Texas Department of Transportation

IH 635 Managed Lanes Project
Technical Provisions

Attachment 19-1AA

Performance and Measurement Table Baseline

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
1) ROADWAY									
							Unless otherwise stated, measurements shall be conducted using procedures, techniques and measuring equipment consistent with TxDOT's Pavement Management Information System Rater's Manual. Unless otherwise stated pavement performance measurement records relate to 0.5 mile sections as described in the PMIS Rater's Manual		
	1.1	Obstructions and debris	Roadway and clear zone free from obstructions and debris	2 hrs	N/A	N/A	Visual Inspection	Auditable Sections with roadway and clear zone free from obstructions and debris	100%
	1.2	Pavement	All roadways have a smooth and quiet surface course (including bridge decks, covers, gratings, frames and boxes) with adequate skid resistance and free from Defects.	24 hrs	28 days	6 months	**a) Pavement Condition Score** Measurements and inspections necessary to derive Pavement Condition Score	Pavement Condition Score for 80% of Auditable Sections exceeding: Mainlanes and ramps – 90 Frontage roads – 80 Auditable Sections with Pavement Condition Score exceeding: Mainlanes and ramps - 80 Frontage roads - 70	 100% 100% 100% 100%
	1.2	Pavement	All roadways have a smooth and quiet surface course (including bridge decks, covers, gratings, frames and boxes) with adequate skid resistance and free from Defects.	24 hrs	28 days	6 months	**b) Ruts – Mainlanes, shoulders & ramps** Depth as measured using an automated device in compliance with TxDOT Standards 10ft straight edge used to	Auditable Sections with percentage of wheel path length with ruts less than ¼" in depth: Mainlanes, shoulders and ramps – 97% Frontage roads – 90%	 100% 100%

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							measure rut depth for localized areas.	Auditable Sections free of ruts greater than ½" in depth	100%
	1.2	Pavement	All roadways have a smooth and quiet surface course (including bridge decks, covers, gratings, frames and boxes) with adequate skid resistance and free from Defects.	24 hrs	28 days	6 months	**c) Ride quality** Measurement of International Roughness Index (IRI) according to TxDOT standard Tex-1001-S, Operating Inertial Profilers and Evaluating Pavement Profiles	For 80% of all Auditable Sections measured, IRI throughout 98% of each Auditable Section is less than or equal to: Mainlanes, ramps – 95** inches per mile Frontage roads – 120** inches per mile	 100% 100%
	1.2	Pavement	All roadways have a smooth and quiet surface course (including bridge decks, covers, gratings, frames and boxes) with adequate skid resistance and free from Defects.	24 hrs	28 days	6 months	** To allow for measurement bias, an adjustment of -10 (minus ten) is made to IRI measurements for concrete pavements before assessing threshold compliance (Renewal Work and new construction subject to construction quality standards) 3ft straight edge used to measure discontinuities	IRI measured throughout 98% of Auditable Section of less than or equal to: Mainlanes, ramps 120** inches per mile Frontage roads – 150** inches per mile Mainlanes, ramps 0.1 mile average – 150** inches per mile Frontage roads, 0.1 mile average – 180** inches per mile IRI measured throughout 98% of each lane containing a bridge deck in any Auditable Section, 0.1 mile average – 200** inches per mile Auditable Sections free of individual discontinuities greater than 0.75"	 100% 100% 100% 100% 100% 100%

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	1.2	Pavement	All roadways have a smooth and quiet surface course (including bridge decks, covers, gratings, frames and boxes) with adequate skid resistance and free from Defects.	24 hrs	28 days	6 months	**d) Failures** Instances of failures exceeding the failure criteria set forth in the TxDOT PMIS Rater's Manual, including potholes, base failures, punchouts and jointed concrete pavement failures	Auditable Sections free from instances of failure exceeding the failure criteria set forth in the TxDOT PMIS Rater's Manual, including potholes, base failures, punchouts and jointed concrete pavement failures	100%
	1.2	Pavement	All roadways have a smooth and quiet surface course (including bridge decks, covers, gratings, frames and boxes) with adequate skid resistance and free from Defects.	24 hrs	28 days	6 months	**e) Edge drop-offs** Physical measurement of edge drop-off level compared to adjacent surface	Auditable Sections free from instances of edge drop-off exceeding 2"	100%
	1.2	Pavement	All roadways have a smooth and quiet surface course (including bridge decks, covers, gratings, frames and boxes) with adequate skid resistance and free from Defects.	24 hrs	28 days	6 months	**f) Skid resistance** ASTM E 274 Standard Test Method for Skid Resistance Testing of Paved Surfaces at 50 MPH using a full scale smooth tire meeting the requirements of ASTM E 524	Auditable Sections with Skid Numbers for mainlanes, shoulders and ramps exceeding 30 and for which investigations as to potential risk of skidding accidents and appropriate remedial actions have been taken.	100%
	1.2	Pavement	All roadways have a smooth and quiet surface course (including bridge decks, covers, gratings, frames and boxes) with adequate skid resistance and free from Defects.	24 hrs	28 days	6 months	**f) Skid resistance** ASTM E 274 Standard Test Method for Skid Resistance Testing of Paved Surfaces at 50 MPH using a full scale smooth tire meeting the requirements of ASTM E 524	Auditable Sections with Skid Numbers for frontage roads exceeding 30 and for which investigations as to potential risk of skidding accidents and appropriate remedial actions have been taken.	100%
	1.2	Pavement	All roadways have a smooth and quiet surface course (including bridge decks, covers, gratings, frames and boxes) with adequate skid resistance and free from Defects.	24 hrs	28 days	6 months	**f) Skid resistance** ASTM E 274 Standard Test Method for Skid Resistance Testing of Paved Surfaces at 50 MPH using a full scale smooth tire meeting the requirements of ASTM E 524	Auditable Sections with Skid Numbers that comply with Federal requirements and / or classified as high risk by the Wet Weather Accident Reduction Program, for which the Concessionaire has performed a site investigation and any required corrective action.	100%

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	1.2	Pavement	Road users warned of potential skidding hazards	24 hrs	7 days	N/A	**Skid resistance** (as above)	Auditable Sections with potential skidding hazards for which road user warnings are provided	100%
	1.3	Crossovers and other paved areas	Crossovers and other paved areas are free of Defects	24 hrs	28 days	6 months	**a) Potholes** **b) Base failures**	Auditable Sections free from potholes Auditable Sections free from base failures	100% 100%
	1.4	Joints in concrete	Joints in concrete paving are sealed and watertight Longitudinal joint separation	24 hrs	28 days	6 months	Visual inspection of joints Measurement of joint width and level difference of two sides of joints	Auditable Sections free from unsealed joints greater than ¼” Auditable Sections free from joint widths more than 1” or faulting more than 1/4”	100% 100%
	1.5	Curbs	Curbs are free of defects	24 hrs	28 days	6 months	Visual inspection	Auditable Sections with 95% of curbs free of defects	100%
2) DRAINAGE									
	2.1	Culverts, Pipes and Channels	Each element of the drainage system is maintained in its proper function by cleaning, clearing and/or emptying as appropriate including vegetation and debris and silt from the point at which water drains from the travel way to the outfall or drainage way.	24 hrs	28 days	6 months	Visual inspection supplemented by CCTV where required to inspect buried pipe work	Auditable Sections with culverts, pipes and channels with a minimum of 90% clear cross-sectional area, calculated as the arithmetic mean of the clear cross-sectional areas of individual 10 feet lengths of culverts, pipes and channels in each Auditable Section.	100%
	2.2	Drainage treatment devices	Drainage treatment and balancing systems, flow and spillage control devices function correctly and their location and means of operation is recorded adequately to permit their correct operation in Emergency.	24 hrs	28 days	6 months	Visual inspection	Auditable Sections with drainage treatment devices functioning correctly and with means of operation displayed	100%

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	2.3	Travel Way	The travel way is free from water to the extent that such water would represent a hazard by virtue of its position and depth.	24 hrs	28 days	6 months	Visual inspection of water on surface	Auditable Sections with travel way free from instances of hazardous water build-up	100%
	2.4	Discharge systems	Surface water discharge systems perform their proper function and discharge to groundwater and waterways complies with the relevant legislation and permits.	24 hrs	28 days	6 months	Visual inspection and records	Auditable Sections with surface water discharge systems performing their proper function and discharging in compliance with the relevant legislation and permits.	100%
	2.5	Protected Species	Named species and habitats are protected	24 hrs	28 days	6 months	Visual inspection	Auditable Sections with named species and habitats with protection of these named species and habitats	100%
3) STRUCTURES									
	3.1	Structures having an opening measured along the centre of the roadway of more than 20 feet between undercopings of abutments or springlines of arches or extreme ends of openings or multiple boxes	Substructures and superstructures are free of: • Graffiti • Undesirable vegetation • Debris and bird droppings • Blocked drains, weep pipes manholes and chambers • Blocked drainage holes in structural components • Defects in joint sealants • Defects in pedestrian protection measure • Scour damage • Corrosion of rebar • Paint system failures	24 hrs	28 days	6 months	Inspection and assessment in accordance with the requirements of federal National Bridge Inspection Standards (NBIS) of the Code of Federal Regulations, 23 Highways – Part 650, the TxDOT Bridge inspection Manual, and the Federal Administration's Bridge Inspector's Reference Manual.	Records as required in the TxDOT Bridge Inspection Manual Auditable Sections with superstructures and substructures with condition ratings of seven or higher Auditable Sections with structure components with condition states of one	100% 100%

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			• Impact damage						
	3.2	Structure components	i) Expansion joints are free of: • Dirt debris • Defects in drainage systems • Loose nuts and bolts • Defects in gaskets ii) The deck drainage system is free of all and operates as intended iii) Parapets are free of: • Loose nuts or bolts • Blockages of hollow section drain holes • Graffiti • Vegetation • Accident damage iv) Bearings and bearing shelves are clean. v) Sliding and roller surfaces are clean and greased to ensure satisfactory performance. Additional advice contained in bearing manufacturers' instructions in the Structure Maintenance Manual is followed. Special finishes are clean and perform to the appropriate standards.	24 hrs	28 days	6 months	Inspection and assessment in accordance with the requirements of federal National Bridge Inspection Standards (NBIS) of the Code of Federal Regulations, 23 Highways – Part 650, the TxDOT Bridge inspection Manual, and the Federal Administration's Bridge Inspector's Reference Manual.	Records as required in the TxDOT Bridge Inspection Manual Auditable Sections with superstructures and substructures with condition ratings of seven or higher Auditable Sections with structure components with condition states of one	100% 100%

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			vi) All non-structural items such as hoists and electrical fixings, operate correctly, are clean and lubricated as appropriate, in accordance with the manufacturer's recommendation and certification of lifting devices is maintained.						
	3.3	Non-bridge class culverts	Non-bridge-class culverts are free of: • Defects in sealant to movement joints • Scour damage	24 hrs	28 days	6 months	Visual inspection	Auditable Sections with non-bridge-class culverts free from defects in sealant and movement joints and no scour damage	100%
	3.4	Gantries and high masts	Sign signal gantries, high masts are structurally sound and free of: • Loose nuts and bolts • Defects in surface protection systems • Graffiti	24 hrs	28 days	6 months	Visual inspection	Auditable Sections with gantries and high masts free of loose assemblies Auditable Sections with gantries and high masts free from defects in surface protection systems Auditable Sections with gantries and high masts free from graffiti	100% 100% 100%
	3.5	Load ratings	All structures maintain the design load capacity.	24 hrs	28 days	6 months	Inspection and assessment in accordance with the requirements of AASHTO's Guide Manual for Condition Evaluation and Load and Resistance Factor Rating (LRFR) of Highway Bridges, the TxDOT Bridge inspection Manual, and the Federal Administration's Bridge Inspector's Reference Manual.	Auditable Sections with structures that do not require load restrictions for Texas legal loads	100%

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	3.6	Surface coating	Include a re-coating schedule in the MMP.	N/A	N/A	1 year	Visual Inspection of gloss and color	Auditable Sections with surface coating compliant with the standards referenced in the MMP	100%
	3.7	Graffiti	Graffiti is removed in a manner and using materials that restore the surface to a like appearance similar to adjoining surfaces.	N/A	N/A	24 hours	Visual inspection	Auditable Sections with structures that have suffered graffiti and for which graffiti removal and surface restoration have been carried out.	100%
	3.8	Retaining walls	Integrity and structural condition of the retaining walls is maintained	24 hrs	28 days	6 months	Structural assessment if visual inspection warrants	Auditable Sections with inspection records showing compliance	100%
	3.8	Retaining walls	Integrity and structural condition of the retaining walls is maintained	24 hrs	28 days	6 months	Structural assessment if visual inspection warrants	Auditable Sections with inspection records showing compliance with the following: • No joint with exposed filter fabric or backfill material • No concrete to concrete contact • No loss of joint seal material • No settlement of backfill material	100%
4) PAVEMENT MARKINGS, OBJECT MARKERS, BARRIER MARKIERS AND DELINEATORS									
	4.1	Pavement markings	Pavement markings are: • clean and visible during the day and at night • whole and complete and of the correct color, type, width and length • placed to meet the TMUTCD and TxDOT's Pavement Marking Standard Sheets	24 hrs	28 days	6 months	a) Markings – General Portable retroflectometer, which uses 30 meter geometry meeting the requirements described in ASTM E 1710	Auditable Sections with white thermoplastic pavement markings meeting a minimum retroreflectivity of 250 mcd/sqm/lx Auditable Sections with white paint and beads pavement markings meeting a minimum retroreflectivity of 175 mcd/sqm/lx	100% 100%

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							Physical measurement b) Profile Markings Visual inspection	Auditable Sections with yellow thermoplastic pavement markings meeting a minimum retroreflectivity of 175 mcd/sqm/lx	100%
								Auditable Sections with yellow paint and beads pavement markings meeting a minimum retroreflectivity of 125/mcd/sqm/lx	100%
								Auditable Sections with pavement markings with more than 95% of original specified pavement marking area	100%
								Auditable Sections with pavement marking dimensions compliant with the relevant specified dimensions.	100%
								Auditable Sections with pavement markings performing their intended function and compliant with relevant regulations	100%
	4.2	Raised reflective markings	Raised reflective pavement markers, object markers and delineators are: • clean and clearly visible • of the correct color and type • reflective or	24 hrs	28 days	6 months	Visual inspection	Auditable Sections free from occurrences of 6 consecutive ineffective markers (ineffective includes missing, damaged, settled or sunk). (A minimum of four markers should be visible at 80' spacing when viewed under	100%

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			retroreflective as TxDOT standard • correctly located, aligned and the correct level • are firmly fixed • are in a condition that will ensure that they remain at the correct level					low beam headlights) Auditable Sections free from occurrences of 6 consecutive markers failing to provide equivalent performance characteristics to adjacent markers	100%
	4.3	Delineators & Markers	Object markers, mail box markers and delineators are: • clean and visible • of the correct color and type • legible and reflective • Straight and Vertical	24 hrs	28 days	6 months	Visual inspection	Auditable Sections free from defective or missing object markers or delineators	100%
5) GUARDRAILS, SAFETY BARRIERS AND IMPACT ATTENUATORS									
	5.1	Guard rails and safety barriers	All guardrails, safety barriers, concrete barriers, etc. are maintained free of Defects. They are appropriately placed and correctly installed at the correct height and distance from roadway or obstacles.	24 hrs	7 days	N/A	Visual inspection	Auditable Sections with guard rails and safety barriers appropriately placed and correctly installed Auditable Sections with guard rails and safety barriers free from defects Auditable Sections with guard rails and safety barriers at correct heights Auditable Sections with guard and rails and safety barriers at correct distance from roadway obstacle	100% 100% 100% 100%

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	5.2	Impact attenuators	All impact attenuators are appropriately placed and correctly installed	24 hrs	7 days	6 months	Visual inspection	Auditable Sections with impact attenuators appropriately placed and correctly installed	100%
6) TRAFFIC SIGNS									
	6.1	General – All Signs	i. Signs are clean, correctly located, clearly visible, legible, reflective, at the correct height and free from structural and electrical defects ii. Identification numbers are provided, correctly located, visible, clean and legible iii. Sign mounting posts are vertical, structurally sound and rust free iv. All break-away sign mounts are clear of silt or other debris that could impede break-away features and shall have correct stub heights v. Obsolete and redundant signs are removed or replaced as appropriate vi. Visibility distances meet the stated requirements	24 hrs	28 days	6 months	**a) Retroreflectivity** Coefficient of retro reflectivity **b) Face damage** Visual inspection **c) Placement** Visual inspection **d) Obsolete signs** Visual inspection **e) Sign Information** Visual inspection **f) Dynamic Message Signs** Visual inspection	Auditable Sections with signs with reflectivity meeting or exceeding the requirements of TxDOT's TMUTCD Auditable Sections with signs with face damage less than 5% of face area Auditable Sections with signs placed in accordance with TxDOT's Sign Crew Field Book including not twisted or leaning Auditable Sections free from obsolete signs Auditable Sections with sign information of the correct size, location, type and wording to meet its intended purpose Auditable Sections with fully functioning dynamic message signs	100% 100% 100% 100% 100% 100%

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			vii. Sign information is of the correct size, location, type and wording to meet its intended purpose and any statutory requirements viii. All structures and elements of the signing system are kept clean and free from debris and have clear access provided ix. All replacement and repair materials and equipment are in accordance with the requirements of the TMUTCD x. Dynamic message signs are in an operational condition						
	6.2	General – Safety critical signs	Requirements as 6.1, Plus: "Stop," "Yield," "Do Not Enter," "One Way" and "Wrong Way" signs are clean legible and undamaged	2 hrs	1 week	6 months	Visual inspection	Auditable Sections with safety critical signs that are clean legible and undamaged	100%
7) TRAFFIC SIGNALS									
	7.1	General	i. Traffic Signals and their associated equipment are: • clean and visible	2 hrs	24 hrs	6 months	**a) General condition** Visual inspection **b) Damage**	Auditable Sections with clean and visible traffic signals Auditable Sections free of	100% 100%

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			• correctly aligned and operational • free from damage caused by accident or vandalism • correctly aligned and operational ii. Signal timing and operation is correct iii. Contingency plans are in place to rectify Category 1 defects not immediately repairable to assure alternative traffic control is provided during a period of failure				Visual inspection **c) Signal timing** Timed measurement **d) Contingency plans** Records Review	damaged traffic signals Auditable Sections with installations with correct traffic signals timing Auditable Sections with contingency plans in place	 100% 100%
	7.2	Soundness	Traffic Signals are structurally and electronically sound	24 hrs	28 days	6 months	**a) Structural soundness** Visual inspection **b) Electrical soundness** Testing to meet NEC regulations	Auditable Sections with inspection records showing safe installation and maintenance	100%
	7.3	Identification marking	Signals have identification markers and the telephone number for reporting faults are correctly located, clearly visible, clean and legible	N/A	28 days	6 months	Visual inspection	Auditable Sections with inspection records showing identification markers and other information are easily readable	100%
	7.4	Pedestrian Elements and Vehicle Detectors	All pedestrian elements and vehicle detectors are correctly positioned and fully functional at all times	24 hrs	28 days	6 months	Visual inspection	Auditable Sections with inspection records showing compliance	100%

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8) LIGHTING									
	8.1	Roadway Lighting – General	i. All lighting is free from defects and provides acceptable uniform lighting quality ii. Lanterns are clean and correctly positioned iii. Lighting units are free from accidental damage or vandalism iv. Columns are upright, correctly founded, visually acceptable and structurally sound	24 hrs	28 days	6 months	**a) Mainlane lights operable** Night time inspection or automated logs **b) Mainlane lights out of action** Night time inspection or automated logs	Auditable Sections with 10 or more lights with more than 90% of lights functioning correctly / Auditable Sections with less than 10 lights with no more than 1 light not functioning correctly. Auditable Sections free from instances where two or more consecutive lights are out of action	100% 100%
	8.2	Sign Lighting	Sign lighting is fully operational	24 hrs	28 days	6 months	Night time inspection or automated logs	Auditable Sections with sign lighting with no more than one bulb per sign not working	100%
	8.3	Electrical Supply	Electricity supply, feeder pillars, cabinets, switches and fittings are electrically, mechanically and structurally sound and functioning	24 hrs	7 days	1 Month	Testing to meet NEC regulations, visual inspection	Auditable Sections with inspection records showing safe installation and maintenance	100%
	8.4	Access Panels	All access panels in place at all times	24 hrs	7 days	1 Month	Visual Inspection	Auditable Sections with all access panels in place	100%
	8.5	High Mast Lighting	i. All high mast luminaries functioning on each pole	24 hrs	48 hrs	1 Month	Yearly inspection and night time inspection or automated logs	Auditable Sections with no more than one lamp not functioning on each high mast pole	100%

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			ii. All obstruction lights are present and working (if required) iii. Compartment door is secure with all bolts in place iv. All winch and safety equipment is correctly functioning and maintained without rusting or corrosion (for structural requirements refer to Element Category 3)					Auditable Sections with no identified other defects	100%
9) FENCES, WALLS AND SOUND ABATEMENT									
	9.1	Design and Location	Fences and walls act as designed and serve the purpose for which they were intended	24 hrs	28 days	6 months	Visual Inspection	Auditable Sections with inspection records showing compliance	100%
	9.2	Construction	Integrity and structural condition of the fence is maintained.	24 hrs	28 days	6 months	Structural assessment if visual inspection warrants	Auditable Sections with inspection records showing compliance	100%
			Integrity and structural condition of the walls are maintained.	24 hrs	28 days	6 months	Structural assessment if visual inspection warrants	Auditable Sections with inspection records showing compliance with the following: • Vertical tolerance of wall ½" per 10' of wall height • Wall panel offset of ¾" or less	100%
10) ROADSIDE MANAGEMENT									
	10.1	Vegetated Areas – Except landscaped areas –	Vegetation is maintained so that:	24 hrs	7 days	28 days	**a) Urban areas** Physical measurements of	Auditable Sections having 95% of height of grass and	100%

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		General	i. Height of grass and weeds is kept within the limits described for urban and rural areas. Mowing begins before vegetation reaches maximum height ii. Spot mowing at intersections, ramps or other areas maintains visibility of appurtenances and sight distance iii. Grass or vegetation does not encroach into or on paved shoulders, main lanes, sidewalks, islands, riprap, traffic barrier or curbs iv. A herbicide program is undertaken in accordance with the TxDOT Herbicide Manual to control noxious weeds and to eliminate grass in pavement or concrete v. A full width mowing cycle is completed after the first frost vi. Wildflowers are preserved utilizing the guidelines in the mowing specifications and TxDOT *Roadside*				height of grass and weeds **b) Rural areas** Physical measurement of height of grass and weeds **c) Encroachment** Visual inspection of instances of encroachment of vegetation **d) Wildflowers** Visual inspection with audit of process **e) Sight lines** Visual inspection	weeds between 5 in and 18 in Auditable Sections having 95% of height of grass and weeds between 5 in and 30 in Auditable Sections free of vegetation encroachment Auditable Sections that adhere to vegetation management manuals Auditable Sections free from instances of impairment of sight lines or sight distance to signs	 100% 100% 100% 100%

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			Vegetation Manual.						
	10.2	Landscaped Areas	i. All landscaped areas are maintained to their originally constructed condition. Landscaped areas are as designated in the plans. ii. Mowing, litter pickup, irrigation system maintenance and operation, plant maintenance, pruning, insect, disease and pest control, fertilization, mulching, bed maintenance, watering is undertaken as per FMP. iii. The height of grass and weeds is kept between 2" and 8" iv. Damaged or dead vegetation is replaced	24 hrs	7 days	28 days	Visual inspection	Auditable Sections with inspection records showing compliance	100%
	10.3	Fire Hazards	Fire hazards are controlled	24 hrs	7 days	28 days	Visual inspection	Auditable Sections free from instances of dry brush or vegetation forming fire hazard	100%
	10.4	Trees, brush and ornamentals	i. Trees, brush and ornamentals on the right of way, except in established no mow areas, are trimmed in accordance with TxDOT standards ii. Trees, brush and ornamentals are trimmed to insure they	24 hrs	7 days	28 days	Visual inspection	Auditable Sections with inspection records showing compliance	100%

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			do not interfere with vehicles or sight distance, or inhibit the visibility of signs. iii. Dead trees, brush, ornamentals and branches are removed. Potentially dangerous trees or limbs are removed. iv. All undesirable trees and vegetation are moved. Diseased trees or limbs are treated or removed by licensed contractors.						
	10.5	Wetlands	Wetlands are managed in accordance with the permit requirements	24 hrs	7 days	28 days	Visual inspection, assessment of permit issuers	Auditable Sections free from instances where permit requirements not met	100%
11) REST AREAS AND PICNIC AREAS									
	11.1	Rest areas and picnic areas	i. Picnic areas are clean and neat in appearance ii. Trash barrels are painted and attached to their supports to prevent stealing iii. Site free of any visible litter, all litter properly disposed. Litter removed from the picnic grounds and barrels before being allowed to accumulate outside of the barrels	24 hrs	28 days	6 months	Inspection records showing compliance	Auditable Sections having 90% of grass and weeds height between 2 in and 8 in. Mowing shall begin before vegetation reaches 8 in Auditable Sections free from bare ground areas larger than 5 square feet Auditable Sections free from prohibited, invasive or noxious weeds	100% 100% 100% 100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
			iv. All vehicles used in transporting litter are equipped to prevent the accumulated litter from being strewn along the roadway					Auditable Sections free from occurrences of encroachment of vegetation or debris for more than two (2) inches onto any curb or sidewalk located throughout the rest area.	100%
			v. Vegetation damaged due to improper or careless mowing and trimming operations or any other reason is replaced					Auditable Sections free from occurrences of deviation of soil or mulch above or below the top of the curb	100%
			vi. Weeds, grass and other undesirable growth are removed from beds of plants and shrubs as needed. Trees and shrubs are trimmed neatly. All curbs and sidewalks are edged and repaired.					Auditable Sections with paved surfaces maintained clean and safe with minimal obstruction	100%
			vii. All picnic tables are clean, free of stains and free of any defect					Auditable Sections free from occurrences of pavement undermining greater than 2”	100%
			viii. All directional, informational, safety and any other sign is properly installed, contains accurate information and is visible from a reasonable distance					Auditable Sections free from unsealed cracks greater than ½ inch at rest areas and picnic areas	100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
			ix. All striping is intact and all parking and travel areas are clearly marked x. All curbs are in place and intact					Auditable Sections with fully functional lights at rest areas and picnic areas	100%
12) EARTHWORKS, EMBANKMENTS AND CUTTINGS									
	12.1	Slope Failure	All structural or natural failures of the embankment and cut slopes of the Facility are repaired	24 hrs	28 days	6 months	Visual inspection by geotechnical specialist and further tests as recommended by the specialist	Auditable Sections with repaired structural or natural failures of the embankment and cut slopes	100%
	12.2	Slopes – General	Slopes are maintained in general conformance to the original graded cross-sections, the replacement of landscaping materials, reseeding and re-vegetation for erosion control purposes and removal and disposal of all eroded materials from the roadway and shoulders.	24 hrs	28 days	6 months		Auditable Sections with inspection records showing compliance	100%
13) ITS AND ETCS EQUIPMENT									
	13.1	ETCS Equipment – Maintenance	All ITS and ETCS equipment is fully functional and housing is functioning and free of defects. i. All equipment and cabinet identification numbers are visible, sites are well drained and access is clear ii. Steps, handrails and	24 hours	14 days	1 month	Visual Inspection	Auditable Sections with inspection records showing compliance	100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
			accesses are kept in good condition iii. Access to all communication hubs, ground boxes, cabinets and sites is clear iv. All drainage is operational and all external fixtures and fittings are in a satisfactory condition v. All communications cable markers, cable joint markers and duct markers are visible and missing markers are replaced. vi. Backup power supply system is available at all times.						
	13.2	VES Equipment – Maintenance	All VES equipment is kept clean, the identification numbers are visible.	24 hrs	14 days	1 month	Visual Inspection	Auditable Sections with inspection records showing compliance	100%
	13.3	Dynamic Message Sign Equipment	Dynamic Message Signs are free from faults such as: i. Any signal displaying an message which is deemed to be a safety hazard ii. Failure of system to clear sign settings when appropriate iii. 2 or more contiguous sign failures that prevent control office setting strategic diversions iv. Signs displaying an	2 hrs	24 hrs	14 days	Defect measurement dependent on equipment	Auditable Sections with inspection records showing compliance	100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
			incorrect message						
	13.4	CCTV Equipment	CCTV Systems are free from serious faults that significantly limit the availability of the operators to monitor the area network, such as: i. Failure of CCTV Systems to provide control offices with access and control of CCTV images ii. Failure of a CCTV camera or its video transmission system iii. Failure of a Pan / Tilt unit or its control system iv. Moisture ingress onto CCTV camera lens v. Faults that result in significant degradation of CCTV images	2 hrs	24 hrs	14 days	Defect measurement dependent on equipment	Auditable Sections with inspection records showing compliance	100%
	13.5	Vehicle Detection Equipment	All equipment free of defects and operational problems such as: i. Inoperable loops. ii. Malfunctioning camera controllers	2 hrs	24 hrs	1 month	Defect measurement dependent on equipment Traffic Detector Loops: Loop circuit's inductance to be > 50 and < 1,000 micro henries Insulation resistance to be > 50 meg ohms	Auditable Sections with inspection records showing compliance Auditable Sections free from instances where loops are out of compliance	100% 100%
14) TOLLING FACILITIES AND BUILDINGS (Not Used)									

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
15) AMENITY									
	15.1	Graffiti	Graffiti is removed in a manner and using materials that restore the surface to a like appearance similar to adjoining surfaces	24 hrs	N/A	N/A	All graffiti is considered a Category 1 defect	Auditable Sections with inspection records showing compliance	100%
16) SNOW AND ICE CONTROL									
	16.1	Travel Lanes	Maintain travel way free from snow and ice.	1hr or 2hrs as noted.	N/A	N/A	Maximum 1hr response time to complete manning and loading of spreading vehicles Maximum 2hrs from departure from loading point to complete treatment and return to loading point Maximum 1hr response time for snow and ice clearance vehicles to depart from base	Auditable Sections with inspection records showing compliance	100%
	16.2	Weather Forecasting	weather information is obtained and assessed and appropriate precautionary treatment is carried out to prevent ice forming on the travel way	2 hrs	N/A	N/A	Operations plan details the process and procedures in place and followed	Auditable Sections with inspection records showing compliance	100%
	16.3	Operational Plans	Operate snow and ice clearance plans to maintain traffic flows during and after snowfall and restore the travel way to a clear condition as soon as possible.	2 hrs	N/A	N/A	Operations plan details the process and procedures in place and followed	Auditable Sections with inspection records showing compliance	100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
17) INCIDENT RESPONSE									
	17.1	General	Respond to Incidents and Emergencies in accordance with Sections 22 and 24 of the Technical Provisions	15 min	N/A	N/A	Response times met for 98% of Incidents measured on a 1 year rolling basis. No complaints from Emergency responders.	Auditable Sections with inspection records showing compliance	100%
	17.2	Hazardous Materials	For any hazardous materials spills, comply with the requirements of Section 22 of the Technical Provisions.	1 hr	N/A	N/A	FMP details the process and procedures in place and followed	Auditable Sections with inspection records showing compliance	100%
	17.3	Structural assessment	Evaluate structural damage to structures and liaise with emergency services to ensure safe working in clearing the incident	24 hrs	28 days	6 months	Inspections and surveys as required by incident	Auditable Sections with structures that have suffered damage and for which liaison with emergency services and safe clearance of the damage incident have been carried out.	100%
	17.4	Temporary and permanent remedy	Propose and implement temporary measures or permanent repairs to Defects arising from the Incident. Ensure the structural safety of any structures affected by the incident.	24 hrs	28 days	N/A	Review and inspection of the incident site	Auditable Sections with inspection records showing compliance	100%
18) CUSTOMER RESPONSE									
	18.1	Response to inquiries	Timely and effective response to customer inquiries and complaints	48 hrs	28 days	N/A	Contact the customer within 48 hours following initial customer inquiry. All work resulting from customer requests is scheduled within 48 hours of customer contact. Follow-up contact with the customer within 72 hours of initial inquiry.	Auditable Sections with responses within specified times	100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
							All customer concerns / requests are resolved to TxDOT's satisfaction within 2 weeks of the initial inquiry.		
	18.2	Customer contact line	Telephone line manned during business hours and 24 hour availability of messaging system. Faults to telephone line or message system rectified	24 hrs	28 days	N/A	Instances of line out of action or unmanned	Auditable Sections with operations records showing line availability, including complaints from public.	100%
19) SWEEPING AND CLEANING									
	19.1	Sweeping	i. Keep all channels, shoulders, gore areas, ramps, intersections, islands and frontage roads swept clean ii. Clear and remove debris from traffic lanes, shoulders, verges and central reservations, footways and cycle ways iii. Remove all sweeping without stockpiling in the right of way and dispose of at approved tip	24 hrs	28 days	6 months	Buildup of dirt, ice rock, debris, etc. on roadways and bridges not to accumulate greater than 24 in. wide or ½ in. deep.	Auditable Sections with inspection records showing compliance.	100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	19.2	Litter	i. Keep the right of way in a neat condition, remove litter regularly ii. Pick up large litter items before mowing operations iii. Dispose of all litter and debris collected at an approved solid waste site	24 hrs	28 days	6 months	No more than 20 pieces of litter per roadside mile shall be visible when traveling at highway speed.	Auditable Sections with inspection records showing compliance.	100%
20) BUILDINGS AND ENCLOSED FACILITIES									
	20.1	Buildings and Enclosed Facilities	All structural features of buildings and enclosed facilities (walls, roof, fenestrations, etc.) are safe functional and operational.	24 hrs	7 days	6 months	Perform visual inspection by a Texas Real Estate Commission (TREC) certified Professional Inspector that meets the National Academy of Building Inspection Engineers (NABIE) Standards of Practice for building inspection.	Auditable Sections with all Elements safe, functional and operational. Auditable Sections with inspection and maintenance records showing compliance.	100% 100%
	20.2.1	Electrical Systems, Normal, Electrical & Security Lighting	Lighting system fixtures, lamps and control functioning to provide the intended illumination level, lighting quality, duration, availability of sources and energy efficiency for the task.	8 hrs	7 days	6 months	Regularly scheduled visual inspection(s) of a frequency to determine adequate function for the particular system, both daytime and nighttime, as determined by the Developer. Nighttime lighting level readings of all exterior lighting quarterly. Preventative maintenance of lighting components, circuiting, re-lamping and testing per NFPA 70B, 101, 110 & 111	Auditable Sections with illumination levels of all lighting systems meeting intended levels, quality and duration. Auditable Sections with all inspections conducted and documented. Auditable Sections with all preventative maintenance performed and documented in accordance with the referenced standards. Auditable Sections with original energy efficiency requirements maintained.	100% 100% 100% 100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	20.2.2	Electrical Systems, Fire Detection & Alarm	Fire detection and alarm systems provide the intended detection and notification functions.	4 hrs	7 days	6 months	Visual and demonstration testing monthly to meet the requirements of NFPA 70B and 72. Preventative maintenance of fire alarm components, circuiting, sources and testing per NFPA 70B, 72, 101, 110 & 111. Follow manufacturer's recommendations for maintenance and testing where requirements are more demanding.	Auditable Sections with all fire alarm systems perform as designed and providing the intended level of protection. Auditable Sections with all detectors operating within manufacturer's tolerance for sensitivity and cleanliness. Auditable Sections with all inspections conducted and documented. Auditable Sections with all preventative maintenance performed and documented in accordance with the referenced standards.	100% 100% 100% 100%
	20.2.3	Electrical Systems, Communications to include telephone, Network and CCTV	Communications systems serving their intended functions.	4 hrs	4 days	6 months	Visual and demonstration testing monthly to meet the requirements of NFPA 70B. Preventative maintenance of communication system components, circuiting, sources and testing per NFPA 70B Follow manufacturer's recommendations for maintenance and testing where requirements are more stringent. Continuous monitoring through self-system diagnostics and failure detection.	Auditable Sections with all equipment operating in accordance with manufacturer's recommendations for actual conditions of use. Auditable Sections with all inspections conducted and documented. Auditable Sections with all preventative maintenance performed and documented in accordance with the referenced standards. Auditable Sections free from database and communication system security breaches.	100% 100% 100% 100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
								Auditable Sections with electronic retention of database files, back-ups and other stored media.	100%
	20.2.4	Electrical Systems, Distribution – normal, essential & emergency	Electrical system serving connected loads with intended capacity, voltage regulation, protection, control and monitoring.	2 hrs	3 days	6 months	Regularly scheduled visual and operational testing of electrical equipment, circuits, protection devices, control and monitoring of a frequency to determine adequate function for the particular system. Preventative maintenance and testing per NFPA 70B, 110, 111, manufacturer's recommendations and NETA MTS. Exercising of back-up generators under load where used as Emergency source, monthly. Exercising of ATS switches, semi-annually. Load testing of UPS systems where used as Emergency source, monthly. Monitoring and Testing of individual battery cell condition, annually.	Auditable Sections with all equipment operating in accordance with manufacturer's recommendations for actual conditions of use. Auditable Sections with electrical systems and components serving the intended loads with proper capacity, voltage and frequency. Auditable Sections with protection devices calibrated and set properly for selective coordination. Auditable Sections with all preventative maintenance in accordance with the referenced standards. Auditable Sections where serving as a redundant source, availability of 100%. Auditable Sections with all electrical outages within Developer control documented as to time, duration, loads affected, cause and resulting corrective measures taken. Auditable Sections with adequate on-site storage of	100% 100% 100% 100% 100% 100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
								fuel supply sufficient to meet the intended standby essential operating time. Auditable Sections with continuous monitoring of essential & Emergency sources when consisting of a non-utility source.	100% 100%
	20.2.5	Electrical Systems, SCADA	SCADA system provides intended function of control, monitoring, communication and visual display of all connected systems including integration with other systems.	2 hrs	3 days	6 months	Visual and demonstration testing monthly to meet the requirements of NFPA 70B. Preventative maintenance of SCADA components, wiring, communications, power supplies, sensors and visual displays per NFPA 70B. Follow manufacturer's recommendations for maintenance and testing where requirements are more demanding. Continuous monitoring through self-system diagnostics and failure detection. Like Safety preventative maintenance performed and reported bi-annually.	Auditable Sections with all SCADA systems performing as designed and providing the intended level of control and monitoring. Auditable Sections with all sensors and monitoring devices operating within manufacturer's tolerance for sensitivity. Auditable Sections free from loss of critical or life safety functions due to equipment or system malfunction. Auditable Sections with software and system integration with other systems including ITS and ETCS, debugged, vendor supported and updated to latest release. Auditable Sections with all inspections conducted and documented. Auditable Sections with all preventative maintenance performed and documented in accordance with the referenced standards.	100% 100% 100% 100% 100% 100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
								Auditable Sections free from loss of redundancy due to SCADA system malfunction where the controlled function is in support of other redundant systems.	100%
	20.2.6	Electrical Systems, Grounding & LP	Grounding and lightning protection systems provide intended function and level of protection for equipment, structure and personnel protection.	24 hours	7 days	3 months	Regularly scheduled visual inspection(s) of a frequency to determine adequate function for the particular system, as a minimum annually. Perform preventative maintenance and testing in accordance with NFPA 70B, 780, manufacturer's recommendations and NETA MTS. The fall of potential method shall be used to test the resistance to earth of all grounding electrode systems serving electrical services, lightning protection and alternate energy sources, every 5 years. The continuity of ground connections to remote earth shall be tested during replacement of equipment served or any major change of system configuration.	Auditable Sections with all bonding, grounding and lightning protection connections passing visual inspection and not showing signs of corrosion. Auditable Sections with all fall of potential tests demonstrating proper resistance to earth. Auditable Sections with all continuity tests showing proper resistance. Auditable Sections with inspection & maintenance records showing compliance	100% 100% 100% 100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	20.3.1	Plumbing Systems	All plumbing systems (domestic water, gas, drains, sewerage) operational and functioning properly.	24 hrs	7 days	1 month	An inspection, maintenance, and rehabilitation plan shall be developed and adhered to. The plan shall be based on the FHWA Highway and Rail Transit Tunnel Inspection Manual, FHWA Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, and manufacturer's recommendations.	Auditable Sections with maintenance performed and documented in accordance with the Maintenance Management Plan. Auditable Sections with all equipment in satisfactory physical condition and systems/equipment operating per design	100% 100%
	20.3.2	HVAC Systems	All heating, ventilating and air conditioning systems (chillers, air handling units, heating systems, etc.) operational and functioning properly.	8 hrs (2 hrs if serving critical space(s) or equipment).	7 days	1 month	An inspection, maintenance, and rehabilitation plan shall be developed and adhered to. The plan shall be based on the FHWA Highway and Rail Transit Tunnel Inspection Manual, FHWA Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, and manufacturer's recommendations.	Auditable Sections with maintenance performed and documented in accordance with the Maintenance Management Plan. Auditable Sections with all equipment in satisfactory condition and systems/equipment operating per design	100% 100%
	20.3.4	Fire Suppression Systems	All fire suppression systems (sprinkler, standpipe, clean agent, fire extinguishers, etc.) operational and functioning properly.	2 hrs	7 days	1 month	Inspection, maintenance, and rehabilitation plans shall be developed and adhered to. The plan shall be based on the FHWA Highway and Rail Transit Tunnel Inspection Manual, FHWA Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, and applicable NFPA standards.	Auditable Sections with maintenance performed and documented in accordance with the applicable NFPA code. Auditable Sections for which the physical condition and configuration of fire protection equipment is satisfactory and proper, respectively, based on visual inspection. Auditable Sections free from alarms, supervisory or trouble	100% 100% 100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
								signals on fire alarm control panels.	
21) SUBSURFACE MANAGED LANE ELEMENTS									
	21.1	Subsurface Structures including but not limited to tunnels and tunnel ancillary facilities and spaces (General Purpose lane cantilever structure and supports – see Element Category 3)	All subsurface structures shall be free of Defects.	24 hrs	28 days	6 months	An inspection, maintenance, and rehabilitation plan shall be developed, documented as part of the Maintenance Management Plan, and adhered to. The plan shall be based on the FHWA "Highway and Rail Transit Tunnel Inspection Manual, 2005" and the FHWA "Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, 2005".	Auditable Sections free of moderate or severe Defects Auditable Sections free of any conditions exposing rebar	100% 100%
	21.2	Structural Supports & Connections for all miscellaneous structural attachments or supports. Specific items may include but not limited to include support for signage, ventilation equipment, fire detection and protection items, safety items, and any item attached to a larger structural element.	Structural Supports & Connections for all miscellaneous structural attachments or supports shall be free of defects.	24 hrs	7 days	3 months	An inspection, maintenance, and rehabilitation plan shall be developed, documented as part of the Maintenance Management Plan, and adhered to. The plan shall be based on the FHWA "Highway and Rail Transit Tunnel Inspection Manual, 2005" and the FHWA "Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, 2005".	Auditable Sections with full capacity connections in accordance with the design and manufacturer's requirements Auditable Sections free of loss of connection material due to impact, corrosion, or wear. Auditable Sections: • Free of loose connections or bolts. • Free of deterioration or damage of base structure material • Free of movement of supported item. • Free of excessive vibration of supported item.	100% 100% 100% 100% 100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	21.3	Retaining Walls	As a minimum the items listed as defects in the FHWA "Highway and Rail Transit Tunnel Inspection Manual, 2005" Chapter 4, Section A.	2 hrs	7 days	3 months	A subsurface retaining wall inspection, maintenance, and rehabilitation plan shall be developed and adhered to. The plan shall be based on the FHWA Highway and Rail Transit Tunnel Inspection Manual and the FHWA Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual.	Auditable Sections: • Free from moderate or severe conditions of concrete as defined by FHWA • With vertical tolerance of wall ½" per 10' of wall height • With wall panel offset of ¾" or less • With no joint with exposed filter fabric or backfill material • With no concrete to concrete contact • With no loss of joint seal material • With no settlement of structures or backfill material resulting with non compliance of pavement criteria	100% 100% 100% 100% 100% 100% 100%
	21.4	Waterproofing	The Subsurface Managed Lanes Structures shall be free of leaks.	24 hrs	28 days	6 months	An inspection, maintenance, and rehabilitation plan shall be developed, documented as part of the Maintenance Management Plan, and adhered to. The plan shall be based on the FHWA "Highway and Rail Transit Tunnel Inspection Manual, 2005" and the FHWA "Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, 2005".	Auditable Sections: • That adhere to maximum allowable water infiltration rate defined in Technical Provision. • Free of dripping water on travel lanes • In full compliance with additional requirements in the referenced FHWA Inspection Manual • Free of water infiltration causing unsafe conditions	100% 100% 100% 100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	21.5	Finishes	All finishes shall be free of Defects.	24 hrs	28 days	6 months	An inspection, maintenance, and rehabilitation plan shall be developed, documented as part of the Maintenance Management Plan, and adhered to. The plan shall be based on the FHWA "Highway and Rail Transit Tunnel Inspection Manual, 2005" and the FHWA "Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, 2005".	Auditable Sections: • Maintaining level of reflectivity and brightness consistent with lighting level criteria. • Free of loose or damaged finish materials • With fully functional emergency equipment such as exit signage, lights, hose cabinets, fire alarm boxes and communications equipment. • With maintained colors and design characteristics consistent with aesthetic requirements.	100% 100% 100% 100%
	21.6	Drainage	Subsurface drainage and pumping systems fully operational and clear of debris.	2 hrs	7 days	6 months	An inspection, maintenance, and rehabilitation plan shall be developed and adhered to. The plan shall be based on the FHWA Highway and Rail Transit Tunnel Inspection Manual, FHWA Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, and manufacturer's recommendations.	Auditable Sections: • With maintenance performed and documented per the Maintenance Management Plan. • With flow rates established per design • Free from blockage due to sedimentation or calcification • With fully functional pumping components and systems, screeds, and control and monitoring equipment.	100% 100% 100% 100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	21.7	Fire Protection	Fire protection systems (e.g., fire detection, alarm, notification and suppression systems) fully functional and operational.	2 hrs	7 days	3 months	Inspection, maintenance, and rehabilitation plans shall be developed and adhered to. The plan shall be based on the FHWA Highway and Rail Transit Tunnel Inspection Manual, FHWA Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, and applicable NFPA standards. Life Safety preventative maintenance performed and reported bi-annually.	Auditable Sections: • With maintenance performed and documented in accordance with the Maintenance Management Plan and applicable NFPA code. • For which the physical condition and configuration of fire protection equipment is satisfactory and proper, respectively, based on visual inspection. • Free from alarms, supervisory or trouble signals on fire alarm control panels.	100% 100% 100%
	21.8.1	Electrical Systems, Normal & Emergency Lighting	Lighting system fixtures, lamps and control functioning to provide the intended illumination level, light output, lighting quality, duration and energy efficiency, for the location.	8 hrs	7 days	6 months	An inspection, maintenance, and rehabilitation plan shall be developed and adhered to. The plan shall be based on the FHWA Highway and Rail Transit Tunnel Inspection Manual, FHWA Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, and manufacturer's recommendations. Daytime and nighttime lighting level readings of all lighting levels, quarterly. Calibration of luminance meter, every 3 years. Walk tests of emergency lighting equipment to demonstrate proper function.	Auditable Sections: • For which illumination levels of all lighting systems meet intended levels, quality and duration. • With all inspections conducted and documented. • With all preventative maintenance performed and documented in accordance with the referenced standards. • With original energy efficiency requirements maintained. • With luminance meter calibrated.	100% 100% 100% 100% 100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
							Life Safety preventative maintenance performed and reported bi-annually. Preventative maintenance of lighting circuiting and sources per NFPA 70B, 101, 110 & 111.		
	21.8.2	Electrical Systems, Fire Detection & Alarm	Fire detection and alarm systems provide the intended detection and notification functions.	2 hrs	4 days	6 months	An inspection, maintenance, and rehabilitation plan shall be developed and adhered to. The plan shall be based on the FHWA Highway and Rail Transit Tunnel Inspection Manual, FHWA Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, manufacturer's recommendations, NFPA 70B and 72. Preventative maintenance of fire alarm sources and testing per NFPA 70B, 72, 101, 110 & 111. Follow manufacturer's recommendations for maintenance and testing where requirements are more demanding. Continuous monitoring through self-system diagnostics and failure detection.	Auditable Sections: • For which all fire alarm systems perform as designed and provide the intended level of protection. • With all detectors operating within manufacturer's tolerance for sensitivity and cleanliness. • With all inspections conducted and documented. • With all preventative maintenance performed and documented in accordance with the referenced standards.	100% 100% 100% 100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
	21.8.3	Electrical Systems, Communications to include AM/FM Rebroadcast, 2-way Radio, Telephone and CCTV	Communications systems serving their intended functions	4 hrs	4 days	6 months	An inspection, maintenance, and rehabilitation plan shall be developed and adhered to. The plan shall be based on the FHWA Highway and Rail Transit Tunnel Inspection Manual, FHWA Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, and manufacturer's recommendations. Operational tests using 2-way radio equipment and frequencies to match outside agencies served, weekly. Continuous monitoring through self-system diagnostics and failure detection. CCTV system compliance with NFPA 72 inspection and maintenance requirements for fire detection, where used.	Auditable Sections: • With all equipment operating in accordance with manufacturer's recommendations for actual conditions of use. • With 2-way radio system performance conforming with up-to-date using agency specifications • With CCTV system complying with all requirements required to function as second means of fire detection. • With all inspections conducted and documented. • With all preventative maintenance performed and documented in accordance with the referenced standards. • Free from database and communication system security breaches. • With electronic retention of database files, back-ups and other stored media.	100% 100% 100% 100% 100% 100% 100%
	21.8.4	Electrical Systems, Distribution – Normal, Essential & Emergency	Electrical system serving connected loads with intended capacity, voltage regulation, protection, control and monitoring.	2 hrs	3 days	6 months	An inspection, maintenance, and rehabilitation plan shall be developed and adhered to. The plan shall be based on the FHWA Highway and Rail Transit Tunnel Inspection Manual, FHWA Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, and manufacturer's recommendations.	Auditable Sections: • With all equipment operating in accordance with manufacturer's recommendations. • Free from loss of electrical source to connected loads due to electrical system component or installation failure. • With protection devices	100% 100% 100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
							Preventative maintenance and testing of essential & Emergency sources per NFPA 110 and 111. Exercising of back-up generators under load where used as essential & Emergency sources, monthly. Exercising of ATS switches, semi-annually. Load testing of UPS systems where used as essential & Emergency source, monthly. Monitoring and Testing of individual battery cell condition, annually.	calibrated & set properly. • With preventative maintenance in accordance with the referenced standards. • That, where serving as a redundant source, availability of 100%. • For which all electrical outages within Developers control documented as to time, duration, loads affected, cause and corrective measures taken. • For which the capacity, duration and availability of non-utility essential or emergency sources meet the design requirements. • With adequate on-site storage of fuel supply sufficient to meet the intended standby essential operating time. • With continuous monitoring of essential Emergency sources when consisting of a non-utility source.	100% 100% 100% 100% 100% 100%
	21.8.5	Electrical Systems, SCADA	SCADA system provides intended function of control, monitoring, communication and visual display of all connected systems including integration with other systems.	2 hrs	3 days	6 months	An inspection, maintenance, and rehabilitation plan shall be developed and adhered to. The plan shall be based on the FHWA Highway and Rail Transit Tunnel Inspection Manual, FHWA Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, and manufacturer's recommendations. Follow manufacturer's	Auditable Sections: • With SCADA systems providing the intended level of control and monitoring. • For which trouble conditions are corrected and cleared within 72 hours. • With all sensors and monitoring devices operating within manufacturer's tolerance for sensitivity. • Free from loss of critical or	100% 100% 100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation	Permanent Remedy	Permanent Repair			
							recommendations for maintenance and testing where requirements are more demanding. Continuous monitoring through self-system diagnostics and failure detection.	life safety functions due to equipment or system malfunction. • With software and system integration with other systems including ITS and ETCS, debugged, vendor supported and updated to latest release. • With inspections and preventative maintenance in accordance with the referenced standards. • With availability on-site or within 2 hours of spares for all critical components serving critical or life safety functions. • Free from loss of redundancy due to SCADA system malfunction where the controlled function is in support of other redundant systems.	100% 100% 100% 100% 100%
	21.8.6	Electrical Systems, Grounding & LP	Grounding and lightning protection systems provide intended function and level of protection for equipment, structure and personnel protection.	24 hours	7 days	3 months	An inspection, maintenance, and rehabilitation plan shall be developed and adhered to. The plan shall be based on the FHWA Highway and Rail Transit Tunnel Inspection Manual, FHWA Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, manufacturer's recommendations and NFPA 780. The fall of potential method shall be used to test the resistance to earth of all grounding electrode systems	Auditable Sections: • For which all bonding, grounding and lightning protection connections pass visual inspection and do not show signs of corrosion. • For which all fall of potential tests demonstrate proper resistance to earth. • For which all continuity tests show proper resistance. • With inspection & maintenance records showing compliance	100% 100% 100% 100%

Performance and Measurement Table Baseline

ELEMENT CATEGORY	REF	ELEMENT	PERFORMANCE REQUIREMENT	RESPONSE TO DEFECTS			INSPECTION AND MEASUREMENT METHOD *	MEASUREMENT RECORD *	TARGET
				Category 1		Category 2			
				Hazard Mitigation		Permanent Repair			
							serving electrical services, lightning protection and alternate energy sources, every 5 years. The continuity of ground connections to remote earth shall be tested during replacement of equipment served or any major change of system configuration.		
	21.9	Ventilation System	Ventilation System fully functional and operational.	2 hrs	7 days	1 month	An inspection, maintenance, and rehabilitation plan shall be developed and adhered to. The plan shall be based on the FHWA Highway and Rail Transit Tunnel Inspection Manual, FHWA Highway, Rail Transit Tunnel Maintenance and Rehabilitation Manual, and manufacturer's recommendations. Life Safety preventative maintenance performed and reported bi-annually. Life safety components of the tunnel ventilation system tested annually, Verification of OCC activation and separately, local activation of tunnel ventilation life safety response, annually.	Auditable Sections: • With maintenance performed and documented per the Maintenance Management Plan. • For which the physical condition and configuration of fire protection equipment is satisfactory and proper, respectively, based on visual inspection. • For which Supervisory Control and Data Acquisition system operates and monitors system properly.	100% 100% 100%

* Items in these columns shall be reviewed annually by Developer as part of the MMP to comply with Technical Documents and/or Good Industry Practice