

PRELIMINARY INFORMATION MEMORANDUM

Pennsylvania Turnpike Commission Broadband Public-Private Partnership



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List of Acronyms and Abbreviations

ATMS:	Advanced Traffic Management System
AVL:	Automatic Vehicle Location System
BMP:	Best Management Practice
CCTV:	Closed-Circuit Television Cameras
DMS:	Dynamic Message Signs
HAR:	Highway Advisory Radio System
ITS:	Intelligent Transportation Systems
LAN:	Local Area Network
LMR:	Land Mobile Radio System
NPDES:	National Pollutant Discharge Elimination System
P3:	Public-Private Partnership
PDA:	Pennsylvania Department of Agriculture
PennDOT:	Pennsylvania Department of Transportation
PIM:	Preliminary Information Memorandum
PPA:	Public-Private Partnership Agreement
PSP:	Pennsylvania State Police
PTC:	Pennsylvania Turnpike Commission
RFP:	Request for Proposals
RFQ:	Request for Qualifications
RWIS:	Road Weather Information System
RTMS:	Remote Traffic Microwave Sensors
SAN:	Storage Area Network
SOQ:	Statement of Qualifications
WAN:	Wide Area Network



1. Introduction

A. Overview and Project Description

The Pennsylvania Turnpike Commission (PTC or Commission) is exploring the possibility of entering into a public-private partnership (P3) in which a private partner (the developer) will design, build, finance and maintain fiber optic infrastructure in PTC's right-of-way for the benefit of PTC and its users, as well as for the benefit of the developer and its customers. The network will provide connectivity for PTC's administrative buildings, maintenance sheds, service plazas, tolling systems, traffic cameras, dynamic message signs, and similar devices and will accommodate future applications throughout the PTC system. The term of the public-private partnership agreement (PPA) as currently contemplated is 30 years. Additionally, the Commission anticipates making funds available to cover a portion of project costs.

Based on input received from an industry forum held in January 2017, the Commission has refined the project scope. The previously required ubiquitous wireless mesh network and upgrades to the land mobile radio system are no longer required as part of this project.

Limited network services will be required of the developer. Following construction of the fiber optic infrastructure, the developer will install PTC-specified routers at a limited number of demarcation sites. PTC will monitor the network and notify the developer of any fiber network failures, for which the developer will be responsible to repair in the acceptable response times to be defined in the PPA. All other Wide Area Network (WAN) and Local Area Network (LAN) services will be the responsibility of PTC.

The developer will be required to have the capacity to finance the project and it is anticipated that it will have the opportunity to commercialize private fiber optic infrastructure to offset project costs. The broadband network will consist of fiber optic cables, conduits, junction boxes, splice enclosures, and related appurtenances all of which will be separately designated for the use of PTC and the developer. The fiber optic network is envisioned to span the majority of the Pennsylvania Turnpike system.

B. Purpose and Uses of the PIM

The purpose of the Preliminary Information Memorandum (PIM) is to provide further details relating to the project in order to facilitate industry feedback and encourage competitive interest. Following the issuance of the PIM, industry input will be sought to inform decision-making regarding the structure and approach of the project.

The information contained herein is of an indicative and preliminary nature, and is subject to change. No representation or warranty is made that the information is correct or complete. The issuance of this PIM does not constitute the commencement of any procurement process. In the event of any future procurement related to the project, interested parties cannot rely on this PIM in preparing their Statements of Qualifications (SOQs) and final proposals.

C. Authority to Proceed

In 2012, the Pennsylvania General Assembly passed Act 88 of 2012, 74 Pa.C.S. §§ 9101 – 9124, which provided certain public entities, including PTC, with a new tool to address the Commonwealth’s transportation challenges: public-private partnerships (P3s). The process for implementing P3s is more fully detailed in the Implementation Manual & Guidelines for Solicited and Unsolicited Projects (available at <http://www.p3forpa.pa.gov/> under the heading labeled “About P3”). On May 31, 2016, PTC received approval from the Pennsylvania Public-Private Transportation Partnerships Board to advance the project as a P3.

D. Project Objectives

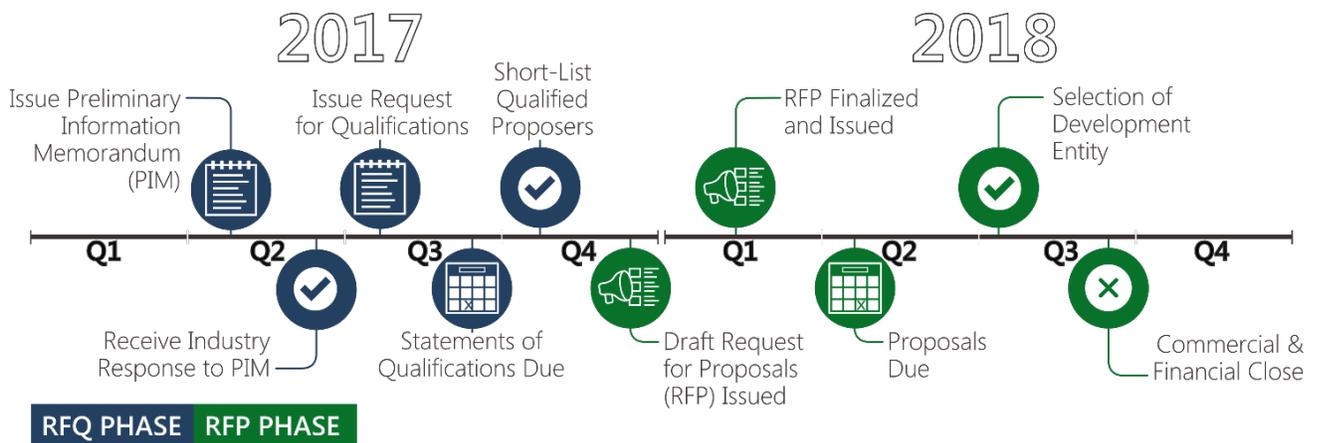
The principal objective of the project is to accommodate PTC’s existing and future data communication needs. The specific goals for the project are as follows:

- I. Deliver long-term savings in communications costs and potentially future revenue;
- II. Reduce or eliminate the cost of tower maintenance and communications infrastructure upgrades on towers;
- III. Provide a reliable and redundant network with sufficient capacity for existing and future needs;
- IV. Advance the project with minimal interference with PTC’s operations and users;
- V. Serve as a catalyst for the expansion of affordable broadband services to rural areas and other underserved populations;
- VI. Promote economic development through the extension of broadband service; and
- VII. Build network capacity for connected vehicle/autonomous vehicle technology to enhance safety and mobility of freight and passenger vehicles.

E. Procurement Schedule

The procurement schedule and key milestones are outlined in Figure 1.

Figure 1 - PTC Procurement Schedule





F. Sources of Further Information

The project website (https://www.paturnpike.com/business/Broadband_P3.aspx) provides information about the project. All questions related to the project and the information in this document should be directed to the project email account at BroadbandP3@paturnpike.com.



2. Project Scope and Overview

A. Current and Future Data Needs

Background

The Pennsylvania Turnpike consists of 552 miles of roadway with an average daily traffic volume in excess of 500,000 vehicles. The following Turnpike system sections outlined in Table 1 are also identified on the map in Figure 2:

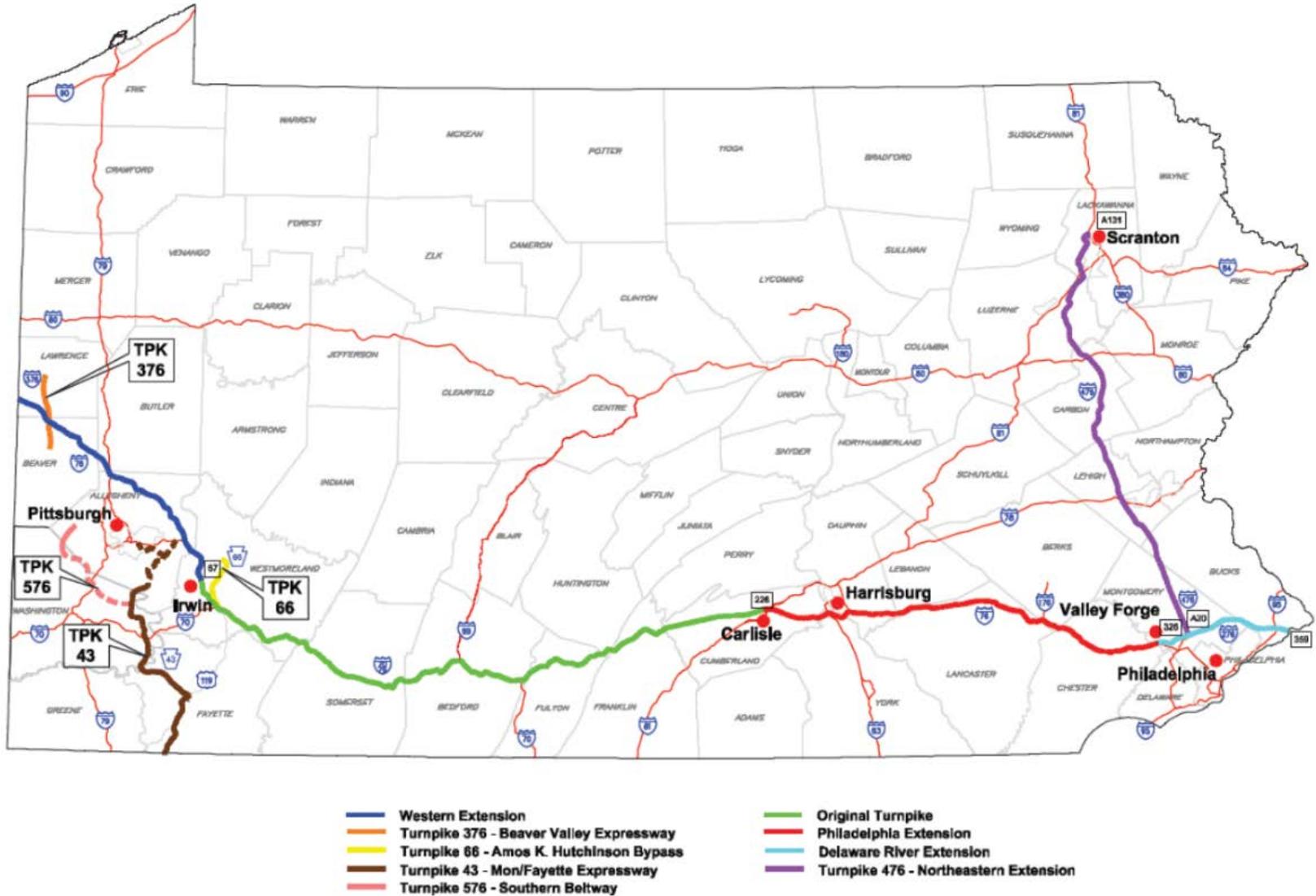
Table 1 - PA Turnpike System

Turnpike Segment	PA Turnpike Route	Miles
Mainline Turnpike	76 & 276	359
Northeast Extension	476	110
Southern Beltway	576	5.6
Mon-Fayette Expressway	43	48.4
Beaver Valley Expressway	376	16
Greensburg Bypass	66	13

Communications infrastructure is vital to the Commission’s daily operations and its ability to meet future needs. PTC’s network consists of microwave towers for backhaul, microwave hub locations (typically at maintenance buildings and offices), and a combination of methods connecting field devices to hub locations including wireless antennas and fiber optic cable. The Commission leases circuits to add network redundancy to its microwave network. Cellular connectivity is also leased for certain roadside devices with low-bandwidth requirements. PTC’s network provides connectivity for the following applications:

- Administrative office support – voice, video, data and security
- Tolling Operations – buildings at interchanges and mainline gantries
- Land Mobile Radio (LMR) system
- Automated gates for access roads
- Traffic Operations – Intelligent Transportation Systems including:
 - Advanced Traffic Management System (ATMS)
 - Automatic Vehicle Location (AVL) system
 - Closed-Circuit Television (CCTV) cameras
 - Dynamic Message Signs (DMS)
 - Highway Advisory Radio (HAR) system
 - Road Weather Information System (RWIS)
 - Remote Traffic Microwave Sensors (RTMS)

Figure 2 - Turnpike Roadway Map



Bandwidth Usage

Bandwidth usage across the entire network has increased approximately 14% annually since 2003. Despite this rapid growth, the Commission has kept pace with recent demand and the network is adequate to accommodate short term needs. However, within approximately five years the current infrastructure will near its capacity and will be unable to keep pace with projected bandwidth needs. Several contributing factors include:

1. Limited capacity available in the current network;
2. Lack of additional microwave spectrum available for use or purchase;
3. High costs of repairing and upgrading existing towers and leasing circuits;
4. Subject to successful pilot projects, implementation of Cashless Tolling with mainline gantries (tolling gantries located between interchanges rather than at interchanges), which would substantially increase data requirements including toll data and video imagery; and
5. Substantial increases in bandwidth requirements that will result from future deployment of ITS devices, including infrastructure required for connected vehicle/autonomous vehicle applications.

Technology and Communications Infrastructure

Given the increasing demand for bandwidth, the Commission's Information Technology (IT) department fully recognizes the significant challenge to provide network capacity for existing and future operations. The IT department is well-positioned to lead the project procurement and oversee the project through completion, given its depth of experience successfully planning, implementing and operating complex networking solutions.

The IT department is responsible for developing, implementing, maintaining and supporting all information management technologies on an enterprise-wide basis. The project would result in the migration of the data communications network from the current microwave system to a fiber optic network. Responsibilities and required technical expertise of Commission IT staff would remain relatively unchanged. Commission IT staff currently provide the following WAN and LAN network services:

- Network design, engineering, and planning
- Network construction and systems integration
- Network operations
- Field operations
- Network operations center
- Security
- Performance engineering
- Network administration
- Network end-to-end management

B. Project Elements

Key features of the project include the following:

- **Fiber Optic Network** – The developer will design the infrastructure, secure permits and approvals, and construct the project.
- **Financing** – The developer will be required to finance the project for the term of the agreement, which is currently anticipated to be 30 years.
- **Maintenance** – The developer will be responsible for preventative maintenance and repairs to the fiber optic cable.
- **Redundant WAN Services** – Provision of a geographically redundant network may be required of the developer. Two options are currently under consideration: (1) inclusion in the project as a service provided by the developer; or (2) a separate procurement by the Commission outside of the project.
- **Commercialization** – The Commission anticipates that the developer will install a private fiber optic network for its own commercial purposes, which would generate revenue for the developer and enhance financial feasibility for both the developer and the Commission.

C. Scope of Project

The Commission envisions the project scope as follows:

Fiber Optic Network

The developer will be responsible for the following:

- Design, permitting and construction services as well as any other related services required to deliver the project.
- Installation of new conduit, fiber optic cable, junction boxes, communications shelters, server racks, and related infrastructure for the Commission's use.
- Installation of fiber optic cable within existing PTC conduits as necessary to fulfill the developer's proposal.
- Installation of the developer's fiber optic cable and related infrastructure. The number of conduits and fiber optic cables to be installed by the developer for commercial purposes will be subject to Commission approval.
- Provision of a minimum number of fiber optic cables and conduits reserved exclusively for PTC's use and physically separated from the developer's fiber optic network.

The developer will install fiber optic cable and provide terminations at specified demarcation sites. At network hub locations the developer will also install a PTC-specified router, which will be turned over to and managed by the Commission after acceptance of installation. Demarcation sites are currently envisioned to include the locations outlined in Table 2.

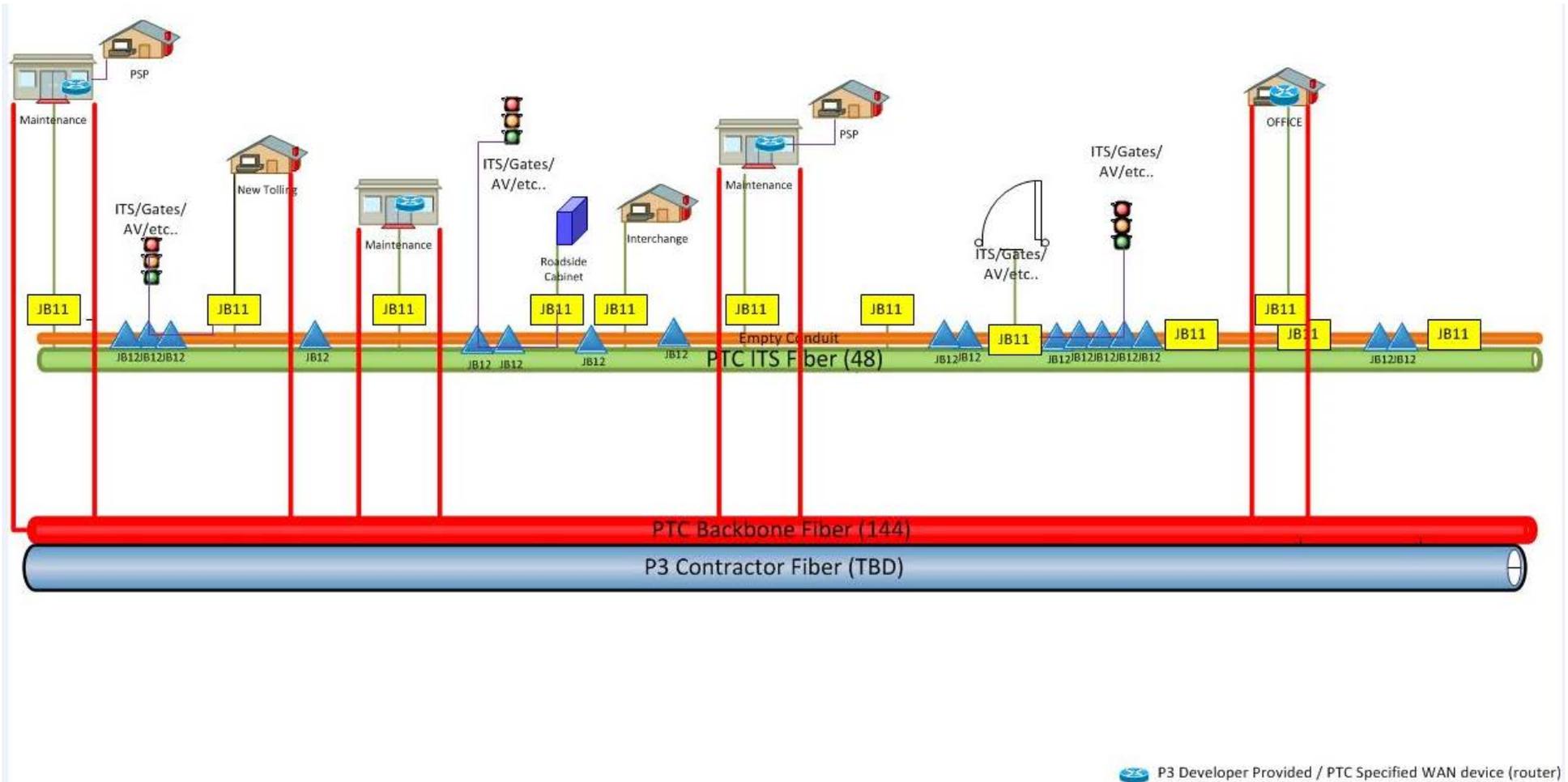
Table 2 – Demarcation Sites

Type of Site	# of Sites
Administrative Offices (network hub)	3
Maintenance Buildings (network hub)	22
Interchanges	75
Tunnels (network hub)	5
Cashless Tolling Points	45
Total	150

Fiber optic connections at the above demarcation sites will address the most significant short-term needs of the project. Such connections will result in the migration of non-LMR data communications from the microwave tower network to the fiber optic network, which will result in substantial savings to the Commission in the form of avoided annual maintenance costs.

A diagram showing the types of connections to PTC buildings and field equipment is provided in Figure 3.

Figure 3 – Diagram of Field Equipment Connections to Fiber Optic Network



To ensure that the fiber optic network remains a resource for future applications, it must be readily accessible at regularly-spaced intervals. For example, the location and type of devices supporting connected vehicle/autonomous vehicle technology may remain unknown until the technology has further developed. To adequately plan for the connection of future devices, the Commission envisions that the project would be constructed in a manner that provides maximum flexibility by requiring the project to be in conformance with PTC's standards for ITS projects. Construction in this manner would provide access to fiber conduits at "JB-12" junction boxes spaced apart approximately every 1,200 feet, and access to fiber splicing points at larger "JB-11" junction boxes, spaced approximately every mile. The developer's fiber optic network could be constructed in a substantially different manner.

In addition to the requirements for the spacing of junction boxes and conduits, the Request for Proposals (RFP) will require a minimum number of Single Mode Fiber Optic (SMFO) strands of cable and conduits for PTC's exclusive use, in a configuration similar to the following:

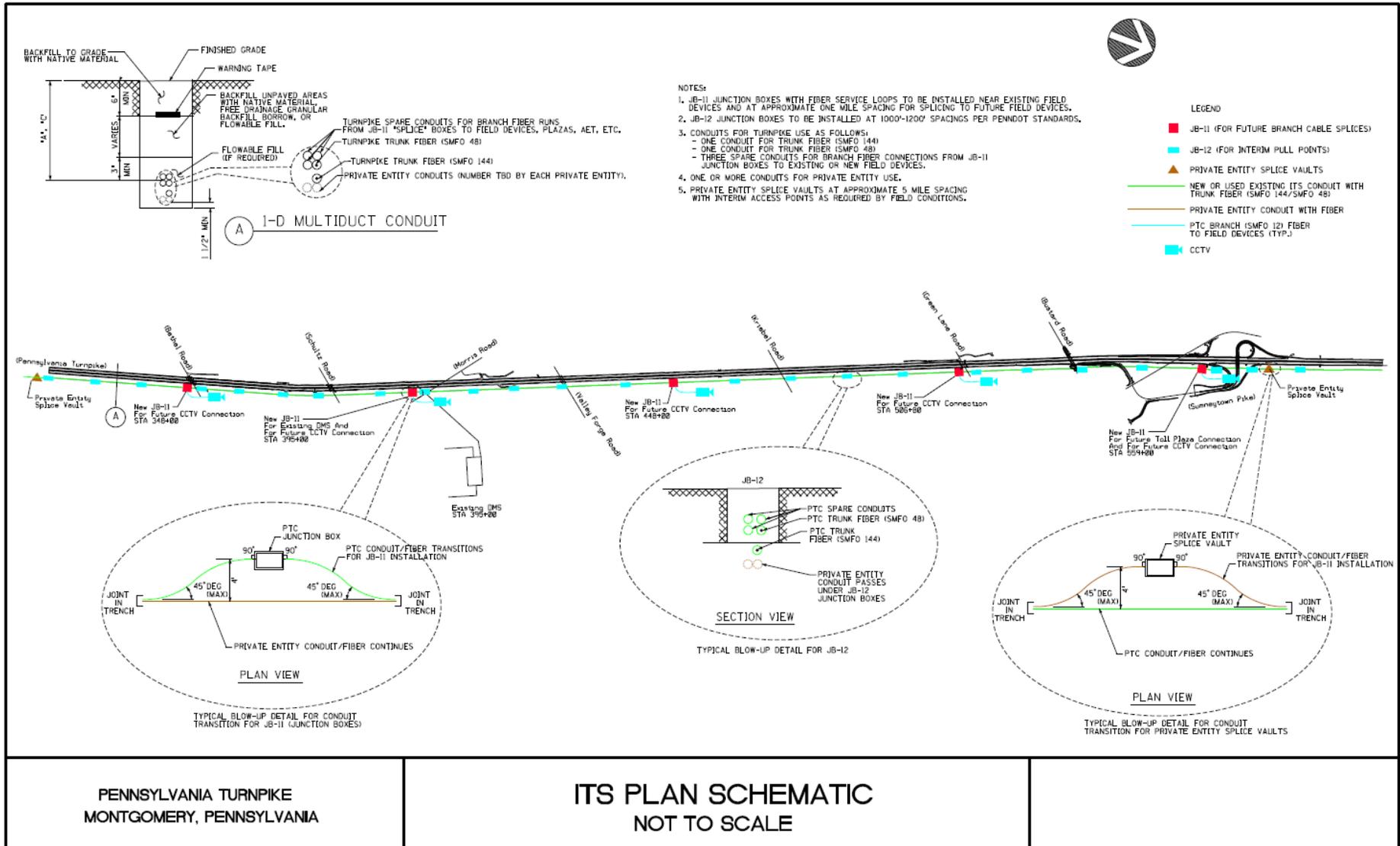
- A main trunk cable, consisting of 144-strand SMFO, which would connect network hub locations listed in Table 2. The network hub sites would serve as communications hubs. This 144-strand fiber optic cable would only be accessible at these sites and would function as the main backhaul for fiber, in a similar manner as the microwave towers function currently.
- A second trunk cable, consisting of 48-strand SMFO, which would pass through JB-12s and JB-11s, and would include a service loop in JB-11s for future splicing. This 48-strand fiber optic cable would be terminated at each of the demarcation sites in Table 2 and may be required for all or portions of the project where the main trunk cable is installed.
- A minimum of four conduits, which would be installed in each JB-12 and JB-11, including the conduit occupied by the 48-strand SMFO trunk cable.
- The developer's conduit(s) and fiber optic cables could pass under, or adjacent to, PTC's conduits and junction boxes.

To illustrate the above requirements, a schematic drawing is provided in Figure 4.

Geographic Scope

The entire Turnpike system is potentially available for inclusion in the scope of the project. The core of the project is comprised of the contiguous sections including the Mainline Turnpike, Northeast Extension, Beaver Valley Expressway, and Greensburg Bypass. The RFP may request pricing for the Commission's consideration for the Mon-Fayette Expressway and Southern Beltway; and if not built, the developer may be granted the right to negotiate the extension of the project into these corridors should they prove desirable at some later point during the term of the PPA. PTC seeks industry feedback regarding the commercial value of these sections of the Turnpike.

Figure 4 – ITS Plan Schematic



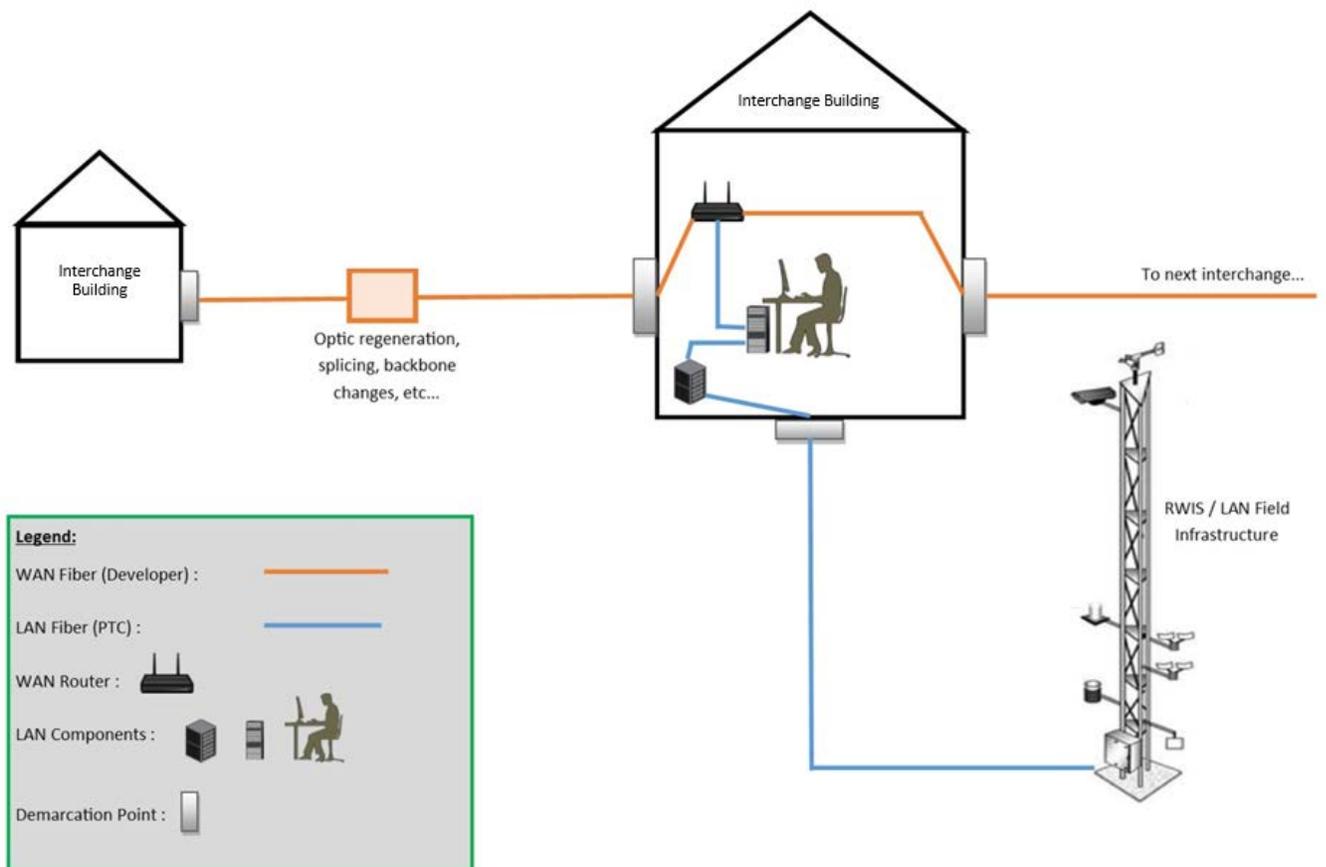
Redundant WAN Services

The fiber optic network will require a geographically redundant network at each endpoint of the fiber optic trunk line. This redundant network would provide immediate connectivity in the event of a failure of the primary fiber optic network. The Commission is considering either including such services as a requirement of the developer as part of the project, or continuing its current practice of leasing such services from a third party as a separate procurement outside of the project.

Maintenance

PTC will monitor the network and notify the developer of any failures in the WAN Field Operations, including the fiber optic cable, optic regeneration equipment, or other integral equipment within the PTC network. The developer will be responsible to repair such infrastructure in the acceptable response times to be defined in the PPA (see also, Section 2.F. Service Level Expectations). All other WAN and LAN services will be the responsibility of PTC. Figure 5 provides an example of the delineation between the developer’s WAN Field Operations (orange line) and PTC’s LAN Operations and LAN Field Operations (blue line).

Figure 5 – WAN and LAN Diagram



D. Construction Means and Methods

The Commission uses a combination of PTC and PennDOT design standards. While more design requirements will be developed and provided in the RFP, project requirements will largely be based on the current standards listed and hyperlinked below:

- https://www.paturndpike.com/business/engineering_standards.aspx
- <https://www.dot.state.pa.us/public/pubsforms/Publications/PUB%20647.pdf>
- http://www.dot.state.pa.us/public/PubsForms/Publications/Pub_408/408_2016/408_2016.pdf

One advantage of a P3 procurement is that the private sector is more likely to implement innovation to result in greater efficiencies and lower costs if given the flexibility. The Commission intends to encourage such innovation provided that the project objectives are satisfied and quality is not compromised. Given recent advances in fiber optic construction means and methods, it is recognized that there will likely be a wide range of proposed approaches to the project. Additionally, the commercial aspects of the project could result in varied approaches given differences in the scope of the developer's fiber optic infrastructure for private/commercial purposes. Ultimately, the developer is responsible for the final methods and means for constructing the project. For these reasons, the Commission will not design the project or secure permits in advance of the RFP.

Methods of construction anticipated for the project include trenching, concrete encased trenching, trenching in paved shoulders, plowing, and horizontal directional drilling. In general, the PTC favors the location of new conduit to be as near to the right-of-way line as possible, to minimize the chance that it will be disturbed by future construction projects. It is recognized that site conditions may require an alternative approach at certain locations due to physical features such as rock cuts, slopes, dense vegetation, and drainage features or conditions that would require complex permits or other approvals that would add risk or adversely impact the project schedule. Similarly, proposed construction methods may require a reevaluation of the preference to locate conduit near the right-of-way line. For example, directional boring may prove to be advantageous under the shoulder of the road, rather than near the right-of-way line, to avoid environmental impacts or reduce costs. Such situations will be reviewed on a case by case basis.

Through the design process, the developer will need to determine whether to install conduit on an existing bridge, or under the road, stream, river, railroad, and other features that the bridge crosses over. Decisions would be made based on the age of the bridge and the likelihood that the bridge will be widened or replaced within the 30-year term of the PPA. To aid in such decisions, PTC will make available its plans and relative data for bridges. A similar decision would be required if the developer proposes to install fiber and conduit in the area where a third lane might be placed as part of a total reconstruction project. The RFP will identify the assignment of such relocation risks to the developer, PTC, or shared between both parties.

E. Planned Construction Schedule

A completion date will be evaluated during the RFP phase when the Commission will consider its priorities, cost implications of the proposed schedule, and feedback from the short-listed proposers.



The Commission may identify priorities and interim milestones for deployment to sites that would provide immediate benefit to PTC. This may include, but is not limited to, connecting various PTC sites such as maintenance sheds, PTC offices, Pennsylvania State Police facilities, toll plazas, Cashless Tolling locations and other locations and features still to be determined.

The RFP will identify any restrictions based on current and future construction projects as well as any areas that require coordination between the developer and PTC. In addition, the RFP will identify impacts to traffic including holiday construction moratoriums, potential weather moratoriums, and other factors that may affect the developer's schedule.

It is currently anticipated that the developer would achieve commercial and financial closing and receive its Notice to Proceed (NTP) by fall 2018, at which time design and permitting activities would begin. The complexity of design and permit requirements will vary widely throughout the project. In spring 2019, construction could potentially begin on certain components of the project, such as project elements involving the use of existing conduits. However, design and permitting of the majority of the project is expected to have a duration of one year, or until fall 2019 with the completion of construction by December 2021.

The developer will be responsible for determining lead time for construction materials, staging areas, and permits for a spring 2019 construction start.

PTC will endeavor to facilitate timely reviews to assist the developer in maintaining the schedule.

F. Service Level Expectations and Maintenance

The developer will be responsible to maintain complete, reliable operation of the fiber optic network and all related infrastructure, including conduit, fiber optic cable, optic regeneration devices, junction boxes, communications structures, and all related appurtenances. Uninterrupted service is required seven (7) days per week, twenty-four (24) hours per day, and will be delivered through the primary network constructed by the developer for PTC's use, and the redundant network (e.g., envisioned to be some class of leased circuit and/or geographically diverse network separate from the P3 fiber path). This level of service requires both regularly scheduled preventative maintenance of all equipment and around-the-clock availability of troubleshooting and corrective repair teams to handle all service problems, interruptions and emergencies.

The RFP and the PPA will identify the specific requirements for downtime expectations. If a fault or failure occurs in the project's fiber optic cable, network traffic will be automatically rerouted to the redundant network to provide uninterrupted service. Downtime expectations will vary based on the type of repair that is required.

The developer will assemble, manage, and supervise a specialized technical labor force capable of maintaining the fiber optic network at a high level of service and availability utilizing a management structure that promotes and delivers cost efficiency, accountability, and accurate cost predictability.



The developer will respond to calls from PTC IT department staff directing the developer to repair faulty equipment, dispatch technician(s), restore operation, track the status of corrective actions, respond to inquiries, consolidate historical data on outages, perform preventative maintenance, and perform other tasks related to the project as required by the PPA.

The developer will keep PTC's IT department staff fully informed on overall WAN field operations, and will consult with the Commission's designated personnel on policy and procedural activities which bear on the general system function. All interruptions or failures of the fiber optic network constructed as part of the project will be reported by telephone, text, email, or comparable mutually acceptable means to the developer by PTC IT department staff.

G. Handback Requirements

At least three years prior to the end of the PPA term, the developer will be required to submit a handback plan to demonstrate that project elements are in good working order and have a predicted residual life of at least two years at the termination date. The handback plan will describe the evaluation and calculation methodology. After approving the plan, the Commission will have the opportunity to participate in inspections and tests of the relative elements of the project.

3. Site and Constructability Information

A. Available Data and Limitations

During the RFP phase, short-listed proposers will be granted access to a Data Room to allow efficient retrieval of the Commission's maps and data. This resource is intended to enhance the quality of technical proposals by providing detailed information in a user-friendly format. It should be noted that detailed mapping is not available in certain areas where total reconstruction projects have not occurred or are not planned. Maps and other information that are anticipated to be made available through the Data Room are listed below.

- Roadway centerlines and ramps
- Right-of-ways
- Access gates
- Bridges
- Utility crossings
- Microwave towers
- PTC buildings – maintenance buildings, toll plazas, service plazas, administration buildings
- Construction projects (e.g., planned/active)
- Floodplains
- Slopes
- ITS assets
- Construction plans
- Existing conduits and specifications
- Video log from pavement analysis

B. Summary of Ground Conditions

During the RFP phase, PTC will define the manner in which unknown site conditions will be addressed. Short-listed proposers will be granted access to certain construction files for prior projects to provide insight into geotechnical conditions and other ground conditions. The Commission may also provide summary maps showing areas that proposers are instructed to avoid.

The following areas should be avoided (unless horizontal directional drilling is proposed in a manner that would avoid adverse impacts):

- Stormwater Best Management Practices (BMP) features such as basins, rain gardens, infiltration trenches, outlet pipes, etc.
- Wetland and stream mitigation sites
- Areas adjacent to retaining walls with tie-backs or straps
- Areas in the shoulder with moment slabs
- Poorly vegetated steep cut slopes
- Sinkholes

C. Existing and Planned Conduits

In accordance with the Commission’s ITS standards, road reconstruction projects include new conduit and junction boxes for fiber optic infrastructure. Four conduits with a 1¼” diameter are included in these projects and at least two of the conduits are not occupied. In summary, there are approximately 168 miles of Turnpike roadways with conduit either installed, under construction, or in design. A listing of these projects is provided in Table 3. Proposers should consider such conduits to be in a state of good repair and available for consideration for inclusion in the project for both PTC’s and the developer’s fiber optic cable.

Table 3 - PTC Projects with Fiber Optic Infrastructure

Milepost	Conduit	Fiber Installed
MP 0 - 10	Complete	
MP 28 - 31	In Design	
MP 31 - 38	Complete	
MP 40 - 44	Under Construction	
MP 44 - 48	complete	
MP 49 - 67	In Design	
MP 162 - 172 (Fog System)	Complete	•
MP 199 - 202	Complete	•
MP 202 - 206	Under Construction	
MP 206 - 210	Complete	
MP 210 - 215	Complete	
MP 215 - 220	Complete	
MP 220 - 227	Complete	
MP 242 - 245	Under Construction	
MP 245 - 247	Complete	•
MP 312 - 320	In Design	
MP 320 - 326	In Design	
MP 326 - 330	Complete	•
MP 330 - 333	Complete	•
MP 351 - 359 (I-95 connector)	Part In Design/ Part Under Construction	
Northeast Extension A 20 - A 26	Complete	
Northeast Extension A 26 - A 31	Under Construction	
Southern Beltway S 2 - 6	Complete	•
Mon-Fayette Expressway M 15 - 26	Complete	•

E. Access to PTC Assets

The developer will be granted access to the Turnpike's right-of-way for the construction of PTC and developer-owned fiber optic cable and infrastructure. The typical right-of-way for the Turnpike is 200 feet wide from one right-of-way fence to the other, however, it can sometimes be wider. In addition, PTC's widening jobs tend to acquire more right-of-way where the 200-foot swath is inadequate to build the widening. Vehicles used in the performance of maintenance and construction duties will not be charged to travel the Turnpike. In addition, entrance to the Turnpike via access gates may also be provided to expedite service and to minimize costs to the developer.

F. Utilities and Railroads

The developer will be responsible for protection of existing underground and overhead utilities and for the coordination of all utility relocations required for construction work. Designs should minimize impacts to utilities to the greatest extent practicable. During the RFP phase, the Commission will provide summary information regarding utilities, including crossings.

The PTC owns aerial right-of-ways for its bridges over railroads. The developer will be responsible for securing approvals from railroad companies for attachments to PTC bridges or horizontal directional drilling under the railroads. The developer will be required to coordinate with Commission staff regarding applications and outreach to the railroad owners.

G. Permitting

The developer will be responsible for obtaining all permits and environmental approvals for the project. This will necessitate coordination with the relevant governmental entities and other key stakeholders within and outside the Commonwealth that may include but not be limited to:

- U.S. Army Corps of Engineers (USACOE)
- PA Department of Conservation and Natural Resources (DCNR)
- PA Department of Environmental Protection (PADEP)
- PA Game Commission (PGC)
- PA Fish and Boat Commission (PFBC)
- U.S. Fish and Wildlife Service (USFWS)
- PA State Historic Preservation Office
- PA County Conservation Districts
- PA Department of Transportation (PennDOT)
- Municipal and county governments

The developer will be required to coordinate all environmental permit applications with the Commission and submit draft applications to PTC for review prior to submission to agencies. The developer will also be responsible for implementing a permit submission and approval tracking system.

4. Funding Approach and Business Model

A. Business Model and Approach

PTC anticipates entering into a long-term agreement with a developer to design, build, finance, maintain and gain rights to commercialize the project. The operating term currently contemplated is 30 years. In addition to developing the infrastructure and providing the services to meet PTC's needs, it is anticipated that the developer will be able to use, market and/or lease capacity on the network and associated facilities for commercial purposes and, if needed, make additional capital investments required to support the commercial opportunity. The Commission anticipates making funds available to cover a portion of project costs.

In finalizing the contractual structure and procurement approach, PTC will consider which structures and approaches best allow it to align public and private interests and best meet the project goals and objectives on a cost-effective basis.

B. Potential Commercial Opportunities

It is anticipated that portions of the infrastructure developed to meet PTC's needs, as described in Section 2, will be available for commercial uses, and the developer may reasonably make additional, elective capital investments required to support commercial network extensions and/or other commercial opportunities. For example, in addition to the interconnection points needed to provide services to PTC, additional interconnection points may be developed.

PTC is considering granting the developer the right to exploit commercial opportunities including:

- **Wholesale fiber** – the developer may generate revenue from users of wholesale lit fiber, for example, long haul fiber providers, internet service providers and last mile providers. The developer may also offer dark fiber services if desired.
- **Retail fiber** – the developer may provide retail, last mile services directly to customers wishing to connect directly to the network. Subject to approval on a case by case basis, the developer may be permitted to provide network connectivity to customers nearby or adjacent to the Turnpike right-of-way.
- **Other opportunities** – revenue from other activities utilizing the infrastructure developed for this project, as may be authorized by PTC.

C. Potential Commonwealth Users

It is anticipated that other public entities may have facilities that require broadband services, including redundant network services, within close proximity to the project. Public entities may include Commonwealth agencies, neighboring state departments of transportation, toll authorities, or other government entities. In instances where such entities provide transportation-related functions, such as the Pennsylvania State Police or the Pennsylvania Department of Transportation, the Commission envisions that connectivity to PTC's designated fiber optic network may be permitted where feasible. Other such entities would be potential customers of the developer that would pay user fees for any services accessed. The Commission envisions the resulting P3 agreement would provide that such user fees and terms of broadband service agreements will be on a "most favored nation" basis or better in relation to commercial users.

D. Potential for Direct PTC Contributions

PTC anticipates making funds available to cover a portion of project costs. These funds may be available during the construction period and/or during the operating period. The amount and timing of PTC's payments will depend on various factors including the availability of funds, anticipated reduction in future operating and maintenance costs as a result of the project, and the need for a subsidy from a project feasibility perspective. As a result of the project, PTC anticipates a reduction in the costs of operating and maintaining its towers, as well as avoided costs of new leased lines as additional devices are installed. Over a 30-year period, PTC estimates that the annual savings will grow each year and will range from \$4 - \$14 million per year, for a total of \$250 - \$300 million (savings are expressed in 2017 dollars). It is anticipated that a direct contribution would not exceed the amount of the cost savings.

To the extent payments are made over the term of the agreement, it is likely that they will be subject to deductions based on factors such as the unavailability of the network or service levels below those specified in the agreement. In addition, commercial revenues generated by the developer during the operating period may be subject to revenue sharing with PTC.

PTC wishes to encourage competition and innovation, achieve service quality, reduce costs, and allow for the generation of revenue. PTC will continue to consider the views of market participants as to the appropriate funding and financing models for the project.

PTC's Capital Plan has not currently programmed funds for this project since those funds are not currently defined, with the exception of P3 advisory services. However, PTC will program funds when its direct contribution is defined further into the P3 process. It is anticipated this will be captured in the next fiscal year Capital Plan update.

5. Contractual and Commercial Principles

A. General Contractual Obligations

PTC is contemplating a structure under which the developer will assume full responsibility for the design, construction, financing and maintenance of the project under a PPA. The developer will also have certain rights to commercialize the project under the PPA.

During the operating period, the developer will have general responsibility for ensuring pre-agreed service and performance levels are met. Specific requirements related to the function, performance, and quality will be specified by PTC in the procurement documents and in the agreement. The agreement will also grant rights to allowable commercial activities, how they will relate to the core services of PTC, and the basis for any revenue sharing. The basis for earning direct contributions from PTC will be established by the PPA as will a schedule of liquidated damages for contractual breaches and failure to meet specified performance levels.

B. Term

The term of contract is currently under consideration but is anticipated to be 30 years.

C. Risk Allocation

The allocation of risk and reward for the commercialization of the project to a developer is a key reason for considering a P3. However, PTC also recognizes that a successful P3 approach requires considering the allocation of risks for the project's costs and functional performance – particularly as it contemplates making a direct contribution to the project.

Accordingly, one of PTC's objectives in proceeding with the project as a P3 is to achieve an optimal and cost-effective risk allocation for costs and performance. This means that key project risks will be allocated to the contracting party best able to (1) control the likelihood of the risk occurring, (2) control the impact of the risk on project outcomes, and (3) absorb the risk at lowest cost if the first two items cannot be controlled. Appropriate risk allocation between the Commission and the developer is intended to encourage innovation, enhance project feasibility, and generate cost savings.

PTC is currently evaluating the appropriate risk sharing approach. Specific details regarding risk sharing will be specified in the RFP and will be further refined based on feedback from proposers in order to align incentives, support commercialization, improve cost effectiveness and/or meet other goals and objectives. Table 4 below provides a general indication of PTC's current view about risk allocation for this project. The developer will have responsibility for a large proportion of the risks related to design, construction, maintenance and financing of the project and the developer will, to a large extent, be able to select how to best fulfill the contract scope while managing these risks.

The RFP will specify the allocation of risks between the parties. The developer will be responsible for maintaining appropriate insurance coverages.

Preliminary Risk Allocation Matrix

This table is provided for informational purposes only; actual risk allocation will be set forth in detail in the RFP.

Table 4 - Preliminary Risk Allocation Matrix

Risk Category	Description	Risk Allocation		
		PTC	Developer	Shared
Construction	Refers to risks associated with the construction phase of the project, such as cost overruns, cost escalation, delays and maintenance and protection of traffic. These risks will be assumed by the developer.		X	
Additional Right-of-Way	It is anticipated that the project will be constructed in PTC's right-of-way. However, if additional right-of-way is required by the developer, the developer will be responsible for acquiring such right-of-way, although PTC may provide reasonable assistance.		X	
Site conditions	<p>PTC recognizes that site conditions will be an important factor that proposers will consider.</p> <p>PTC intends to provide preliminary data to proposers; however, proposers will be required to rely on their own diligence of site conditions likely to be encountered and will have flexibility to determine the design and construction approach.</p> <p>PTC anticipates that risks associated with subsurface conditions will be borne by the developer; however PTC will retain the risk in certain circumstances to be defined in the RFP.</p> <p>PTC may also stipulate the fitness and availability of certain PTC structures to accommodate conduit and equipment.</p>			X
Permits	<p>The developer will generally bear risks associated with obtaining necessary permits, including permits required by the developer's design choices.</p> <p>It is expected, however, that in some instances PTC will be required to conduct certain environmental clearances and reasonably assist the developer in obtaining permits for which it is responsible.</p>		X	
Utilities and Railroads	<p>Refers to risks related to reaching agreements with utility providers for utility relocation or railroad crossings.</p> <p>While these risks will generally be allocated to the developer, to the extent PTC has certain rights which it alone can exercise, PTC will be responsible for exercising</p>			X



Risk Category	Description	Risk Allocation		
		PTC	Developer	Shared
	those rights in cooperation with the developer. In addition, PTC may share the risk of uncooperative utilities in certain limited circumstances.			
Force Majeure	Refers to the impact of force majeure events, which may impact construction, significantly damage the project or reduce service availability to PTC. Such events cannot reasonably be controlled by either of the parties, thus the risk may be shared between PTC and the developer.			X
Financial	The developer will be responsible for securing financing for the project and for repaying such financing.		X	
Operations and Maintenance	Refers to risks associated with the operations and maintenance phase of the project, such as asset failures, and cost and availability of labor and maintenance materials. These risks will be assumed by the developer and the developer will be responsible for assuring both service levels and asset condition, including at handback.		X	
Commercial Activities	This risk relates to those activities that the developer may undertake to generate revenue. It is anticipated that the generation of revenue at the levels required to sustain operations, meet contractual obligations and repay lenders and equity investors are the responsibility of the developer. These risks will be within the purview of the developer and these activities shall not adversely impact the delivery of the public elements of the project.		X	
Procurement / Political	Refers to the risk associated with obtaining approvals necessary for award of contract. The risks are retained by PTC since they cannot be managed by the developer.	X		

D. Other Contract provisions

Change Orders

The PPA will clearly define the scope of work. However, the PPA will include a change order mechanism that will allow for flexibility to make adjustments to the scope over the term, while compensating the developer for its costs reasonably incurred to effect the change.

Termination

P3 contracts typically allow for the termination of the contract and stipulate the procedures for exercising termination rights. In the event of termination, appropriate compensation will be made. The amount of compensation will depend on the termination scenario – meaning specifically termination could include termination for convenience, whereby PTC may terminate the contract at any time if the termination is determined to be in the interest of the Commonwealth or Commission, termination for developer default, termination for extended force majeure, or termination for owner default. Details regarding the compensation amount under each termination scenario will be specified during the RFP stage as set forth in the PPA.

Developer Guarantees and Security

PTC is currently evaluating the guarantee and security requirements it will establish to assure commercial and financial closing and performance, including that the project is designed, financed and constructed on a timely basis.

PTC anticipates that proposers will be asked in an RFQ to evidence their capacity to undertake the project and provide performance security with respect to the design and construction of the project. PTC also anticipates that the RFP will require proposals to be submitted with proposal security (likely in the form of a letter of credit) in favor of PTC, which would be returned once the agreement is executed and/or financial close occurs.

PTC welcomes feedback from the industry with respect to the most efficient performance security package (which may include a combination of a parent company guaranty, performance bond, and/or letter of credit), as well as any considerations the PTC should bear in mind for firms interested in delivering the project using corporate financing as opposed to a non-recourse project finance structure. In any case, PTC will not contract with a developer that is unable to materially assure completion and performance, and will establish requirements accordingly.

6. Procurement Approach

A. Procurement Stages

PTC anticipates undertaking a two-stage procurement process – a Request for Qualifications (RFQ) followed by a Request for Proposals (RFP).

- **RFQ Stage** – PTC will evaluate the statements of qualifications (SOQs) received in response to the RFQ and will select, according to criteria outlined in the RFQ, a short-list of proposers, who alone shall be eligible to receive and respond to the RFP.
- **RFP Stage** – A draft RFP will be issued to the shortlisted proposers for feedback and discussion, with multiple rounds of meetings anticipated, following which a final RFP will be issued. Proposals submitted in response to the final RFP will then be evaluated to select the proposer to which the contract will be awarded. The evaluation criteria will be identified in the RFP.

B. Procurement Overview

This procurement is specifically governed by Act 88 of 2012 (Act 88), with further guidance provided by the Implementation Manual and Guidelines approved for use on January 9, 2013, as amended November 24, 2015.

A flowchart of the P3 process is provided in Figure 6.

Figure 6 – P3 Process Flowchart

