Turnpike ITS Design Guidance

Fiber Optic Cable, Conduit, and Connections

Fiber Optic Cable:

- Coordinate with the Turnpike Specifications Office to develop Section 102 Modified Special Provision (MSP) with the following requirements, as applicable:
    - For device downtime:
        - Limit WWVDS downtime to overnight during ramp closure and testing
        - Limit CCTV downtime to 24 hours
        - Limit MVDS and VDS-AVI downtime to 48 hours
        - Limit HAR, RWIS downtime to 2 weeks
    - Provide a Method of Procedure (MOP) for the Turnpike's review and approval. Submit MOP a minimum of 14 days prior to outage request. The procedure shall include but not limited to cut-over plan, sequence of steps, field procedures, anticipated outage times, and any other necessary communications.
    - After the MOP is approved, provide the following notifications to the TMC at (407) 264-3363, ITS team at (954) 934-1400 & SunWatch at (877) 786-3375.
        - 48-hour advance request of the intended service disruption.
        - On the day of approved service disruption.
        - The following information shall be included when notification is provided:
            - Project FPID and Contract no:
            - Outage request contact name:
            - Caller call back name/cell #:
            - Planned date:
            - Planned date #2:
            - Planned start time:
            - Planned stop time:
            - Reason:
            - Affected Devices:
            - Prime contractor and cell #:
            - ITS subcontractor and cell #:
            - Splice subcontractor and cell #:
            - Location Mile Post (MP) and facility:
    - Proposed work requiring communication outages must be performed between 10:00 pm and 5:00 am.
- Ensure the design adheres to the above downtime requirements and make provisions accordingly in the plans.
- When terminating the backbone fiber optic cable within a Hub building, terminate all fibers within the Hub building rack.
- When relocating fiber optic backbone conduit, replace entire permanent fiber optic backbone between existing butt splices and/or minimum one mile of continuous fiber optic cable between butt splices.

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Fiber Optic Route Marker:

- Place markers at a maximum spacing of 1,000 feet.

Conduit Infrastructure:

- Include a minimum of three 2-inch conduits for the ITS backbone fiber optic conduit system utilizing color scheme as described below:
    - Orange without stripes (backbone fiber optic cable)
    - Orange with white stripes (tone wire)
    - Orange with green stripes (spare)
- Include three 2-inch conduits for ITS lateral fiber conduits utilizing color scheme as described below. Provide lateral fiber optic cable and tone wire in separate designated conduits.
    - Orange without stripes (lateral fiber optic cable);
    - Orange with white stripes (tone wire); and
    - Orange with green stripes (spare).
- For conduits that require stripes, include three equally spaced longitudinal stripes of sufficient width and color intensity which are easily distinguished.
- Provide backbone and lateral fiber optic cable and tone wire in separate designated conduits.
- Include a minimum of one 2-inch conduit utilizing red colored (without stripes) conduit for the electrical conduit system.
- Use directional bore installation method for arterial and canal conduit crossings. If directional bore conduit installation is constrained, coordinate options with Turnpike ITS design.
- Include conduit casing (outerduct) of adequate size when conduits are installed under large water bodies such as canals etc.
- Include only one fiber cable in each conduit and avoid collocation of fiber cables inside the same conduit.

Splices, Terminations, and Connection Hardware

- Assign the backbone fiber optic cable buffers based on the following functionalities:
  - Blue and Green buffers → ITS Layer 3 Communications
  - Orange buffer → ITS Distribution
  - Red and Black buffers → Tolls
  - Rest of the buffers → Reserved for other functionalities
  - Allocate Orange buffer fibers to respective ITS device(s) based on the following:

ITS Device Fiber Allocation			
Orange Buffer Fibers		ITS Device Type	Fiber Allocation Spacing
1	2	CCTV, DMS and collocated devices	Alternate the adjacent device type across fiber pairs and cycle through all pairs.
3	4		
5	6		
7	8		
9	10	MVDS, Generator, VDS-BlueTooth & WWVDS	Alternate the adjacent device type across fiber pairs and cycle through all pairs.
11	12		

ITS Device Fiber Allocation			
Orange Buffer Fibers		ITS Device Type	Fiber Allocation Spacing
1	2	CCTV and Collocated Devices →	Stagger between fiber pairs for each adjacent CCTV
3	4		
5	6	DMS and Collocated Devices →	Stagger between fiber pairs for each adjacent DMS
7	8		
9	10	MVDS Generator Bluetooth AVI Wrong Way Detection	Alternate Between Fiber Pair
11	12		

- Coordinate fiber assignments with the Turnpike ITS and Network Administrator prior to the Phase III submittal.
  - Provide written concurrence of coordination with the Turnpike ITS and Network Administrator with the Phase III submittal.