NYSDOT-FHWA PROTECT Funding Eligibility Matrix

The FHWA FACT SHEET defines the PROTECT program purpose as:

> *The BIL establishes the Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Formula Program to help make surface transportation more resilient to natural hazards, including climate change, sea level rise, flooding, extreme weather events, and other natural disasters through support of planning activities, resilience improvements, community resilience and evacuation routes, and at-risk costal infrastructure.*

This matrix has been developed in consultation with FHWA-NY to identify project types and scopes that are eligible for funding under the PROTECT program. With the exception of capacity and LOS improvements, this table is intended to allow programming of funds that meet the criteria noted without project specific review by FHWA. FMIS phase authorization request should note “Complies with NYSDOT/FHWA PROTECT funding eligibility matrix”

Asset Type	Scope	Resilience Criteria	Evac. Route Criteria	Criteria Required for Specified Funding Eligibility
Bridges	State of Good Repair (SOGR) Rehab or Replacement – ‘Average’ route	NO	NO	
	SOGR Rehab or Replacement	NO	100%	a. Governmental designation as evacuation route, **OR** b. NYSDOT Functional Class Interstate (1, 11) or Expressway (2,12) **AND** c. At least one NBI rating of POOR
	SOGR Replacement – Over water	Up to 100% (1)	NO	a. 100% if work scope limited to replacement of bridge and approach work required for replacement **AND** b. Designed to current NYSDOT hydraulic standards. This includes key parameters such as: a. Peak flows increased to account for future projected peak flows (10%-20% above USGS ‘StreamStats’ tool b. 2-feet of freeboard for Q50 and dry superstructure at Q100. c. Permanent structures supported on deep foundations or founded on competent bedrock. d. Increased hydraulic capacity for ‘Critical Bridges’ e. Slope protection with stone fill to an elevation 1-ft above design high water. In addition, note that NYSDOT practice favors integral abutments for single spans and continuous spans in multi-span locations. Both of these practices lead to a more resilient structure. See notes below for additional explanation of these design factors. Note (1): If there is significant ancillary work on the project that is not required by the bridge replacement, only that share of the project linked to the bridge shall be eligible for PROTECT funding.
	Scour/hydraulic element specific work.	100%	NO	Work such as check dams, micro-pile retrofits, heavy stone armoring or other related work.
Large Culverts (5-ft to 20-ft span)	SOGR Replacement. Bring to modern hydraulic standards	100%	NO	Design to current NYSDOT Highway Design Manual hydraulic standards. Similar to bridges, these standards include a 10% to 20% increase in peak flows to account for future projected increases, as well as numerous other risk based criteria to improve resiliency.
	Rehab: Invert paving/reline metal pipes.	100%	NO	Improves resiliency by armoring against debris damage and internal piping of embankment from corrosion holes in steel pipes.
Slopes & Walls	Replacement / Repair	100%	100%	1. Walls a. Wall supports roadway itself or material above roadway where failure would impact travelled way, **AND** b. Wall is judged to be in POOR condition requiring replacement. 2. Slopes a. Slope has evidence of movement/failure that could impact travelled way if continued.
Drainage	Improvement at location with known drainage problem history	100%	NO	Acceptable with known history noted.
	General surface or closed drainage renewal.	100%	NO	Full funding where complete reconstruction performed to Highway Design Manual standards.
Highway	Capacity/LOS improvement	NO	FHWA review required	
	SOGR Paving - any route	NO	NO	

Additional detail regarding NYSDOT bridge design resiliency benefits:

a. **<u>Integral abutments</u>**. – The integral/fixed connection between the superstructure/girders and the abutment decrease the likelihood that the superstructure will become displaced from its supports during an extreme/flooding event. The deep foundations inherent with integral abutments in NYS also provide resiliency against scour failures/collapse of the bridge during extreme flooding events. Integral abutments are a preferred NYSDOT design option for many geometries.

b. **<u>Increased waterway opening</u>**. – Increasing the hydraulic opening for proposed/replacement bridges typically lowers the water surface elevations both at the bridge and immediately upstream for both low flow and design flow flood events, thus increasing available freeboard. Debris obstructing the bridge opening during flood events can lead to increased flow velocities at the bridge, which may increase the calculated scour depths at the substructures. Debris obstructing a bridge opening can also cause an increase in backwater elevations above those calculated for non-obstructed flow. Increasing freeboard improves the resiliency of a bridge by lowering the probability that flooding effects will be exacerbated by debris obstructing the bridge's hydraulic opening. Current design flows are increased 10% in the western portion of NYS, and 20% in eastern portion of NYS, as prescribed in the NYSDOT Bridge Manual. These increased flows are used for all new designs of bridges over water. These increases to flow are implemented to account for possible future climate change effects resulting in more extreme rainfall/flooding events.

c. **<u>Deep foundations</u>** (either replaced or new where shallow foundations previously) -Bridges founded on shallow foundations are vulnerable to sudden/catastrophic collapse due to scour. Undermining and erosion of the soil supporting a shallow foundation (spread footing) can cause instability and failure of the substructure. Deep/pile foundations, properly designed for calculated scour depths, remain stable after scour occurs at design and extreme flooding events. NYSDOT design standards require permanent structures over water to be supported on deep foundations or to be founded on competent bedrock.

d. **<u>Channel/bank armoring</u>** – Armoring of channels, stream banks, roadway embankments, and disturbed ground regions around substructures increases the resistance to erosion for a given flow event. Armoring can take different forms not limited to riprap (placed stone), grouted riprap, pinned/unpinned block walls, grout bags, wire enclosed riprap mattresses, and/or soil cement. The improved resistance to erosion increases the bridge's resiliency to scour. Armoring is a routine design element of most bridges over water.

e. **<u>Check dams</u>** – Natural processes causing degradation of the streambed at the bridge location can be arrested using a check dam. A check dam placed downstream of a bridge will decrease flow velocities and reduce or eliminate degradation of the channel immediately upstream. Channel degradation is a component of the total calculated scour at a bridge. Limiting/eliminating channel degradation increases a bridge's resiliency to scour. The need for check dams is considered on a case-by-case basis.

f. **<u>Spurs/Vanes/Guide Banks</u>** - Stream alignment with the bridge opening influences the scour effects at the substructures. Lateral migration and/or meandering of the channel can lead to an adverse alignment of the channel to the bridge opening. Spur/vane/guide bank structures, typically comprised of heavy stone, placed upstream of the bridge can alter the direction of flow. These flow training structures can restore/improve the alignment of the channel to the bridge opening. Correcting adverse stream alignment improves the bridge's resiliency to scour. These options are considered on a case-by-case basis.

g. **<u>Streambank Plantings/Vegetation</u>** – Similar to spurs & vanes, targeted planting/placement of bank vegetation can increase the resistance to erosion of the stream bank. Limiting/preventing streambank erosion can arrest lateral migration of a channel before an adverse alignment to the bridge opening develops or worsens. Maintaining or improving the channel alignment to the bridge opening increases the bridge's resiliency to scour. These options are considered on a case-by-case basis.