

Spruce Street Bridge Reconstruction

Category: Under \$20 Million • 2024 Project of the Year Award



Presented to:



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Completed Entry Form

ASHE NJ 2024 PROJECT OF THE YEAR



AMERICAN SOCIETY OF HIGHWAY ENGINEERS (ASHE) NORTH CENTRAL & SOUTHERN NEW JERSEY SECTIONS 2024 PROJECT OF THE YEAR AWARD

ENTRY FORM

Project Name: Spruce Street Bridge Reconstruction Location: Paterson, NJ, Passaic County, New Jersey Date of completion: September 2022 Total construction cost: \$5.8 Million

APPLICANT DATA

OWNER

Name: Passaic County Contact Person: Jonathan Pera, County Engineer Address: Passaic County Engineering Department, Passaic County Administration Building 401 Grand Street, Room 524, Paterson, NJ 07505 Phone: (973) 881-4456 Email: jonathanp@passaiccountynj.org

DESIGNER

Name: WSP USA Inc. Contact Person: Steve Esposito Address: 2000 Lenox Drive, 3rd Floor, Lawrenceville, NJ 08648 Phone: (609) 512-3505 Email: Steve.Esposito@wsp.com

CONTRACTOR

Name: Grade Construction Contact Person: Joseph Diaco Address: 110 Pennsylvania Ave, Paterson, NJ 07503 Phone: (973) 925-4021 Email: joe@gradeconstruction.net

Executive Summary

Now affectionately referred to by residents as the "Gateway to the Falls," superstructure rehabilitation and aesthetic upgrades have increased the safety and brought back the history of the Spruce Street Bridge. Spanning the Passaic River and built in 1931, the original bridge exceeded the expected service life of its deck. The five-span structure required constant maintenance. Labeled structurally deficient due to the deck condition and with a functionally obsolete cross section that was inconsistent with the safety goals of the dense urban environment, the Spruce Street Bridge was in need of reconstruction.

WSP USA Inc. (WSP) was selected by Passaic County to design the bridge superstructure reconstruction. The project included the full replacement of the bridge deck, profile improvements, enhanced pedestrian accessibility across the bridge, signal upgrades at the intersection of Wayne and Totowa Avenues, and traffic improvements along Spruce and Front Streets.

With high volumes of vehicular and pedestrian traffic and adjacent to the Paterson Great Falls National Historical Park there was an active community with vested interest in the improvements to this popular and highly traveled bridge. WSP refused to work under an assumption that the community's needs were widely known and a robust stakeholder outreach program was conducted to be sure that all parties were connected, understood, and satisfied with the direction of the project.

WSP's innovative plan called for the existing, deteriorated bridge deck to be replaced with a new composite high-performance concrete deck, detailed to accommodate significant profile changes. A side effect of smoothing out the severe dip at the north end of the bridge without replacing the existing substructure or stringers was uncommonly large concrete haunches on the stringers. Further complicating this detail was the design team's desire to make the existing steel stringers composite with the new deck. To accomplish these goals, a one of a kind plan was developed which used mild steel reinforcement to prevent cracking in the deep concrete haunches, as well as shear studs stacked two and three high to properly transfer shear loads from the deck to the existing stringers. Avoiding a full bridge replacement saved millions of dollars and a lengthy permitting schedule that would not have fit the need for swift improvements.

The reconstruction eliminated a vehicle lane and an unsafe turning condition at Front Street by increasing the sidewalk widths on both sides of the bridge. This also allowed for safer pedestrian flow to the eight nearby schools, the Paterson Great Falls, and the revitalized Historic Hinchcliffe Stadium. Special attention was given to incorporate elements that paid tribute to the original bridge elements and the surrounding environment including new parapets, lighting, stamped concrete and banner poles. For example, a special concrete mix was also specified for the new parapet to create a coarse aggregate appearance that would blend seamlessly with the remaining historic balustrade adjacent to the bridge. Also, help reduce the energy demand on the City, a special lighting analysis for the unique historic lighting fixtures with LED technology was conducted to replace the existing high pressure sodium fixtures.

The Spruce Street Bridge is a vital transportation link for residents and tourists in the Historic District of Paterson and the project received positive feedback from the community. They have seen an unexpected transformation of utilitarian infrastructure to a structure that meets performance expectations and significantly enhances safety, mobility, pedestrian access, and aesthetics. The excitement generated for the project was demonstrated at the ribbon cutting event held on September 21, 2022. The event also featured a student who came to speak about the importance of the structure for his individual use and what it means to the community. The project has helped re-invigorated the area encouraging more visitors to Paterson's Great Falls National Historical Park and soon some baseball at Hinchcliffe Stadium.

Project Description

PROJECT DESCRIPTION

The need for major improvements at the Spruce Street Bridge over the Passaic River was not a topic of debate. From its deck, which had far exceeded its expected service life and required constant maintenance, to the structurally deficient and functionally obsolete classifications, the bridge needed rehabilitation. Passaic County requested proposals from consultants for the reconstruction of the historic bridge adjacent to the Paterson Great Falls. The bridge is located partly within the New Jersey Register of Historic Places - listed Great Falls of Paterson/Society for Useful Manufacturers Historic District.

WSP USA Inc. was selected based on its understanding and approach to the unique project. Since that point, WSP has been committed to restoring the historic Spruce Street Bridge to its original status as a safe and functional throughway for vehicular and pedestrian traffic alike.

Complexity

The complexity of the reconstruction stemmed largely from the unique details of the project constraints and economic goals. Smoothing out the severe dip at the north end of the bridge without replacing the substructure or stringers would yield uncommonly large concrete haunches on the stringers. Further complicating this detail was the design team's desire to make the existing steel stringers composite with the new deck. WSP developed a one-of-a-kind plan using mild steel reinforcement to prevent cracking in the deep concrete haunches, as well as shear studs stacked two and sometimes three high to properly transfer shear loads from the deck to the existing stringers. The large haunches also required the design team to verify the location of the neutral axis under truck loading and to check that excessive tension was not experienced in the reinforced concrete haunches.

Selecting a parapet that maintained the safety of travelers and restored the historical aesthetic was an exceptional task. WSP conducted field surveys of the balustrades and scoured original as-built drawings to understand the aesthetic of the historic bridge that the County wanted to replicate. To restore the historic look to bridge, the design team specified that the concrete of the new, widened sidewalks must be stamped to create a hand-made, old-fashioned look. A special concrete mix was specified for the new parapet to create a coarse aggregate appearance that would blend with the historic balustrade. Details were coordinated with the Historic Preservation office to ensure the desired aesthetics could be achieved.

The banner poles were another unique complexity. One steel banner pole with a decorative base to match the new light poles on the bridge was installed on each fascia. The poles were an important feature of the reconstructed bridge because of the critical location and the desire to advertise local events and festivities. The concrete anchorage for the poles was designed for necessary wind load on signs and carefully detailed to be structurally safe with minimal bulk, as not to ruin the aesthetic of the fascia.

New Application of Existing Technologies / Originality / Innovation

The purpose of this reconstruction was to restore the structure to safe operating condition fore vehicular traffic and pedestrians traveling to school and local attractions. The existing bridge featured two lanes northbound and southbound. An intensive traffic analysis and corridor study was followed by an implemented traffic calming measure. One northbound lane was eliminated and the additional space in the bridge's cross-section, and increased overhangs allowed the sidewalks to be widened.

The existing profile of the bridge was substandard. While improving the profile was not originally planned, WSP identified the problems, and several improvement alternatives were presented. The solution mitigated structural impacts and the limits of pavement reconstruction. The profile was raised more than 1 foot at critical points. Deep concrete haunches made up the grade difference on the bridge. The haunches were reinforced and included two levels of shear connectors to properly develop composite action between the deck and steel stringers. The lower-level of studs were welded to the stringers, and the upperlevel studs were welded to the lower level.

The northwest corner of the bridge includes flared stringers and curved decking to accommodate the intersection with Front Street. Originally, left and right turning movements from Spruce Street onto Front Street were allowed along with left and right turns from Front Street onto Spruce Street. This led to frequent congestion bottlenecks during peak travel hours. Front Street was modified to one-way travel near the intersection, maintaining the right turn from Front Street onto Spruce Street. A new traffic signal system was designed at the Spruce Street and Totowa Avenue intersection. This required all new poles, ADA ramps, new conduits, new timing and phasing, and a new controller. This vastly improved the flow of traffic and safety along the corridor.

Social / Economic Considerations

The Spruce Street Bridge is a vital transportation link for residents and tourists in the Historic District of Paterson. With eight (8) schools within several blocks of the bridge, high volumes of vehicular and pedestrian traffic are continuous. The bridge sits at the center of the Great Falls National Park redevelopment which includes the reconstruction of historic Hinchliffe Stadium (newly announced home of the minor league NJ Jackals). This means that the heavily used structure will continue to get more traffic and be a key point of commerce for the community.

The design for the project was very forward thinking in this regard. Instead of looking to add lanes to account for the redevelopment, focus was put on serving the community with not only an improved traveled bridge for vehicles, but a safe and inviting structure for pedestrians looking to connect to key points in the area. Such a bold change in direction needed to be fully vetted by stakeholders and the public. A rendering was developed during design to adequately demonstrate the key project features for the public.

Details about the project and the key features related to the number of lanes, sidewalk sizes, aesthetic treatments and profile improvements were communicated early with the stakeholders to achieve a consensus on how to proceed with the project.

A key element to maintaining an economical design for this project was the ability to verify the structure's life could be extended effectively without replacing the substructure or primary bridge stringers. Maintaining the bridge stringers saved approximately \$5.5M. Avoiding a full bridge replacement saved approximately \$20M and a lengthy permitting schedule.

Safety

Improved safety for the public was always the priority. The reconstruction alleviated the obvious structural concerns. Designed to current AASHTO and NJDOT Bridge Design Manual standards, the structure allows both traffic and pedestrians to travel safely. Newly installed elements promote safety for all transportation modes. Careful planning for work around utilities was conducted during design and verified during construction, ensuring that the appropriate clearances were available for all work activities and equipment used on- site. Precautions were also taken to ground all metal components. Provisions to protect crews and civilians were required. In terms of day- to- day safety, the field team showed an exemplary commitment to working within the developing COVID- 19 guidelines, as construction was completed without any major outbreaks, work stoppages, or any OSHA violations.

Aesthetics and Sustainable Features

Key features including sidewalk sizes, aesthetic treatments (historic lighting elements, historic open balustrades with exposed aggregate finishes, and custom banner poles), and profile improvements were discussed stakeholders early in design to achieve a consensus. These details were shared with the County's Planning and Traffic groups, the City of Paterson, the Historic Preservation Commission for the City of Paterson in addition to the State Historic Preservation Office, Paterson Great Falls National Historic Parks, Eagle Creek Renewable Energy (responsible for operations of the Great Falls), and the NJ Community Development Corporation. The ability for such a large group to come together and reach an agreement on such a critical piece of infrastructure was extraordinary and ensured the best product would be achieved for the community.

To help reduce the energy demand on the City, the lighting for the bridge was also carefully selected. Not only to be respectful to the history and charm of this site, but to provide a more efficient system that will reduce energy demands to improve sustainability and also reduce energy/maintenance costs. This was achieved by running a special lighting analysis for the unique historic lighting fixtures desired with LED technology to replace the existing High Pressure Sodium fixtures.

Meeting and Exceeding Owner's / Client's Needs

As evident by the immediate positive feedback for the complete upgrades from this project, the public community that uses the bridge has seen an unexpected transformation of utilitarian infrastructure to a structure that meets performance expectations and significantly enhances safety, mobility, pedestrian access, and aesthetics. The project has re-invigorated the area including the adjacent Paterson Great Falls National Historical Park and Hinchcliffe Stadium.

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Spruce Street Bridge Reconstruction Project 2024 Project of the Year Award – Under \$20 Million

For this project, WSP refused to work under an assumption that the community's needs were known. A robust stakeholder outreach program was conducted to ensure all parties were connected, understood, and satisfied with the direction of the project. The success of this project along with the overwhelming satisfaction from the client and the community sets an example for how to connect meaningfully with stakeholders and deliver context sensitive designs that benefit the public.

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The excitement generated for this project was demonstrated at the ribbon cutting event which was held on September 21, 2022. The usual local officials were in attendance, but also a volunteer student that came to speak about the importance of the structure for his individual use and what it means to the community. He referenced the difficulty in traversing the bridge in the past, and that the rapid manner of its repairs has significantly improved the quality of life for the public, as well as reducing the reports of tardy school students that commuted by foot.

Construction Drawings



ΑΤΑ						
COORDINATES						
ORTH	EAST					
348.59	580104.63					
3393.42	580065.82					
3438.90	580026.44					
3484.39	579987.06					
3529.88	579947.67					
3574.70	579908.86					

	QUANTITIES	-	
SEQUENCE NUMBER	DESCRIPTION	UNIT	PL/ Q
97	TEMPORARY SHIELDING (2900 SY)	LS	LU
108	CONCRETE BRIDGE APPROACH	CY	

	STATE FEDERAL PROJECT NO. SHEET TOTAL SHE					
	N.J.		51	86		
	STRUCTURE NO 1600-018 SPRUCE STREET BRIDGE OVER PASSAIC RIVER					

NOTES:

- 1. EXISTING BRIDGE ELEMENTS TO BE REMOVED ARE NOT SHOWN FOR CLARITY.
- 2. SEE SHEET B2 FOR GENERAL NOTES.
- 3. APPROACH SLABS AND SUBBASE OUTLET DRAINS ARE REQUIRED THE FULL WIDTH OF THE ROADWAY AT EACH ABUTMENT. FOR DETAILS SEE BRIDGE CONSTRUCTION DETAIL SHEET BCD-507-07. THE COST FOR THIS WORK SHALL BE INCLUDED IN THE BID PRICE FOR "CONCRETE BRIDGE APPROACH". THE APPROACH SLAB SHALL RECEIVE A SAWCUT GROOVED FINISH IN ACCORDANCE WITH THE SPECIFICATIONS.FOR ALL CORNERS, MATCH THE LIMITS SHOWN TO MEET THE PROPOSED ROADWAY CURB. ACCOUNT FOR VARYING BAR LENGTHS IN THE BAR SCHEDULE SUBMITTAL.
- EXISTING RETAINING WALL TO REMAIN IS SHOWN IN PLAN. NOT SHOWN IN ELEVATION FOR CLARITY.
- BED ELEVATIONS SHOWN ARE APPROXIMATE AND SUBJECT TO CHANGE. CONTRACTORS SHALL VERIFY BED CONDITIONS AS NEEDED PRIOR TO SUBMITTING BIDS.
- FOR LOCATIONS OF LIGHT POLES AND BRIDGE DRAINAGE BY BASELINE STATION, SEE SH B14.
- TEMPORARY SHIELDING NOT SHOWN IN PLAN VIEW FOR CLARITY.
- 8. WORKING POINTS ARE PROVIDED ALONG THE PROPOSED BASELINE AT THE CENTERLINE OF EACH PIER AND AT THE CENTERLINE OF BEARINGS AT THE ABUTMENTS.
- 9. WORKING POINT DATA PROVIDED IS BASED ON THE EXISTING STRUCTURE LOCATIONS BASED ON THE ORIGINAL CONSTRUCTION PLANS. THE CONTRACTOR SHALL FIELD VERIFY ALL POINTS PRIOR TO STARTING THE WORK AND SUBMIT ANY CHANGES NECESSARY TO THE RE FOR APPROVAL.
- 10. SEE ROADWAY PLANS FOR PROFILE INFORMATION.
- 11. FOR CURB OVER THE NORTH APPROACH SLAB SEE ROADWAY DETAILS, INCLUDE COSTS IN ROADWAY ITEM.
- 12. SEE WINGWALL DETAILS FOR POST LOCATIONS ON THE WINGWALLS.
- 13. EXISTING BRONZE PLAQUE AT SOUTHEAST CORNER TO BE REMOVED, PROTECTED, CLEANED AND GROUTED INTO NEW PARAPET. ALL ASSOCIATED COSTS SHALL BE INCLUDED IN THE BID PRICE FOR THE "CONCRETE BRDIGE PARAPET, HPC" PAY ITEM.

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				PASSAIC COUNTY ENGINEERING DEPARTMENT
				GENERAL PLAN & ELEVATION
				SPRUCE STREET BRIDGE OVER PASSAIC RIVER SUPERSTRUCTURE RECONSTRUCTION
				WSP USA, Inc. CERTIFICATION OF AUTHORIZATION NO. 24GA28029800 SCALE: AS SHOWN
				Marc S. Esposito MARC S. ESPOSITO BRIDGE BRID BRIDGE BRIDGE BRID BRIDGE BRIDGE BRIDGE BRIDGE BRIDGE BRIDGE BRIDGE BRIDGE BRIDGE BRIDGE BRIDGE BRIDGE BRIDGE BRID BRID BRID BRID BRID BRID BRID BRID
ON	I BY	I CHK	DATE	NEW JERSEY PROFESSIONAL ENGINEER LICENSE NO 24GE04845300 SHEET NO. DJ OF DJO



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				PASSAIC COUNTY ENG	NEERING DEPARTMENT		
	BRIDGE SECTIONS						
				SPRUCE STREET BRIDGE SUPERSTRUCTURE R	OVER PASSAIC RIVER ECONSTRUCTION		
				WSP_USA, Inc.			
				CERTIFICATION OF AUTHORIZATION NO. 24GA28029800	SCALE: AS SHOWN		
				Wave S. Esperiste	(53)		
				MARC S. ESPOSITO			
REVISION	BY	СНК.	DATE	NEW JERSEY PROFESSIONAL ENGINEER LICENSE NO. 24GE04845300	SHEET NO. <u>B5</u> OF <u>B38</u>		



SR1 - EXISTING FLARED STRINGER

- INDICATES CONCRETE ENCASEMENT REMOVAL AND REPLACEMENT AT BOTTOM FLANGE, SEE TABLES FOR ESTIMATED LOCATIONS

----- - INDICATES CONCRETE ENCASEMENT REMOVAL AT WEB AND TOP FLANGES, SEE TABLES FOR ESTIMATED LOCATIONS

CONTROL SECTION				JO	B NO	
DES. BY	S. ESPO	SITO	СН	ĸ.	J. MUMBER	
DWN. BY	K. MULR	ENNAN	В١	(
EST. BY	A. KLUK	CH B`	K. (S. ESPOSITO		
SPECS. BY	S. ESPO	CH B`	K. (J. MUMBER		
IN CH	IN CHARGE OF M.S. ESPOSITO					

CONCR	ETE ENCAS	EMENT RE	Μ		
STRINGER	Х				
		BOI FLANGE			
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SR2	0' - 0"	5′ - 0″			
SR3	0' - 0"	10′ - 0″			
SR3	15′ - 6″	8' - 0"			
SR4	0' - 0"	18′ - 0″			
SR5	0' - 0"	5' - 0"			
SR5	8' - 0"	4'-0"			
S1W	29' - 0"	24' - 6"			
S2	46' - 6"	12′ - 0″			
S3	52′ - 6″	6' - 0"			
S8	0' - 0"	3' - 0"			
S11	0' - 0"	10′ - 0″			
S12	0' - 0"	10′ - 0″			
S13	0' - 0"	10′ - 0″			
S13	34' - 0"	9' - 6"			

	QUANTITIES							
SEQUENCE NUMBER	DESCRIPTION	UNIT	PLAN SHEET QUANTITY					
98	CONCRETE ENCASEMENT REMOVAL AND PAINTING (BEAMS)	SF	1,800					
109	ENCASEMENT CONCRETE	CY	22					

1″ = 1′-0″ 6″ 0 1′ 1″ = 15′

		STATE FEDERAL PROJECT NO SHEET TOTAL SHEETS
		N.J. 58 86
TION OF NORTH		
angle (TYP), NOTE 4		STRUCTURE NO 1600-018
)		SPRUCE STREET BRIDGE OVER PASSAIC RIVER
) 7R4		
- <i>SR5</i>		NOTES:
- • -		<u></u> 1. ALL EXISTING STEEL STRINGERS SHALL REMAIN AND SHALL BE
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<u>``</u>		BE INSTALLED IF PREFERRED TO FACILITATE CONSTRUCTION.
· \ \ 		FABRIC. INCLUDE THE COST IN THE PAY ITEM "ENCASEMENT
		CONCRETE".
	<u>`</u>	4. SEE STRUCTURAL STEEL DETAILS - 2 FOR FLARED STRINGER
E		
	<u> </u>	5. FOR WORKING POINT LOCATIONS AND DATA, SEE SH B2.
<u>\\</u> Е	,`	6. RE SHALL INSPECT ENCASEMENT TO DETERMINE QUANTITIES
	<u> </u>	AT THE TIME OF CONSTRUCTION. CONTRACTOR SHALL PROVIDE ACCESS FOR INSPECTION.
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12' - 0"	-	
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	-	
		PASSAIC COUNTY ENGINEERING DEPARTMENT
		FRAMING PLAN
		SPRUCE STREET BRIDGE OVER PASSAIC RIVER
		SUPERSTRUCTURE RECONSTRUCTION
<b></b>		WSP USA, Inc.
		WSP USA, Inc. CERTIFICATION OF AUTHORIZATION NO. 24GA28029800 SCALE: AS SHOWN
2'		WSP USA, Inc. CERTIFICATION OF AUTHORIZATION NO. 24GA28029800 MARC S ESPOSITO
2' 30' REVISION		WSP USA, Inc. CERTIFICATION OF AUTHORIZATION NO. 24GA28029800 Marc S. Esposito MARC S. ESPOSITO DATE NEW JERSEY PROFESSIONAL ENGINEER LICENSE NO. 24GE04845300 BRIDGE SHEET NO. <u>B10</u> OF <u>B38</u>





4.0"			STATE	FEDERAL PROJECT NO.	SHEET	TOTAL SHEETS			
ARAPET			N.J. STRUC	TURE NO 1600-018	71	86			
← € OPEN JT IN PARAPET, CONTR JT BELOW WINDOW			SPRUC	E STREET BRIDGE O	VER PAS	SAIC RIVER			
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D ON THE BRIDGE INCLUDING ASE AND COLOR. BANNER TIC FEATURES WILL BE PROVAL.	2.	BOLTS, NUTS AND WASHERS CLASS C.	TO E	E GALVANIZED P	ER AST	M A153			
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DE-STEEL, WITH NJDOT FANDARD SPECIFICATIONS ION AND FULL PENETRATION ESTING CONFORM TO		SPRUCE STREET SUPERSTRUC		GE OVER PA	ASSA RUCT	IC RIVER			
ISE NOTED.		WSP USA, Inc.	•		_ •				
		CERTIFICATION OF AUTHORIZATION No Marc S. Esperate MARC S. ESPOSITO	O. 24GA28	BRIDGE	SHOWN				
4' REVISION BY CHK.	DATE	NEW JERSEY PROFESSIONAL ENGINEER LICENS	SE NO. 24GE	04845300 SHEET NO	<u>B23</u> of	<u>B38</u>			

# Photographs

![](_page_18_Picture_0.jpeg)

![](_page_19_Picture_0.jpeg)

![](_page_20_Picture_0.jpeg)

![](_page_21_Picture_0.jpeg)

![](_page_22_Picture_0.jpeg)

![](_page_23_Picture_0.jpeg)

# **Display Panel**

# GATEWAY TO THE GREAT FALLS SPRUCE STREET BRIDGE RECONSTRUCTION

# The Spruce Street Bridge over the Passaic River was long overdue for major

**improvements.** The five span structure required constant maintenance and was classified as structurally deficient due to the condition of the deck and functionally obsolete due to a substandard cross-section. Making matters worse, the outdated geometry of the bridge was inconsistent with the safety goals of the dense urban environment with high volumes of vehicular and pedestrian traffic. By all accounts, significant upgrades were necessary to bring this key link in the Great Falls Historic District back to its original status as a safe, functional, and historically important throughway for the local traveling public. Urgent improvements were needed and made. The reconstruction was approached with the mindset to truly improve the quality of life for the public and community instead of SPRUCE STREET BRIDGE simply restoring the War Memorial 1959 structural integrity of the bridge. The project included enhanced pedestrian accessibility across the bridge, signal upgrades at the nearby intersection of Wayne and Totowa Avenues, traffic calming measures along Spruce and Front Streets and a new, high-performance concrete bridge deck with unique details which allowed for significant profile improvements.

![](_page_25_Picture_3.jpeg)

![](_page_25_Picture_4.jpeg)

The existing bridge deck had numerous deficiencies and patches over time, including holes that extended through the entire deck surface.

The work was progressed in two primary stages to maintain traffic flow during construction. After the deck was reconstructed, key aesthetic and functional elements were introduced and a lane was removed to simplify the flow of traffic which also led to the opportunity to significantly widen the sidewalks.

![](_page_25_Picture_7.jpeg)

# Before

- A 1980s rehabilitation of the sidewalks and parapets moved away from the original open window aesthetic. This time around, special attention was given to re-incorporating the original bridge details and paying tribute to the historic corridor of which this bridge is a vital part.
- Crash-worthy open balustrades were installed with exposed aggregate surfaces to create a rustic look.
- Aesthetic light and custom banner poles also restored the charm from the original design.

![](_page_25_Picture_12.jpeg)

![](_page_25_Picture_13.jpeg)

![](_page_25_Picture_14.jpeg)

![](_page_25_Picture_15.jpeg)

Passaic County, NJ

![](_page_25_Picture_17.jpeg)

## Credits

![](_page_27_Picture_0.jpeg)

#### Credits

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![](_page_28_Picture_0.jpeg)

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