



Summary of Enhancements and Technologies

Elements	Components	Initial Phase (1 -3 years)	Phase 2 (4 - 6 years)	Phase 3 (6+ years)
Smart Yards				
	Paved yard	16 acres (10.4 acres paved)		
	Automated trailer breakdown and container lifter system	Automated freight container transfer from truck trailer to yard jockey trailer Automated yard jockey trailer/Over-the road transfer vehicle (2) Automated container loader (2)	Pallet or other non-conforming form factor freight transfer from truck trailer to yard jockey trailer Addition automated over-the-road transfer vehicles as needed	Addition automated over-the-road transfer vehicles as needed Addition automated container loader (2)
	Opportunity charging for freight jockeys	2 chargers, 480v, horizontal "pantograph" charging stations	Additional chargers as needed	Additional chargers as needed
	Electric truck charging stations	2 DC Fast truck charging stations		
	Rail Intermodal @ Norfolk Southern Goodman Yard	4 acre intermodal yard with rail siding Freight container transfer between train, truck and automated freight movers		
Truck Parking and Long Combination Breakdown Lot				
	Paved truck parking and trailer layover area	16 Acres (10.4 acres paved)		
	Alternative fueling stations	9 DC Fast charging stations 1 500kW charging station 2 CNG fueling stations Provisions for future refueling options	20 DC Fast charging stations 7 500kW charging stations 2 alternative refueling stations (potentially hydrogen)	20 DC Fast charging stations 5 heavy duty charging stations, hydrogen powered
	Real-time truck parking information system with dynamic message signs (DMS) on Ohio Turnpike and I-76	Truck counting system with eight DMS signs, two on each approach (East-West) connected to OTIC Fiber on Ohio TPK		
Smart Corridors				
	Automated freight (over-the-road)	Repurpose existing lanes with the ZONE (via lane repurpose) to create dedicated freight/transit lanes on major roadways (Tod Ave, Hallock Young Rd, Ellsworth Bailey Rd)	Expand deployment to secondary roadways within the Zone, operating in mixed traffic	Expand deployment to additional routes outside the Zone. Reallocate dedicated lanes as traffic demand warrants and operate in mixed traffic on the major routes within the Zone
	Freight Signal Priority (V2X communication)	C-V2X roadside units at signals and outfitting automated freight movers with on-board units (OBUs)	Expand OBU deployment to third party freight companies	Expand third party freight deployment
	In-road inductive charging	Initiate P3 proof-of-concept on select roadway (major route) for in-motion, inductive charging. Install necessary power infrastructure within smart corridors to support wider deployment	Expand proof-of-concept to pilots on main corridors	Convert pilots to full-scale deployment and Implement on expanded deployment routes (20% of routes)
	Situational awareness devices at intersections	Conduct a pilot program with vendor/solution provider at 1-2 locations for collision avoidance application for OBUs deployed with the project	Full scale deployment at all signalized intersections	Introduce additional infrastructure applications, such eco-approach and departure, pedestrian conflict and smart phone applications
	Fiber communication	Install dedicated system fiber and leased fiber within ROW (432-strand microfiber)	Install dedicated system fiber and leased fiber within ROW	
Power and Electrification				
	Solar field/farm and storage	9 acres solar array, provisions for modular energy storage, and distribution infrastructure	Additional 31 acres solar array with 2 MWh of Vanadium Redox Battery Storage	Complete scale to electric utility district with microgrid
	Private EV charging stations at businesses	Add EV charging station(s) for each business that becomes a partner in the Zone (10 stations)	Add EV charging station(s) for each business that becomes a partner in the Zone	Add EV charging station(s) for each business that becomes a partner in the Zone
Distribution Priority and Mission Control System				
	Central control cloud based system	Automated environment within the Zone	Expand system to additional routes and distribution network within the Zone	Expand system to additional routes and distribution network outside the Zone
	Interface to external distribution systems	Non-automated modes within the larger distribution network (Warren, Youngstown, YNG)		
Data Communications				
	Communication totems with LoRaWAN wireless, Wi-Fi, and 5G edge computing	Install communications for each business that becomes a partner in the Zone	Install communications for each business that becomes a partner in the Zone	Install communications for each business that becomes a partner in the Zone
	Connection to ODOT ESP and OARnet	Connection via OTIC/Lumen leased fiber		
Transit				
	First/last mile (FMLM) AV transit	Deploy FMVSS compliant small transit buses (2) in dedicated lanes on major routes (Tod Ave, Hallock Young Rd, Ellsworth Bailey Rd)	Remove driver/safety attendant and transition from fixed-route to on-demand FMLM	Add additional vehicle Expand to mixed traffic within and outside the zone
	Long-haul automated bus	Support existing Warren/ Youngstown traditional service	Bus platooning pilot	Full scale automated bus deployment
	WRTA Regional Transit Hub (SE Quad I-76 & S Bailey Rd)	Support the development of the Transit Hub with integrate smart corridor backbone and informational signage	Integrate on-demand scheduling with WRTA and kiosk at hub	
Regional Transportation Network Improvements				
	Modernize turnpike interchanges			Improvements as necessary based on traffic demand and congestion
	Rail crossing upgrades		Prioritize rail crossing improvements based on traffic demand and safety analysis as development grows	Prioritize rail crossing improvements based on traffic demand and safety analysis as development grows
	Intersection and traffic signal improvements		New signal at Ellsworth Bailey Road and Industrial Trace Road Improvements as necessary based on traffic demand and congestion	Improvements as necessary based on traffic demand and congestion