

# West Virginia Multi-modal Statewide Transportation Plan

Presented to: WVDOT/MPO/FHWA Planning Conference

Presented by:
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Wes Stafford, Wilbur Smith Associates



### **Today's Discussion**

STREET-EIGHTH STREET

US 19 - SUMMERSVILLE

WEST RUN EXPRESSWAY

US 11, TABLER STATION TO V

HEP MPO 2030 plan report

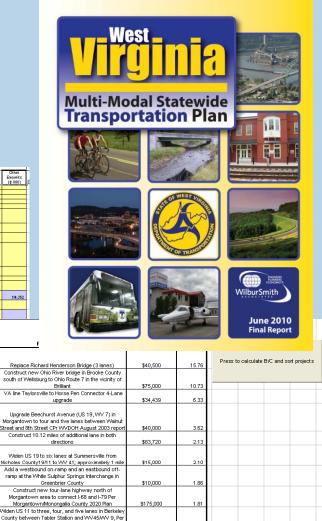
64 WHITE SULPHUR SPRINGS

(MONONGALIA CO)

#### **AGENDA**

- Project Prioritization
- B/C Calculator

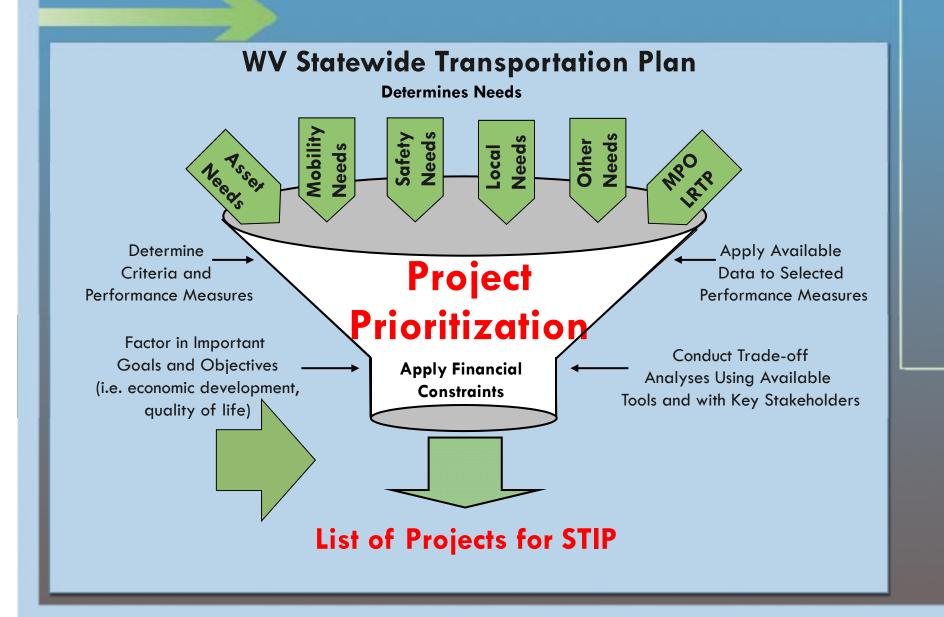
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2		I	Sectio	Capital Cost of Improved	Earmarked Funding			Capacity s/hour)	Annua	Traffic Bate (%)				te per 100	Permane nt Jobs	Other Benefits		
4	Project Name	B B	n ID	Section (\$	(\$ 000)				Growth	Hate [%]	Percen	Trucks				(\$ 000)	-	
5	Projectivame	Project Description	NID	Section (\$	[\$ 000]	Ex	isting	improv	Essting	improv	Ensting	improv	Elisting	improve	Created	3 000	ö*	
6			_			-	-	_	_	_	_	_	_	_	_		-	
7			_			1 1	_		_	_				_	_	_	-	
8			_				-						_	_	_	_	-	
9			_			1 1-	_		_	_				_	_	_	-	
-		Construct split diamond interchange				1 1	-								_	_	-	
		Per draft Harrison County 2025					- 1											
10	1-79/US 50 INTERCHANGE	Transportation Plan report		30,000			- 1											
		Construct 11.6 miles of additional lane				1 1												
11	I-81 Widening-VA Line to S. Martinsburg	in both directions		81,620			- 1				21.0%	21.0%	78.0	64.0				
		Construct 4.26 miles of additional				1 1												
12	I-81 Videning-Falling Vaters to MD Line	lane in both directions		48,900		1 1					21.0%	21.0%	78.0	64.0				
		Reconstruct and widen V/V 14 to four				1												
		lanes from the Parkersburg city				1 1												
		boundary at the Patriot Center (Wal-				1 1												
		Mart   south to the newly relocated					- 1											
13	WV 14 (City Limits of Parkersburg to Pettyville)	WV 14 four-lane highway.		8,500									384.0	384.0				
		Construct 16 miles of additional lane																
14	I-64 Widening Hurricane to Barboursville	in both directions		149,000									94.0					
15	US 35Buffalo Bridge to CR 42	Construct 11 miles of four lane road		131,000									71.0	71.0				
		Construct 10.12 miles of additional					- 1											
16	I-81 Widening-S. Martinsburg I/C to Falling Waters	lane in both directions		83,720							21.0%	21.0%	78.0	64.0				
_		Kerens to Parsons (APD FUNDING)					- 1											
17	Corridor H	Construct 15.47 miles four lane road	2	357,350			$\rightarrow$									114,352		
	I-64 Videning-Barboursville to VV/KY State Line	Construct 18 miles of additional lane in both directions		168,000			- 1						116.0	64.0				
10	1-64 widening-parboursville to wirk it State Line	Wardensville to Virginia Line (APD)	_	166,000		-	-	_	_	_	_		116.0	09.0	_			
		FUNDINGIConstruct 6.53 miles four					- 1											
100	Corridor H	lane road		55.221			- 1				_				_			
10	Collidol H	Construct new 5-in bypass-Stanaford	- 4	30,221		1 1	-		_		_							
20	East Beckley Bupass	to Ragland	3	28,400			- 1			2%								
20	Last Detriey Dypass	Bismark to Foreman Construct 13.78	-	20,400		1 1-	-	_	_	2/-	_							
21	Corridor H	miles four lane road	2	194,000			- 1											
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		(Grade Rd.), Construct four-lane V/V				ш					1867	ac cor	ID 1867	25 IN N	TPO			
22	WV9	9 on new alignment between Berkeley	4	61,000		1 1												
		Davis to Bismark Construct 16.11				ı 🗀							NST. A	LBANS				
23	Corridor H	miles four lane road	2	241,650		1 1					(BRI	DGE)				Replac	e Richard	i Hende
		Parsons to Davis (APD FUNDING)				1					1,000	/					t new Oh	
24	Corridor H	Construct 10.0 miles four lane road	2	177,600														
		Construct 15 miles of additional lane				1					WEL	LSBUR	G BRID	GE (OH	10	south of	/Vellsburg	to Ohic
25	I-79 Widening-Anmore to US 250 South Fairmont	in both directions		104,720							-RIVE	RICRO	SSING"	i '	- 1		-	Brillia
		Widen to five lanes and provide grade				1 [					MAR	ar one	-UU140					
		separation with Kanawha Tumpike				1 1										VA line T	aylorsville	to Hor:
		and rail line; ADHS Corridor G (US				1 1					US 3	840						upara
		119) Davis Creek interchange to				1 1					100.0							- upgi
26	JEFFERSON ROAD (VV 601UPGRADE)	MacCorkle Avenue (US 60) - 18 miles		56,000		1 1												
																		urst Av



#### **Elements of Prioritization**

- B/C Ratio
- Funding Constraints
- Social, Environmental & Economic Development Considerations
- System Linkage
- Stage of Project Development
- Federal Financial Plan Requirements
- Geographic Distribution of Projects

#### **WV STIP Process**



### Why B/C Methodology?

- Deals with actual impact measures (time savings, crash reductions, vehicle operating cost savings)
- Focuses on who benefits (how much and how many) and therefore less likely to double-count or miss benefits
- Extensive past research supporting benefit-cost analysis provides guidance on making the hard trade-offs (e.g., travel time savings vs. reductions in fatalities)
- Support for benefit-cost analysis by AASHTO (recently produced User Benefit Analysis for Highways) and FHWA (maintains Highway Economic Requirements System (HERS) and recently produced Economic Analysis Primer)
- Maximizes benefits from a fixed budget

#### **INITIAL PROJECT SCREENING:**

The approach used to select and prioritize projects must incorporate a transparent decision making process and an easy to understand methodology that is consistent with identified general goals.

- Screen Projects for Eligibility
  - √ Screen for Purpose and Need
  - ✓ Screen for Independence
  - √ Screen for Duplication
  - ✓ Screen for Project Sponsor
- Group Sets of Projects and Corridor Projects
- Sort Projects into Modal and Funding Groupings

#### **QUANITATIVE ANALYSIS:**

- Develop estimates of state revenues and federal funds available for funding selected improvements over the course of the planning period.
- Consider relationships among projects to identify instances where the implementation of one project might make another project more or less desirable.
  - √ Where appropriate, combine projects
  - ✓ Identify projects that should be seen as mutually exclusive
- Compile inputs for each project.
  - ✓ Initially make assumptions that are favorable to the implementation of the project. (makes sure that a good alternative is not wrongly rejected)
  - ✓ If a project scores poorly, it's useful to be able to show that even with favorable assumptions results unfavorable

- Apply workbook to produce a rank-ordering of projects by benefit-cost ratio.
- For the highest ranked projects, develop more accurate cost estimates, traffic forecasts, and assessment of economic development potential. Apply the workbook to recalculate benefit-cost ratios.
- If it continues to be the highest ranked project, assume it will be highly considered during the long-range planning period. If not, repeat the above step with the new highest ranked project.
- Continue this process until the projects identified as priority during the long-range planning period equal funds available for this period (identified in the first step).

### Inputs:

- Setting (Urban or rural)
- Length
- Number of lanes
- Freeway or non-freeway
- Free flow speed (or speed limit)
- Annual average daily traffic
- Cost of improvement (engineering, right-of-way, and construction)
- Special funding sources for the project (federal or state earmarks; contributions by local agencies or private groups)

			-	Capital Cost	Earmarked	Section	Capacity	Annua	Traffic	The Figure	(COOK	Crath ra	ce per 100	Permane	Othi
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		Construct split diamond interchange													
ч		Per draft Harrison County 2025													
)	79US 50 INTERCHANGE	Transportation Plan report		30,000											
П		Construct III 6 miles of additional lane													
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я.		Construct 4.26 miles or additional lane in both directions		48,900						21.0%	21.0%	78.0	64.0		
	I-81 Widening-Falling Waters to MD Line		_	46,900	$\overline{}$	_	_	_		21,0%	21,0%	78.0	64.0		
		Fleconstruct and widen VV 14 to four													
		lanes from the Parkersburg city													
		boundary at the Patriot Center (Val-													
ш		Mart) south to the newly relocated													
)	VV H (City Limits of Parkersburg to Pettyville)	VV M four lane highway	_	8,500		_	_	_			_	384.0	384.0		
	164 Videning Hurricane to Barboursville	Construct 16 miles of additional lane in both directions		143,000								94.0			
Н	US 35 Bull alo Bridge to CRI 42	Construct II miles of four lane road	-	101,000		_	-	_	_		_	71.0	710	-	
4	US 25 DUM NO Bridge to CP1 #2	Construct to the miles of additional	_	120,000		_	_	_	_		_	70.0	rto	_	
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4	Compare	Construct IS miles of additional lane		021,000	_	_	_	_	_	_	_			_	117
, ,	164 Widening-Barboursville to WWKY State Line	in both directions		168,000								196.0	64.0		
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		FUNDINGIConstruct 6.53 miles four													
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	S STOPPET TO	Construct new 5-in bapass-Stanaford	_	1000		_	_		_						
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1	Corridor H	miles four lane road	2	194,000											62
		lanes from existing 4-lanes to CR1													-
		(Grade Rd.), Construct four lane VV													
2	VV9	9 on new alignment between Berkeley	4	61,000								364.0	364.0		. 13
	500	Dayes to Blomark Construct N. III		1000000											
3	Corridor H	miles four lane road.	2	241,650								107.0			77
		Parsons to Davis (APD FUNDING)			7										
	Corridor14	Construct 10.0 miles four lane road	2	177,600								309.0			- 50
T	CONTRACTOR OF THE PROPERTY OF	Construct 15 miles of additional lane		70000											
5	179 Widening-Anmore to US 250 South Fairmont	in both directions		104,720								0.00			
		Widen to five lanes and provide grade													
		separation with Kanawha Turroike													
		and rail line: ADHS Corridor G (US)													

## **Optional Workbook Inputs for Project**

(Default values will be provided by facility type)

- Percent trucks
- Annual traffic growth rate
- Capacity per lane
- Economic development mark-up factor for benefits
- Crash rates

# Parameters for Economic Analyses

	Model	Pa	arameters f	or f	Parameter Used
	Parameters	Ser	isitivity Anal	lysis ir	n Project Analysi:
Discount Rate	7.0%				7.0%
Base Year for Analysis	2009				2009
Default Annual Traffic Growth Rate	1.0%				1.0%
Default Percent Trucks					
Rural Freeway	19.5%				19.5%
Rural Other Multilane	7.3%				7.3%
Rural Two-Lane	7.3%				7.3%
Urban Freeway	16.7%				16.7%
Urban Other	4.3%				4.3%
Value of Travel Time (\$/vehicle hour)					0
Autos	24.64				24.64
Trucks	38.81				38.81
Value of Delay Due to Incidents (\$/vehicle hou	Jr)				
Autos	41.42				41.42
Trucks	77.62				77.62
Average Fuel Consumption (gallons/mile)					
Autos	0.0505				0.0505
Trucks	0.1516				0.1516
Added Gallons Per Hour of Congestion Delay	•				
Autos	0.4203				0.4203
Trucks	1.8711				1.8711
Fuel Price exc. Taxes (\$ / gallon) (Aug 2009)					
Autos	2.23				2.23
Trucks	2.07				2.07
Non-Fuel Vehicle Op. Cost (\$ / mile)					
Autos	0.2373				0.2373
Trucks	0.5172				0.5172

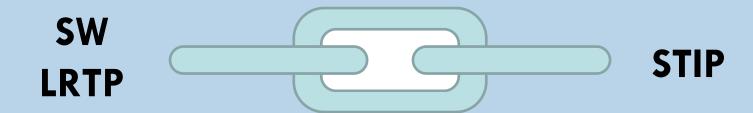
# Outputs

		Project Capital Cost Less Earmarked Funds	Project	
Project Name	Project Description	(\$ 000)	B/C Ratio	
WV 25 SPUR, WV 25 IN NITRO- 6TH AVE. IN ST. ALBANS (BRIDGE)	Replace Richard Henderson Bridge (3 lanes)	\$40,500	15.76	Press to calculate B/C and sort projects
WELLSBURG BRIDGE (OHIO	Construct new Ohio River bridge in Brooke County south of Wellsburg to Ohio Route 7 in the vicinity of Brilliant	\$75.000	10.73	
RIVER CROSSING)	VA line Taylorsville to Horse Pen Connector 4-Lane	\$75,000	10.73	
US 340	upgrade	\$34,439	6.33	
BEECHURST AVE, WALNUT STREET-EIGHTH STREET	Upgrade Beechurst Avenue (US 19, WV 7) in Morgantown to four and five lanes between Walnut			
(MONONGALIA CO)	Street and 8th Street CPr WVDOH August 2003 report	\$40,000	3.62	
I-81 Widening-S. Martinsburg I/C to Falling Waters	Construct 10.12 miles of additional lane in both directions	\$83,720	2.13	
US 19 – SUMMERSVILLE (VMDENING)	Widen US 19 to six lanes at Summersville from Nicholas County19/11 to WV 41; approximately 1 mile	\$15,000	2.10	
I-64 WHITE SULPHUR SPRINGS INTERCHANGE	Add a westbound on-ramp and an eastbound off- ramp at the White Sulphur Springs Interchange in Greenbrier County	\$10,000	1.86	
WEST RUN EXPRESSWAY	Construct new four-lane highway north of Morgantown area to connect I-68 and I-79 Per Morgantown/Monongalia County 2020 Plan	\$175,000	1.81	
US 11, TABLER STATION TO WW 45/WW9	Widen US 11 to three, four, and five lanes in Berkeley County between Tabler Station and WV45/WV 9, Per HEP MPO 2030 plan report	\$24,590	1.76	

#### **Performance Measures**

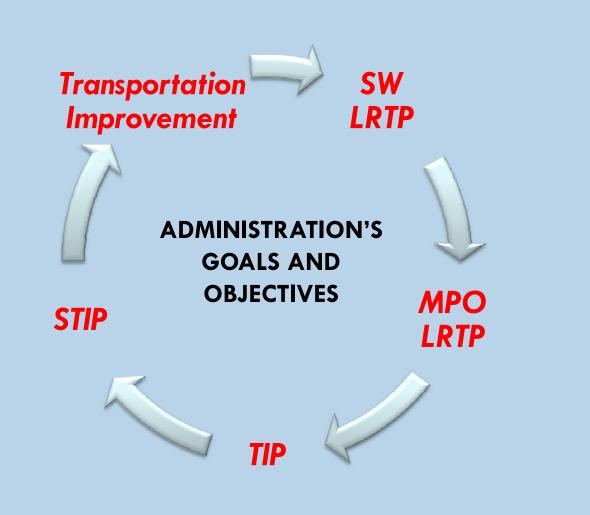
- Revenue Expenditure Estimates
- Programmatic Categories
  - Bridge
    - Rehabilitation
    - Raising
    - Replacement
  - Preservation
  - Modernization
  - Expansion (Capacity Improvements)

#### **SW LRTP and STIP Linkage**



- Categorical Spending Based on Needs
- Forecasted vs. Actual Revenues
- Forecasted vs. Actual Expenditures
- Planning vs. Politics

## **Prioritization Implementation**



# Example Run of B/C Spreadsheet

2			-	Capital Cost	Earmarked	Section	Capacity	∪pt Annual Traffic	onal inputs		rige gerau Crash rai		Permane	Other								
2 3 4 5 6 7 8	Project Name	Project Description	Section ID	of improved		(vehicl	es/hour) G	irowth Rate (%	Percent	Trucks	million	n VMT	nt Jobs Created									
5	Project Name	Project Description	IIID	Section(\$	(\$ 000)	Existing	IIIpiov E	xisting Improv	Existing	Improv	Existing	improve	Created	1 3 000 JE								
6 7			-			l																
8																						
9		Construct split diamond interchange	$\vdash$																			
10	I-79/US 50 INTERCHANGE	Per draft Harrison County 2025 Transportation Plan report		30,000		11																
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11	I-81 Widening-VA Line to S. Martinsburg	in both directions Construct 4.26 miles of additional		81,620		l ⊢			21.0%	21.0%	78.0	64.0										
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		boundary at the Patriot Center (Wal-				11																
13	WV 14 (City Limits of Parkersburg to Pettyville)	Mart) south to the newly relocated WV 14 four-lane highway.		8,500							384.0	384.0										
14	I-64 Widening Hurricane to Barboursville	Construct 16 miles of additional lane in both directions									94.0											
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	Corridor H	Construct 15.47 miles four lane road Construct 18 miles of additional lane	2	357,350										114,352								
18	I-64 Widening-Barboursville to WWKY State Line	in both directions Wardensville to Virginia Line (APD		168,000							116.0	64.0										
		FUNDING)Construct 6.53 miles four				11																
19	Corridor H	lane road Construct new 5-in bypass-Stanaford	2	55,221		I	-							17,671								
20	East Beckley Bypass	to Ragland	3	28,400		l		25	4.0%	4.0%	695.0			9,088								
21	Corridor H	Bismark to Foreman Construct 13.78 miles four lane road	2	194,000		11								62,080								
		lanes from existing 4-lanes to CR1		,																		
22	WV 9	(Grade Rd.). Construct four-lane WV 9 on new alignment between Berkeley	4	61,000		11					364.0	364.0		19.520								
	Corridor H	Davis to Bismark Construct 16.11						•						Project Cap	oital							
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25		Construct 10.0 miles four lane road Construct 15 miles of additional lane in both directions Widen to five lanes and provide grade separation with Kanawha Tunpike and rail line; ADHS Corridor G (US	2	WV 25 SPL 6TH AVE. I (BRIDGE)	JR, WV 25 I N ST. ALBA	N NITRO- ANS	Cons	eplace Riche truct new (	ard Hend Ohio Rive	erson l	Bridge ( e in Bro	oke Cou	unty	armarked F (\$ 000)	unds	B/C Ratio	Press to	o calculate	e B/C and	lsort pro	jects	-
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25	I-79 Videning-Anmore to US 250 South Fairmont	Construct 10.0 miles four lane road Construct 15 miles of additional lane in both directions Widen to five lanes and provide grade separation with Kanawha Turnpike and rail line; ADHS Corridor G (US 119) Davis Creek interohange to	2	WV 25 SPL 6TH AVE. II (BRIDGE) WELLSBUF RIVER CRO US 340	JR, WV 25 I N ST. ALBA RG BRIDGE SSSING)	N NITRO- ANS (OHIO	Cons south VA lii	eplace Riche truct new ( of Wellsbu ne Taylorsv	ard Hend Dhio Rive rg to Ohi Bril ille to Ho upg	erson l r bridg o Rout liant rse Per rade	Bridge ( e in Bro e 7 in th n Conne	oke Cou le vicinity ector 4-L	) unty y of _ane	\$40,500 \$75,000	unds	15.76 10.73	Press to	o calculate	e B/C and	d sort pro	jects	
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25	I-79 Videning-Anmore to US 250 South Fairmont	Construct 10.0 miles four lane road Construct 15 miles of additional lane in both directions Widen to five lanes and provide grade separation with Kanawha Turnpike and rail line; ADHS Corridor G (US 119) Davis Creek interohange to	2	WV 25 SPL 6TH AVE. II (BRIDGE) WELLSBUF RIVER CRO US 340 BEECHURS STREET-EK	JR, WV 25 I N ST. ALBA RG BRIDGE DSSING) ST AVE, WA DHTH STRE	N NITRO- ANS (OHIO	Cons south VA lii Up Morge	eplace Rich truct new ( of Wellsbu ne Taylorsv grade Beed antown to f	ard Hend Dhio Rive rg to Ohi Bril ille to Ho upg churst Ar	erson I r bridg o Routi liant rse Per rade venue ( ive lan	Bridge ( e in Bro e 7 in th n Conne (US 19, es betw	oke Cou le vicinity ector 4-L VVV 7) in veen Wa	) unty y of ane	\$40,500 \$75,000 \$34,439	unds	15.76 10.73 6.33	Press to	o calculati	e B/C and	sort pro	ijects	
25	I-79 Videning-Anmore to US 250 South Fairmont	Construct 10.0 miles four lane road Construct 15 miles of additional lane in both directions Widen to five lanes and provide grade separation with Kanawha Turnpike and rail line; ADHS Corridor G (US 119) Davis Creek interohange to	2	WV 25 SPL 6TH AVE. II (BRIDGE) WELLSBUF RIVER CRC US 340 BEECHURS STREET-EK (MONONG)	JR, WV 25 I N ST. ALBA RG BRIDGE (SSING) ST AVE, WA SHTH STRE ALIA CO)	N NITRO- ANS (OHIO ALNUT ET	Cons south VA lii Up Morga Street	eplace Riche truct new ( of Wellsbu ne Taylorsv grade Beed antown to f and 8th Stri	ard Hend Dhio Rive rg to Ohi Bril ille to Ho upg churst Ar our and to eet CPr V	erson l r bridg o Routi liant rse Per rade /enue ( iive lan vVDOH	Bridge ( e in Bro e 7 in th n Conne (US 19, es betw I Augus	vector 4-L VVV 7) in veen VVa tt 2003 r	) unty y of ane n alnut	\$40,500 \$75,000	unds	15.76 10.73	Press to	o calculate	e B/C and	d sort pro	ijects	
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# Questions

