirements in accordance with RFP Section C.7.16.

Qwest understands the Government's requirement to assure performance of network services in and around the NCR. Qwest has POP diversity in the NCR with two major gateways located in Baltimore, MD and Washington, D.C. Each of these gateways provides complete redundancy to access Qwest nationwide and international network capabilities as well as regional voice and data services. Qwest also has a third provisioning POP in Sterling, VA, which serves as an access POP, IP services node, and high-availability collocation and hosting center.

Figure 4.2.5-14 shows the logical configuration of the major transport facilities as well as the services provided at each POP.

Qwest has multiple 4F-BLSR route-diverse SONET rings that connect Baltimore, MD and Washington, D.C. to the rest of the Qwest network. For visual simplicity, Figure 4.2.5-14 depicts only one ring connecting these POPs to Philadelphia, PA; Chicago, IL; and Atlanta, GA. In fact, Qwest has approximately a dozen local and express SONET rings that are accessible in Baltimore, MD and Washington, D.C. These two POPs are geographically located 40 miles apart. Fortifying our SONET approach with diverse ILEC and CLEC entrance facilities to our POPs increases network resiliency and ensures that a catastrophic event, such as the failure of the infrastructure supporting the POP, will not result in a loss of more than 15 percent of total network traffic.

Figure 4.2.5-14. Qwest's Robust Architecture for the National Capital Region. *Qwest's network architecture for the National Capital Region has access to two diverse SONET-protected POPs and three provisioning POPs to enable service diversity and recovery options to meet NS/EP requirements.*



Qwest's completely separate regional network connects our Sterling, VA CyberCenter™ (high-availability hosting facility) to both our Baltimore, MD and Washington, D.C. POPs in a route-diverse SONET-protected ring. This configuration enables these three locations to participate in the routing of access and backbone traffic, providing significant load-balancing and reconfiguration options in the event of a switch, router, or even a complete

POP failure. In effect, this means that Qwest can completely avoid Washington, D.C. and continue to provide services in an emergency. Qwest has recently acquired OnFiber, a metro SONET and Ethernet provider with yet another diverse network in the NCR. This gives Qwest at least three regional fiber optic networks to use to ensure redundancy and survivability in the greater Washington D.C. area.

Qwest operates seven other major SONET rings and an extensive fiber infrastructure in the NCR to connect NCR customers. Qwest procured this infrastructure from an ILEC and numerous CLECs. As presented in Section 3.2.2, *Arrangements with Other Service Providers for Carrying and Exchanging Traffic*, Qwest connects to several major ILEC POP locations through SONET-protected ring networks to ensure multiple access paths to ILEC services including voice termination and fiber access. The use of CLECs, who provide infrastructure that is generally separate from the ILECs, gives another level of resiliency to the architecture because these services would not be affected by an ILEC facility failure.

The route-diverse SONET backbone and access networks that service the NCR enable the transport of services to any Qwest POP nationwide. Figure 4.2.5-14 shows the regional major data (ATM/FR and IP service) POPs outside of the National Capital Region located at Baltimore, MD; Philadelphia, PA; Chicago, IL; and Atlanta, GA. As with voice services, critical Qwest customers can be dual-homed to ensure extremely high availability of their data services—again protected from any single point of failure in the NCR.

In total, Qwest can dual-home critical customer connections with complete route diversity to all of Qwest's data networking services to have complete resiliency from facility failures in the National Capital Region. Qwest will address the strategy, technical systems and administration, management,

and operation requirements for the NCR in part B of our NS/EP Functional Requirements Implementation Plan (a draft appears as Appendix 2 to this Technical Volume).

4.2.5.18 Approach to Satisfying Section 508 Requirements (L.34.1.4.6 (r))

According to RFP Section C.6.4, *Section 508 Provisions Applicable to Technical Requirements*, Section 508 provisions are not applicable to PLS. Qwest has fully described our approach to satisfying Section 508 requirements for applicable, offered services in Section 3.5.4, *Approach for Meeting Section 508 Provisions*, of this Technical Volume.

4.2.5.19 PLS Impact on Network Architecture L.34.1.4.6 (s))

The delivery of optional service PLS has little impact on the network architecture of the underlying SONET network. Since the service is mature and there is no change to the network, it is unlikely that any adverse security, quality, reliability, or performance issues will arise. The Qwest PLS network has been operating at a very high level of performance for more than nine years and has all major routes already incorporated into the network as well as capacity to support PLS transport requirements well into the future. The network will continue to evolve as customer needs change.

Security: Qwest is proposing to use dedicated capacity to provision PLS. There is no concept of hacking on a physical layer service, and any tapping into the line would be intrusive and detected immediately.

Quality: Since Qwest's PLS is provisioned on dedicated full-time physical circuits, there is no need for any classes or QoS levels. Each customer circuit has its own dedicated path between two endpoints.

Reliability: PLS service rides the reliable Qwest Four-Fiber BLSR network, where availability is consistently high (99.999% system-wide). The PLS service benefits from the same network operations center that manages

all Qwest SONET and optical wavelength services, so sparing, alarms, and technicians are all the same and consistently deliver a highly reliable service.

Performance: Qwest's PLS meets or exceeds all relevant performance criteria since Qwest is actually providing a dedicated path or paths from termination to termination on the SONET Four-Fiber BLSR network. Qwest's PLS easily meets the standards set forth in the RFP for PLS.

4.2.5.20 Optimizing the Engineering of PLS (L.34.1.4.6 (t))

Qwest ensures that our state-of-the-art network is engineered for maximum efficiency and utility. Each DS-3 circuit is engineered with the maximum 28 lower-level DS-1 circuits, and OC-3 and OC-12 circuits contain the maximum number of DS-3 circuits; the timeslots in each OC-48 and OC-192 are programmed to obtain maximum utility from available bandwidth.

Qwest optimizes individual PDH and optical circuits to ensure that the most efficient route is chosen—generally the shortest and most direct route with minimal switching. Circuits are switched between different systems only when absolutely necessary. These practices ensure optimal network efficiency, minimize latency on the customer's circuit, and minimize points of failure on the Agency's circuits.

Qwest optimizes its fiber infrastructure to limit signal-degrading factors such as attenuation, dispersion, and reflection. Qwest uses various amplification technologies, power balancing, dispersion compensation, and fiber splicing to optimize use of the available spectrum, permitting Qwest to provision the maximum amount of optical services on each fiber. Our optimization methods increase network efficiency and reduce costs for Agencies.

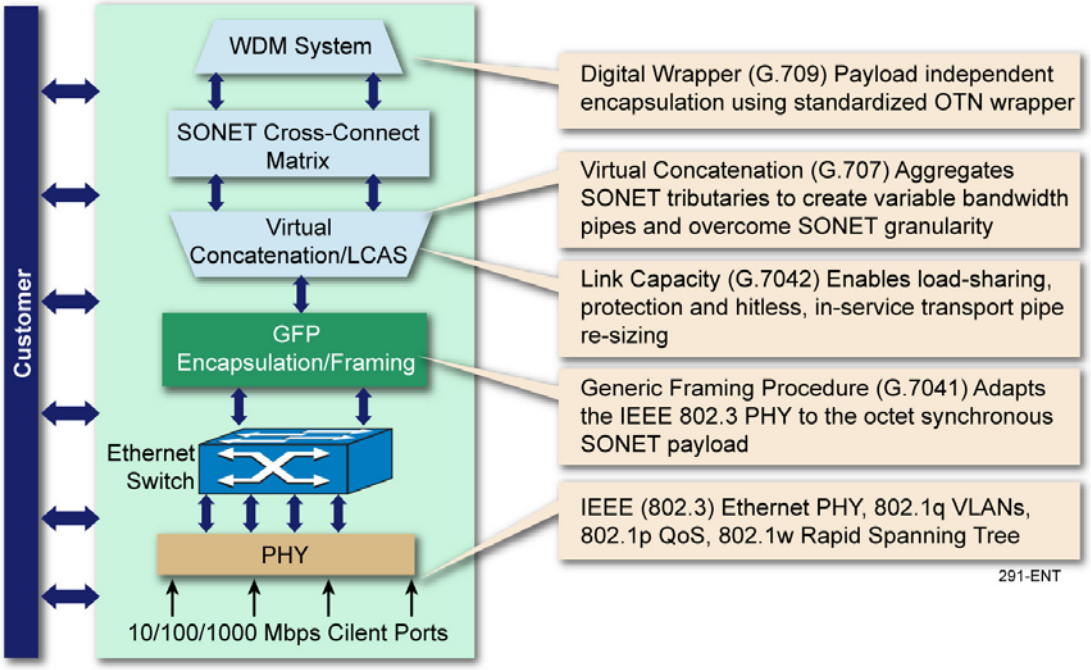
Qwest PLS is optimized through the careful review of the Agency requirements. Engineers analyze system requirements and develop a design to satisfy the requirements using the available infrastructure most effectively.

4.2.5.21 Vision for Service Internetworking (L.34.1.4.6 (u))

Qwest anticipates significant advances in PLS over the next several years. While some applications served by PLS will migrate to IP/MPLS transport, many will continue to require the predictable, high availability performance associated with traditional PLS. As the service platform for PLS, Qwest's next generation SONET network incorporates scalable, multi-Terabit optical-cross connects supporting multiple services. These devices enable port-by-port provisioning of all standardized protection schemes, enabling significant topology flexibility. Also, they support integrated, tunable long-haul transponders, minimizing the cost of connecting the SONET network to wavelength transport. Qwest currently supports all the key features defined in the RFP, including next generation SONETS functionalities such as Generic Framing Procedure (GFP), Virtual Concatenation (VCAT), and Link Capacity Adjustment Scheme (LCAS). These next generation features are used to deliver Ethernet over SONET traffic across our infrastructure. Additionally, these devices will enable switching of Optical Transport Network (OTN) circuits using G.709. These capabilities will be critical to ensuring interoperability and internetworking, as Qwest anticipates all interfaces on IP devices to be either Ethernet or OTN-based. This architecture is illustrated in ***Figure 4.2.5-15***.

All of these capabilities are based upon ITU standards, ensuring network interoperability and supplier flexibility. As Automatically Switched Transport Networking matures, Qwest's IP network and IP customers will be able to interoperate their control planes with the transport network.

Figure 4.2.5-15. Next Gen SONET. *Qwest's next generation SONET architecture ensures interoperability and optical infrastructure support for IP-based services.*



4.2.5.22 Support for Government Traffic (L.34.1.4.6 (v))

Qwest has analyzed the traffic data provided by the Government. The numbers below assume Qwest will support more than 50 percent of all Agency traffic in the model. Qwest estimates that the entire demand for DS0s would represent an increase of 22 percent to our current DS0 base. The aggregate amount of increase only represents five DS3s on Qwest's network. The T-1 demand in the model represents approximately a 30 percent increase compared to Qwest's current base. The T-3 demand in the traffic model represents a 7 percent increase Qwest's base.

Although Qwest understands that the Government requirements for PLS may increase, Qwest's current infrastructure has more than ample capacity to support the likely volumes of traffic. Qwest's currently lit fibers have capacity to support up to 80 wavelengths, of which less than 40 percent

are already activated. Additionally, Qwest has spare fibers that account for more than 60 percent of our installed fiber. For each fiber route, Qwest has multiple spare ducts to allow implementation of new fibers in the future. We also closely monitor the network's utilization and perform trend analysis to develop growth patterns. The trended growth data is a key driver to initiate new builds and timely capacity augments. In addition, Qwest is currently deploying new technology to provide optical waves that will add capacity and reach that will support commercial demand as well as any expected demand from Networx. As a result, Qwest will easily fulfill the Networx Program's requirements for bandwidth to support the Agencies' PLS needs—now and over the coming decade.

4.2.5.23 ICB CLIN and Case Numbers

Table 4.2.5.23-1 Table of ICB CLINs and Case Numbers

CLIN	Case Number	Case Description
130524	4578301	PLS OC-12 MRC for transport from NSC HLAFUT24 to NSC DRPRUTAA
130525	4419401	PLS OC-12c MRC for transport from NSC CMLJNCAP to NSC FTBRNCBM
130525	4861301	PLS OC-12c MRC for transport from NSC FTLWWA10 to NSC BNGRWAAB
130525	5246501	PLS OC-12c MRC for transport from NSC DNVRCO76 to NSC OAFBNEHQ
130525	5246502	PLS OC-12c MRC for transport from NSC DNVRCO76 to NSC CLSPCOMQ
130525	6133503	PLS OC-12c MRC for transport from NSC SNDICA22 to NSC SNDKCAEC
130525	6234603	PLS OC-12c MRC for transport from NSC SNDOCADU to NSC SNDICAHJ
130525	6329503	DISA PLS OC-12c MRC for transport from NSC SLKEUTYL to NSC AURRCOXD
130525	6008601	DISA PLS OC-12c MRC for transport from NSC SNDJCAGW to NSC SNDICA22
130527	4832201	OC-48c PLS between NSC CMLJNCAP (5 POST LN @ (BLDG HP5), CAMP LEJEUNE, NC 28547) and FTBRNCAA (3338 SCOTT ST @ BLDG 1-1434, FORT

CLIN	Case Number	Case Description
		BRAGG, NC 28310)
130527	4822701	OC-48c PLS between NSC JCVLNCJW (224 CAMPBELL PL, JACKSONVILLE, NC 28546) and NRFLVADV (7927 INGERSOL ST @ (BLDG NH95), NORFOLK, VA 23551)
130525	6902202	PLS OC-12c MRC for transport from NSC SNDICAHJ to NSC SNDJCAGW
130525	6906302	DISA PLS OC-12c MRC for transport from NSC ALBYGABN to Eglin On-ramp at POP TLHSFLNG
130525	4578303	DISA PLS OC-12c MRC for transport from NSC HLAFUT24 to NSC DRPRUTAA
130527	8247003	DISA PLS OC-48c MRC for transport from NSC JCVLNCJW to NSC NRFLVADV
130527	7409005	DISA PLS OC-48c MRC for transport from NSC TRACCAJI to NSC CLMDOHNQ
130527	7409006	DISA PLS OC-48c MRC for transport from NSC TRACCAJI to NSC HLAFUT24
130527	7409007	DISA PLS OC-48c MRC for transport from NSC TRACCAJI to NSC WPABOHBI
130527	7409009	DISA PLS OC-48c MRC for transport from NSC TRACCAJI to NSC CLMBOHPU
130527	8247003	DISA PLS OC-48c MRC for transport from NSC JCVLNCJW to NSC NRFLVADV
130525	8367502	PLS OC-12c MRC for transport from NSC ALXPVA96 to NSC FTBLVA04
130526	8465805	DISA PLS OC-48 MRC for transport from NSC BLDRCOHX to NSC AURRCOXD
130528	8465806	DISA PLS OC-192 MRC for transport from NSC BLDRCOHX to NSC AURRCOXD
130525	4267403	DISA PLS OC-12c MRC for transport from NSC DNVRCO76 to NSC AURRCOXD
130525	9210301	PLS OC-12c MRC for transport from NSC KSCYMONP to NSC SCABILDK
130525	9911403	PLS DISA | OC-12c MRC for transport from NSC WRRBGA43 to NSC JCVPFLLZ
130525	9230103	DISA PLS OC-12c MRC for transport from NSC NWNTNHJK to NSC BDFRMAHJ
130525	9561203	DISA PLS OC-12c MRC for transport from NSC NWNTNHJK to NSC FTGMMDAA
130524	78745001	DISA PLS OC-12 MRC for transport from NSC DMAFAZAE to CTL On-ramp at POP PHNXAZUI

CLIN	Case Number	Case Description
130528	78745002	DISA PLS OC-192 MRC for transport from NSC SNDJCAGW to CTL On-ramp at POP SNDICATF
130528	78745003	DISA PLS OC-192 MRC for transport from NSC FTLWWADG to CTL On-ramp at POP TKWLWALL
130526	78745004	DISA PLS OC-48 MRC for transport from NSC AURRCOXD to CTL On-ramp at POP DNVRCO26
130526	78745005	DISA PLS OC-48 MRC for transport from NSC BEALCAAM to CTL On-ramp at POP RCRDCAHL
130526	78745006	DISA PLS OC-48 MRC for transport from NSC FTLWWADG to CTL On-ramp at POP TKWLWALL
130526	78745007	DISA PLS OC-48 MRC for transport from NSC SNDJCAGW to CTL On-ramp at POP LSANCARC
130525	78745008	DISA PLS OC-12c MRC for transport from NSC AURRCOXD to NSC NGLNCOAK
130525	78745009	DISA PLS OC-12c MRC for transport from NSC SNDQCA40 to NSC CRNDCADU
130525	78745010	DISA PLS OC-12c MRC for transport from NSC RDGCCAER to NSC CRNDCADU
130525	78745011	DISA PLS OC-12c MRC for transport from NSC WAFBWYAB to NSC AURRCODP
130527	78745012	DISA PLS OC-48c MRC for transport from NSC CMPDCACF to NSC BEALCAAM
130525	78745013	DISA PLS OC-12c MRC for transport from NSC SCRMCAUX to NSC BEALCAAM
130527	78745014	DISA PLS OC-48c MRC for transport from NSC BMTNWANJ to NSC FTLWWADG
130525	78745015	DISA PLS OC-12c MRC for transport from NSC ALFDWA04 to NSC FTLWWADG
130525	78745017	DISA PLS OC-12c MRC for transport from NSC SNDQCA40 to NSC SNDJCAGW
130527	78745018	DISA PLS OC-48c MRC for transport from NSC CMPDCABV to NSC SNDJCAGW
130527	78745019	DISA PLS OC-48c MRC for transport from NSC BMTNWA21 to NSC AURRCOXD
130525	84656001	DISA PLS OC-12c MRC for transport from NSC LNMTCO19 to NSC NGLNCOAK
130525	84656002	DISA PLS OC-12c MRC for transport from NSC PTHNCAAZ to NSC SNDJCAGW
130525	84656003	DISA PLS OC-12c MRC for transport from NSC PTHNCAAZ to NSC SNLOCA01
130527	84656005	DISA PLS OC-48c MRC for transport from NSC LNMTCO19 to NSC AURRCOXD

CLIN	Case Number	Case Description
130527	84656006	DISA PLS OC-48c MRC for transport from NSC BMTNWAKH to NSC FTLWWADG
130525	89534001	DISA | PLS OC-12c MRC for transport from NSC MRDNMSKT to NSC BILXMSEE)
130525	102944100	DISA PLS MRC for OC12c Transport from NSC HAFBUTAI to NSC FVTPPABI
130525	102944101	DISA PLS MRC for OC12c Transport from NSC HAFBUTAI to NSC RCMEVAED
130525	105945001	DISA PLS MRC for OC12c Transport from NSC AUBNWALP to NSC FTLWWADG
130525	128810001	DISA | PLS OC-12c MRC for transport from NSC BMTNWAHN to NSC FTLWWACZ
130525	128810002	DISA | PLS OC-12c MRC for transport from NSC BMTNWAHN to NSC BMTNWAKW
130524	128810001	DISA | PLS OC-12 MRC for transport from NSC BMTNWAHN to NSC FTLWWACZ
130524	128810002	DISA | PLS OC-12 MRC for transport from NSC BMTNWAHN to NSC BMTNWAKW
130525	128810001	DISA | PLS OC-12c MRC for transport from NSC BMTNWAHN to NSC FTLWWACZ
130525	128810002	DISA | PLS OC-12c MRC for transport from NSC BMTNWAHN to NSC BMTNWAKW
130525	92103001	DISA PLS OC-12c MRC for transport from NSC LVWOKSFL to NSC KSCYMONP
130525	111350001	DISA PLS OC-12c MRC for transport from NSC LEMRCA07 to NSC SNLOCA01
130525	111350002	DISA PLS OC-12c MRC for transport from NSC LEMRCA07 to NSC SNDJCAGW
130525	105940001	DISA PLS OC-12c MRC for transport from NSC CRANINAN to NSC WPABOHBI
130525	105940002	DISA PLS OC-12c MRC for transport from NSC CRANINAN to NSC SCABILDK
130525	102928001	DISA | PLS OC12c MRC for transport from NSC MAVLTNCA to NSC SCABILDK
130525	105944001	DISA | PLS OC12c MRC for transport from NSC ALCOTNAJ to NSC MTGMALBX)
130525	137255001	DISA | PLS OC-12c MRC for transport from NSC ASBNVACY to CTL On-ramp at POP WASIDCRG
130525	109424001	DISA | PLS OC-12c MRC for transport from NSC SNDRCAZT to NSC SNDJCAGW
130524	137255101	DISA | PLS OC-12 MRC for transport from NSC ASBNVACY to CTL On-ramp at POP WASIDCRG

CLIN	Case Number	Case Description
130525	122516001	DISA | PLS OC-12c MRC for transport from NSC HAFBUTBB to NSC NCLDPADP
130525	787451001	DISA | PLS OC-12c MRC for transport from NSC SNDQCA40 to NSC SNDKCAEC
130525	103815001	DISA | PLS OC-12c MRC for transport from NSC SNMGCABE to NSC LEMRCA07
130525	138978001	DISA | PLS OC-12c MRC for transport from NSC KYPTWAAU to CTL On-ramp at POP FTLWWADG
130525	185895001	DISA | PLS OC-12c MRC for transport from NSC SNJYCAHM to NSC SNDJCAGW
130525	158704001	DISA | PLS OC-12c MRC for transport from NSC CRNDCA18 to NSC SNDJCAGW
130525	156961001	DISA | PLS OC-12c MRC for transport from NSC CTNPCTAE to NSC HMFBMABP
130525	846569001	DISA | PLS OC-12c MRC for transport from NSC PTHNCAAZ to NSC SNMGCABE
130524	185895001	DISA | PLS OC-12 MRC for transport from NSC SNJYCAHM to NSC SNDJCAGW
130525	194529001	DISA | PLS OC-12c MRC for transport from NSC LNCLNEUY to NSC SCABILDK
130525	187456999	DISA | PLS OC-12c MRC for transport from NSC CHLKCABO to NSC SNDJCAGW
130525	194472001	DISA | PLS OC-12c MRC for transport from NSC SLKCUTNO to NSC BEALCAAM
130525	194472002	DISA | PLS OC-12c MRC for transport from NSC SLKCUTNO to NSC SNDJCAGW[MHH1]