



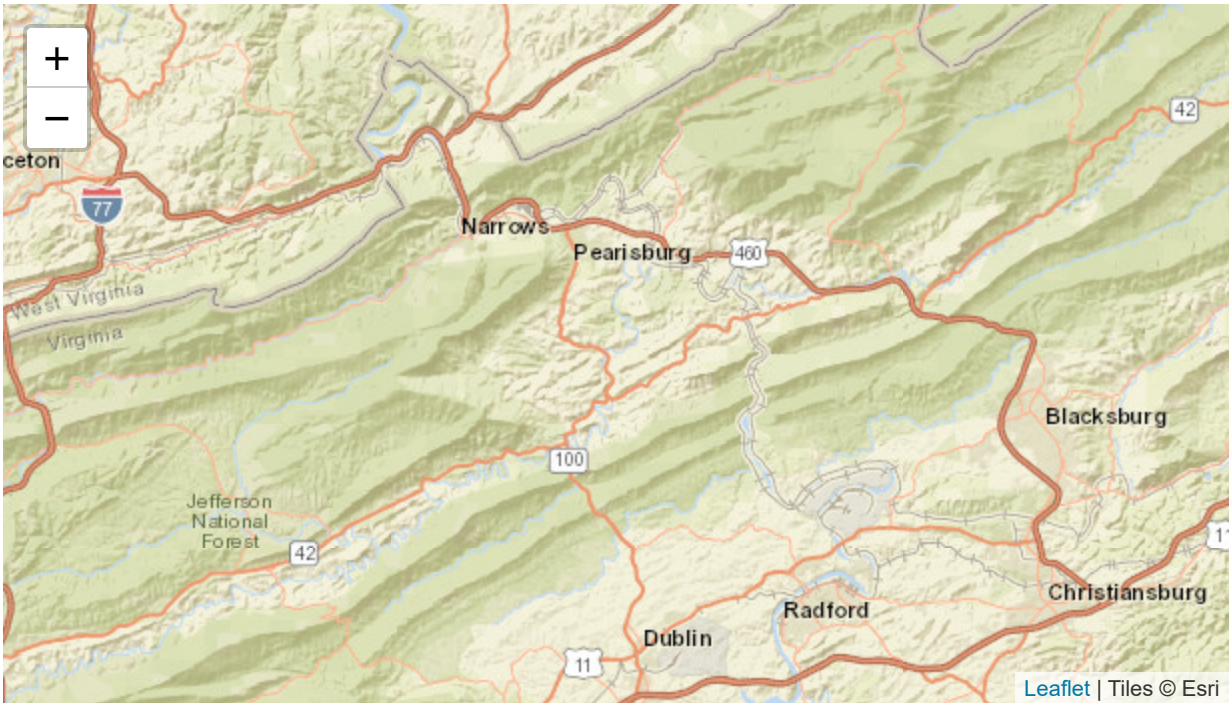
FEMA

Benefit-Cost Calculator

V.6.0 (Build 20241018.1218 | Release Notes)

Benefit-Cost Analysis

Project Name: Indian Village Floodplain Acquisition



Map Marker ▲	Mitigation Title	Property Type	Hazard	Discount Rate (%)	Benefits (B)	Costs (C)	BCR (B/C)	
1	Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013		Riverine Flood	3.1	\$ 2,081,070	\$ 1,635,899	1.27	
2	Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy		Riverine Flood	3.1	\$ 4,533,041	\$ 1,635,017	2.77	
3	Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy		Riverine Flood	3.1	\$ 4,499,446	\$ 1,572,435	2.86	
TOTAL (SELECTED)					\$ 11,113,557	\$ 4,843,351	2.29	
TOTAL					\$ 11,113,557	\$ 4,843,351	2.29	

Property Configuration

Property Title:	Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013
Property Location:	24013, Roanoke, Virginia
Property Coordinates:	37.278926008045175, -79.91513797078055
Hazard Type:	Riverine Flood
Mitigation Action Type:	Acquisition
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013

Discount Rate (%):	3.1%	Use Default:Yes
Project Useful Life (years):	100	
Project Cost:	\$1,528,573	
Number of Maintenance Years:	100	Use Default:Yes
Annual Maintenance Cost:	\$3,492	

Hazard Probabilities Parameters - Flood

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013

Lowest Floor Elevation of the Property (ft):	917.75	
Use Default Recurrence Intervals:	Use Default:Yes	
Include Future Precipitation Impacts:	Yes	
Future Precipitation Scenario:	8.5	
Delta Change Factor (%):	59.7	Use Default:Yes

Discharge
Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013

BEFORE MITIGATION				
Recurrence Interval (years)	Surface Elevation (ft)	Future Water Surface Elevation Due to Climate Change (ft)	Discharge (cfs)	Future Discharge Due to Climate Change (cfs)
10	910.1	913.89	7800	12457
50	915.2	919.82	15800	25233
100	919	922.29	21200	33856
500	924	928.02	42000	67074

AFTER MITIGATION				
Recurrence Interval (years)	Surface Elevation (ft)	Future Water Surface Elevation Due to Climate Change (ft)	Discharge (cfs)	Future Discharge Due to Climate Change (cfs)
10	910.1	913.89	7800	12457
50	915.2	919.82	15800	25233
100	919	922.29	21200	33856
500	924	928.02	42000	67074

Estimated Annual Damages by Category

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-15.52	1.11	\$ 0	\$ 0	\$ 0	\$ 0
-10.79	2	\$ 0	\$ 0	\$ 0	\$ 0
-6.49	5	\$ 0	\$ 0	\$ 0	\$ 0
-4.61	8	\$ 0	\$ 0	\$ 0	\$ 0
-3.51	10.63	\$ 0	\$ 0	\$ 0	\$ 0
-2	16.04	\$ 172	\$ 0	\$ 0	\$ 0
-1.2	20	\$ 743	\$ 0	\$ 0	\$ 0
0	27.98	\$ 452	\$ 265	\$ 0	\$ 0
0.25	30	\$ 1,915	\$ 1,513	\$ 139	\$ 0
1.26	40	\$ 724	\$ 675	\$ 104	\$ 0
1.62	44.34	\$ 2,206	\$ 1,954	\$ 365	\$ 0
2.68	60	\$ 1,094	\$ 941	\$ 208	\$ 0
3.21	70	\$ 902	\$ 797	\$ 182	\$ 0
3.67	80	\$ 756	\$ 696	\$ 160	\$ 0
4.08	90	\$ 57	\$ 53	\$ 12	\$ 0
4.11	90.83	\$ 3,916	\$ 3,623	\$ 947	\$ 0
6.82	200	\$ 1,314	\$ 1,164	\$ 371	\$ 0
8.22	300	\$ 714	\$ 602	\$ 216	\$ 0
9.2	400	\$ 889	\$ 722	\$ 280	\$ 0
10.83	641.73	\$ 4,029	\$ 2,014	\$ 376	\$ 0
Total (\$)		\$ 19,883	\$ 15,018	\$ 3,359	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
Total (\$)		\$ 0	\$ 0	\$ 0	\$ 0

Building Information

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013

Building Type:

Two or More Stories

Foundation Type:

Building Has Basement:

No

NFIP:

No

Standard Benefits - Building

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013

Depth Damage Curve:

USACE - Wilmington: two story

Use Default:Yes

Building Size (sq.ft):

10,772

Building Replacement Value (BRV) (\$/sq.ft):

\$100

Use Default:Yes

BRV Distributional Weight Multiplier:

2.4

Demolition Threshold (%):

50.00%

Use Default:Yes

Expected Annual Losses due to Building
Damages before Mitigation:

\$19,883

Expected Annual Losses due to Building
Damages after Mitigation:

\$0

Expected Annual Benefits - Building:

\$19,883

Depth Damage Curve - Building

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013

Flood Depth (ft)	BEFORE MITIGATION				AFTER MITIGATION			
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)
-2	0.5	12,926.4	0	0	0	0	0	0
-1	0.6	15,511.67	0	0	0	0	0	0
0	7	180,969.6	0	0	0	0	0	0
1	9.1	235,260.47	0	0	0	0	0	0
2	14.5	374,865.6	0	0	0	0	0	0
3	18	465,350.39	0	0	0	0	0	0
4	21.5	555,835.2	0	0	0	0	0	0
5	25	646,320	0	0	0	0	0	0
6	27.2	703,196.15	0	0	0	0	0	0
7	29.4	760,072.32	0	0	0	0	0	0
8	31.6	816,948.48	0	0	0	0	0	0
9	33.8	873,824.63	0	0	0	0	0	0
10	36	930,700.79	0	0	0	0	0	0
11	39.6	1,023,770.88	0	0	0	0	0	0
12	43.2	1,116,840.96	0	0	0	0	0	0
13	46.8	1,209,911.03	0	0	0	0	0	0
14	50.4	2,585,280	0	0	0	0	0	0
15	54	2,585,280	0	0	0	0	0	0
16	57	2,585,280	0	0	0	0	0	0

Standard Benefits - Contents

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Content Damages before Mitigation:	\$15,018	
Expected Annual Losses due to Content Damages after Mitigation:	\$0	
Expected Annual Benefits - Content:	\$15,018	

Depth Damage Curve - Contents

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Percent (%)	Damage Value (\$)	Percent (%)	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	7.3	94,362.72	0	0
1	17.8	230,089.92	0	0
2	25.9	334,793.76	0	0
3	30.3	391,669.92	0	0
4	40	517,056	0	0
5	50	646,320	0	0
6	51.6	667,002.24	0	0
7	53.2	687,684.48	0	0
8	54.8	708,366.72	0	0
9	56.4	729,048.96	0	0
10	58	749,731.2	0	0
11	62.8	811,777.92	0	0
12	67.6	873,824.64	0	0
13	72.4	935,871.36	0	0
14	77.2	997,918.08	0	0
15	82	1,059,964.8	0	0
16	86	1,111,670.4	0	0

Standard Benefits - Displacement		
Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013		
Lodging Per Diem:	\$122	Use Default:Yes
Meals Per Diem:	\$59	Use Default:Yes
Population Affected:	11	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$661	
Expected Annual Losses due to Displacement Damages before mitigation:	\$3,359	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$3,359	

Comments

-

Number of Building Residents:

five units at 2.3 persons per household (USCB)

Depth Damage Curve - Displacement

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	29,745	0	0
2	90	59,490	0	0
3	135	89,235	0	0
4	180	118,980	0	0
5	225	148,725	0	0
6	270	178,470	0	0
7	315	208,215	0	0
8	360	237,960	0	0
9	405	267,705	0	0
10	450	297,450	0	0
11	495	327,195	0	0
12	540	356,940	0	0
13	585	386,685	0	0
14	630	416,430	0	0
15	675	446,175	0	0
16	720	475,920	0	0

Additional Benefits - Street Maintenance

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013

Total Annual Street Maintenance Budget: \$0

Total Number of Street Miles Maintained: 0

Street Miles that will not require future maintenance: 0

Expected Annual Benefits - Street Maintenance: \$0

Standard Benefits - Street Maintenance Costs

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013

Total Annual Street Maintenance Budget (\$): \$0

Number of Street Miles Maintained: 0

Street Miles that will not require future maintenance: 0

Expected Annual Street Maintenance Benefits: \$0

Standard Benefits - Volunteer Costs

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Standard Benefits - Ecosystem Services

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013

Total Project Area (acres):	0.73
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	100.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$27,155

Additional Benefits - Social

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013

Number of Workers:	5
Expected Annual Social Benefits:	\$70,553

Comments

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Number of Workers:

Assume one working person per unit

Benefits-Costs Summary		
Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013		
Discount Rate (%):	3.1%	Use Default:Yes
Total Standard Mitigation Benefits:	\$2,010,517	
Total Social Benefits:	\$70,553	
Total Mitigation Project Benefits:	\$2,081,070	
Total Mitigation Project Cost:	\$1,635,899	
Benefit Cost Ratio - Standard:	1.23	
Benefit Cost Ratio - Standard + Social:	1.27	

Property Configuration

Property Title:	Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy
Property Location:	24013, Roanoke, Virginia
Property Coordinates:	37.278926008045175, -79.91513797078055
Hazard Type:	Riverine Flood
Mitigation Action Type:	Acquisition
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy

Discount Rate (%):	3.1%	Use Default:Yes
Project Useful Life (years):	100	
Project Cost:	\$1,527,722	
Number of Maintenance Years:	100	Use Default:Yes
Annual Maintenance Cost:	\$3,491	

Hazard Probabilities Parameters - Flood

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy

Lowest Floor Elevation of the Property (ft):	913.45	
Use Default Recurrence Intervals:	Use Default:Yes	
Include Future Precipitation Impacts:	Yes	
Future Precipitation Scenario:	8.5	
Delta Change Factor (%):	59.7	Use Default:Yes

Discharge
Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy

BEFORE MITIGATION				
Recurrence Interval (years)	Surface Elevation (ft)	Future Water Surface Elevation Due to Climate Change (ft)	Discharge (cfs)	Future Discharge Due to Climate Change (cfs)
10	910	913.82	7800	12457
50	915.1	919.79	15800	25233
100	919	922.28	21200	33856
500	924	928.06	42000	67074

AFTER MITIGATION				
Recurrence Interval (years)	Surface Elevation (ft)	Future Water Surface Elevation Due to Climate Change (ft)	Discharge (cfs)	Future Discharge Due to Climate Change (cfs)
10	910	913.82	7800	12457
50	915.1	919.79	15800	25233
100	919	922.28	21200	33856
500	924	928.06	42000	67074

Estimated Annual Damages by Category
Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-11.32	1.11	\$ 0	\$ 0	\$ 0	\$ 0
-6.57	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.27	5	\$ 0	\$ 0	\$ 0	\$ 0
-2	5.34	\$ 2,422	\$ 0	\$ 0	\$ 0
-0.38	8	\$ 1,721	\$ 874	\$ 0	\$ 0
0	8.84	\$ 3,805	\$ 2,559	\$ 0	\$ 0
0.71	10.63	\$ 14,135	\$ 12,112	\$ 1,638	\$ 0
3.05	20	\$ 8,851	\$ 8,012	\$ 1,564	\$ 0
4.5	30	\$ 5,311	\$ 5,152	\$ 1,053	\$ 0
5.52	40	\$ 1,679	\$ 1,616	\$ 354	\$ 0
5.89	44.34	\$ 4,273	\$ 3,974	\$ 954	\$ 0
6.95	60	\$ 1,838	\$ 1,647	\$ 435	\$ 0
7.49	70	\$ 1,430	\$ 1,254	\$ 349	\$ 0
7.95	80	\$ 1,146	\$ 988	\$ 287	\$ 0
8.36	90	\$ 85	\$ 72	\$ 21	\$ 0
8.4	90.83	\$ 5,602	\$ 4,605	\$ 1,472	\$ 0
11.13	200	\$ 1,832	\$ 1,437	\$ 499	\$ 0
12.54	300	\$ 1,010	\$ 781	\$ 275	\$ 0
13.52	400	\$ 1,698	\$ 958	\$ 342	\$ 0
15.17	641.73	\$ 4,026	\$ 2,013	\$ 320	\$ 0
Total (\$)		\$ 60,864	\$ 48,054	\$ 9,563	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
Total (\$)		\$ 0	\$ 0	\$ 0	\$ 0

Building Information
Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy

Building Type:

Two or More Stories

Foundation Type:

Building Has Basement: No

NFIP: No

Standard Benefits - Building

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy

Depth Damage Curve:	USACE - Wilmington: two story	Use Default:Yes
Building Size (sq.ft):	10,766	
Building Replacement Value (BRV) (\$/sq.ft):	\$100	Use Default:Yes
BRV Distributional Weight Multiplier:	2.4	
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$60,864	
Expected Annual Losses due to Building Damages after Mitigation:	\$0	
Expected Annual Benefits - Building:	\$60,864	

Depth Damage Curve - Building

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy

Flood Depth (ft)	BEFORE MITIGATION				AFTER MITIGATION			
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)
-2	0.5	12,919.2	0	0	0	0	0	0
-1	0.6	15,503.04	0	0	0	0	0	0
0	7	180,868.80	0	0	0	0	0	0
1	9.1	235,129.44	0	0	0	0	0	0
2	14.5	374,656.80	0	0	0	0	0	0
3	18	465,091.2	0	0	0	0	0	0
4	21.5	555,525.6	0	0	0	0	0	0
5	25	645,960	0	0	0	0	0	0
6	27.2	702,804.48	0	0	0	0	0	0
7	29.4	759,648.96	0	0	0	0	0	0
8	31.6	816,493.44	0	0	0	0	0	0
9	33.8	873,337.91	0	0	0	0	0	0
10	36	930,182.4	0	0	0	0	0	0
11	39.6	1,023,200.64	0	0	0	0	0	0
12	43.2	1,116,218.88	0	0	0	0	0	0
13	46.8	1,209,237.11	0	0	0	0	0	0
14	50.4	2,583,840	0	0	0	0	0	0
15	54	2,583,840	0	0	0	0	0	0
16	57	2,583,840	0	0	0	0	0	0

Standard Benefits - Contents

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Content Damages before Mitigation:	\$48,054	
Expected Annual Losses due to Content Damages after Mitigation:	\$0	
Expected Annual Benefits - Content:	\$48,054	

Depth Damage Curve - Contents

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Percent (%)	Damage Value (\$)	Percent (%)	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	7.3	94,310.16	0	0
1	17.8	229,961.76	0	0
2	25.9	334,607.28	0	0
3	30.3	391,451.76	0	0
4	40	516,768	0	0
5	50	645,960	0	0
6	51.6	666,630.72	0	0
7	53.2	687,301.44	0	0
8	54.8	707,972.16	0	0
9	56.4	728,642.88	0	0
10	58	749,313.6	0	0
11	62.8	811,325.76	0	0
12	67.6	873,337.92	0	0
13	72.4	935,350.08	0	0
14	77.2	997,362.24	0	0
15	82	1,059,374.4	0	0
16	86	1,111,051.2	0	0

Standard Benefits - Displacement		
Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy		
Lodging Per Diem:	\$122	Use Default:Yes
Meals Per Diem:	\$59	Use Default:Yes
Population Affected:	9	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$563	
Expected Annual Losses due to Displacement Damages before mitigation:	\$9,563	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$9,563	

Comments

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Number of Building Residents:

four units at 2.3 persons per household (USCB)

Depth Damage Curve - Displacement

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	25,335	0	0
2	90	50,670	0	0
3	135	76,005	0	0
4	180	101,340	0	0
5	225	126,675	0	0
6	270	152,010	0	0
7	315	177,345	0	0
8	360	202,680	0	0
9	405	228,015	0	0
10	450	253,350	0	0
11	495	278,685	0	0
12	540	304,020	0	0
13	585	329,355	0	0
14	630	354,690	0	0
15	675	380,025	0	0
16	720	405,360	0	0

Additional Benefits - Street Maintenance

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy

Total Annual Street Maintenance Budget: \$0

Total Number of Street Miles Maintained: 0

Street Miles that will not require future maintenance: 0

Expected Annual Benefits - Street Maintenance: \$0

Standard Benefits - Street Maintenance Costs

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy

Total Annual Street Maintenance Budget (\$): \$0

Number of Street Miles Maintained: 0

Street Miles that will not require future maintenance: 0

Expected Annual Street Maintenance Benefits: \$0

Standard Benefits - Volunteer Costs

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Standard Benefits - Ecosystem Services

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy

Total Project Area (acres):	0.73
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	100.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$27,155

Additional Benefits - Social

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy

Number of Workers:	4
Expected Annual Social Benefits:	\$56,931

Comments

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Number of Workers:

Assume one working person per unit

Benefits-Costs Summary		
Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy		
Discount Rate (%):	3.1%	Use Default:Yes
Total Standard Mitigation Benefits:	\$4,476,110	
Total Social Benefits:	\$56,931	
Total Mitigation Project Benefits:	\$4,533,041	
Total Mitigation Project Cost:	\$1,635,017	
Benefit Cost Ratio - Standard:	2.74	
Benefit Cost Ratio - Standard + Social:	2.77	

Property Configuration

Property Title:	Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy
Property Location:	24013, Roanoke, Virginia
Property Coordinates:	37.278926008045175, -79.91513797078055
Hazard Type:	Riverine Flood
Mitigation Action Type:	Acquisition
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy

Discount Rate (%):	3.1%	Use Default:Yes
Project Useful Life (years):	100	
Project Cost:	\$1,469,258	
Number of Maintenance Years:	100	Use Default:Yes
Annual Maintenance Cost:	\$3,357	

Hazard Probabilities Parameters - Flood

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy

Lowest Floor Elevation of the Property (ft):	913.35	
Use Default Recurrence Intervals:	Use Default:Yes	
Include Future Precipitation Impacts:	Yes	
Future Precipitation Scenario:	8.5	
Delta Change Factor (%):	59.7	Use Default:Yes

Discharge
Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy

BEFORE MITIGATION				
Recurrence Interval (years)	Surface Elevation (ft)	Future Water Surface Elevation Due to Climate Change (ft)	Discharge (cfs)	Future Discharge Due to Climate Change (cfs)
10	910	913.79	7800	12457
50	915	919.77	15800	25233
100	919	922.26	21200	33856
500	924	928.05	42000	67074

AFTER MITIGATION				
Recurrence Interval (years)	Surface Elevation (ft)	Future Water Surface Elevation Due to Climate Change (ft)	Discharge (cfs)	Future Discharge Due to Climate Change (cfs)
10	910	913.79	7800	12457
50	915	919.77	15800	25233
100	919	922.26	21200	33856
500	924	928.05	42000	67074

Estimated Annual Damages by Category

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-11.25	1.11	\$ 0	\$ 0	\$ 0	\$ 0
-6.5	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.2	5	\$ 0	\$ 0	\$ 0	\$ 0
-2	5.25	\$ 2,566	\$ 0	\$ 0	\$ 0
-0.31	8	\$ 1,428	\$ 730	\$ 0	\$ 0
0	8.68	\$ 4,095	\$ 2,798	\$ 0	\$ 0
0.78	10.63	\$ 13,810	\$ 12,078	\$ 2,042	\$ 0
3.12	20	\$ 8,621	\$ 7,859	\$ 1,874	\$ 0
4.58	30	\$ 5,153	\$ 5,002	\$ 1,255	\$ 0
5.6	40	\$ 1,625	\$ 1,558	\$ 421	\$ 0
5.96	44.34	\$ 4,135	\$ 3,831	\$ 1,134	\$ 0
7.02	60	\$ 1,778	\$ 1,588	\$ 516	\$ 0
7.57	70	\$ 1,383	\$ 1,209	\$ 414	\$ 0
8.03	80	\$ 1,109	\$ 952	\$ 340	\$ 0
8.44	90	\$ 82	\$ 70	\$ 25	\$ 0
8.48	90.83	\$ 5,423	\$ 4,448	\$ 1,743	\$ 0
11.22	200	\$ 1,774	\$ 1,390	\$ 590	\$ 0
12.62	300	\$ 978	\$ 755	\$ 325	\$ 0
13.62	400	\$ 1,639	\$ 926	\$ 404	\$ 0
15.27	641.73	\$ 3,872	\$ 1,936	\$ 376	\$ 0
Total (\$)		\$ 59,470	\$ 47,131	\$ 11,459	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
Total (\$)		\$ 0	\$ 0	\$ 0	\$ 0

Building Information

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy

Building Type:

Two or More Stories

Foundation Type:

Building Has Basement:

No

NFIP:

No

Standard Benefits - Building

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy

Depth Damage Curve:	USACE - Wilmington: two story	Use Default:Yes
Building Size (sq.ft):	10,354	
Building Replacement Value (BRV) (\$/sq.ft):	\$100	Use Default:Yes
BRV Distributional Weight Multiplier:	2.4	
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$59,470	
Expected Annual Losses due to Building Damages after Mitigation:	\$0	
Expected Annual Benefits - Building:	\$59,470	

Depth Damage Curve - Building

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy

Flood Depth (ft)	BEFORE MITIGATION				AFTER MITIGATION			
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)
-2	0.5	12,424.8	0	0	0	0	0	0
-1	0.6	14,909.75	0	0	0	0	0	0
0	7	173,947.19	0	0	0	0	0	0
1	9.1	226,131.36	0	0	0	0	0	0
2	14.5	360,319.19	0	0	0	0	0	0
3	18	447,292.8	0	0	0	0	0	0
4	21.5	534,266.4	0	0	0	0	0	0
5	25	621,240	0	0	0	0	0	0
6	27.2	675,909.12	0	0	0	0	0	0
7	29.4	730,578.23	0	0	0	0	0	0
8	31.6	785,247.36	0	0	0	0	0	0
9	33.8	839,916.47	0	0	0	0	0	0
10	36	894,585.6	0	0	0	0	0	0
11	39.6	984,044.16	0	0	0	0	0	0
12	43.2	1,073,502.72	0	0	0	0	0	0
13	46.8	1,162,961.27	0	0	0	0	0	0
14	50.4	2,484,960	0	0	0	0	0	0
15	54	2,484,960	0	0	0	0	0	0
16	57	2,484,960	0	0	0	0	0	0

Standard Benefits - Contents

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Content Damages before Mitigation:	\$47,131	
Expected Annual Losses due to Content Damages after Mitigation:	\$0	
Expected Annual Benefits - Content:	\$47,131	

Depth Damage Curve - Contents

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Percent (%)	Damage Value (\$)	Percent (%)	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	7.3	90,701.04	0	0
1	17.8	221,161.44	0	0
2	25.9	321,802.32	0	0
3	30.3	376,471.44	0	0
4	40	496,992	0	0
5	50	621,240	0	0
6	51.6	641,119.68	0	0
7	53.2	660,999.36	0	0
8	54.8	680,879.04	0	0
9	56.4	700,758.72	0	0
10	58	720,638.4	0	0
11	62.8	780,277.44	0	0
12	67.6	839,916.48	0	0
13	72.4	899,555.52	0	0
14	77.2	959,194.56	0	0
15	82	1,018,833.6	0	0
16	86	1,068,532.8	0	0

Standard Benefits - Displacement		
Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy		
Lodging Per Diem:	\$122	Use Default:Yes
Meals Per Diem:	\$59	Use Default:Yes
Population Affected:	11	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$661	
Expected Annual Losses due to Displacement Damages before mitigation:	\$11,459	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$11,459	

Comments

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Number of Building Residents:

five units at 2.3 persons per household (USCB)

Depth Damage Curve - Displacement
Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	29,745	0	0
2	90	59,490	0	0
3	135	89,235	0	0
4	180	118,980	0	0
5	225	148,725	0	0
6	270	178,470	0	0
7	315	208,215	0	0
8	360	237,960	0	0
9	405	267,705	0	0
10	450	297,450	0	0
11	495	327,195	0	0
12	540	356,940	0	0
13	585	386,685	0	0
14	630	416,430	0	0
15	675	446,175	0	0
16	720	475,920	0	0

Additional Benefits - Street Maintenance
Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Standard Benefits - Street Maintenance Costs
Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy

Total Annual Street Maintenance Budget (\$):	\$0
Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Street Maintenance Benefits:	\$0

Standard Benefits - Volunteer Costs

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Standard Benefits - Ecosystem Services

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy

Total Project Area (acres):	0.7
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	100.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$26,039

Additional Benefits - Social

Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy

Number of Workers:	5
Expected Annual Social Benefits:	\$70,553

Comments

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Number of Workers:
Assume one working person per unit

Benefits-Costs Summary		
Acquisition @ 2034 Indian Village Ln SE, Roanoke, Virginia, 24013_copy_copy		
Discount Rate (%):	3.1%	Use Default:Yes
Total Standard Mitigation Benefits:	\$4,428,893	
Total Social Benefits:	\$70,553	
Total Mitigation Project Benefits:	\$4,499,446	
Total Mitigation Project Cost:	\$1,572,435	
Benefit Cost Ratio - Standard:	2.82	
Benefit Cost Ratio - Standard + Social:	2.86	