Verde Village Wastewater Feasibility Study

Public Treatment & Collection Workshop

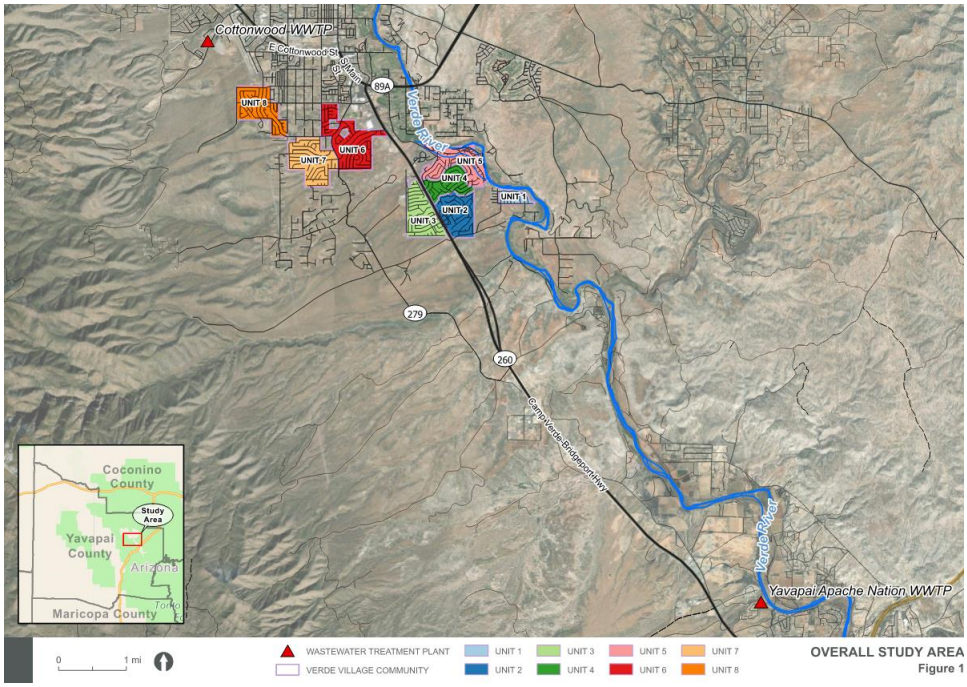
October 10, 2023

1

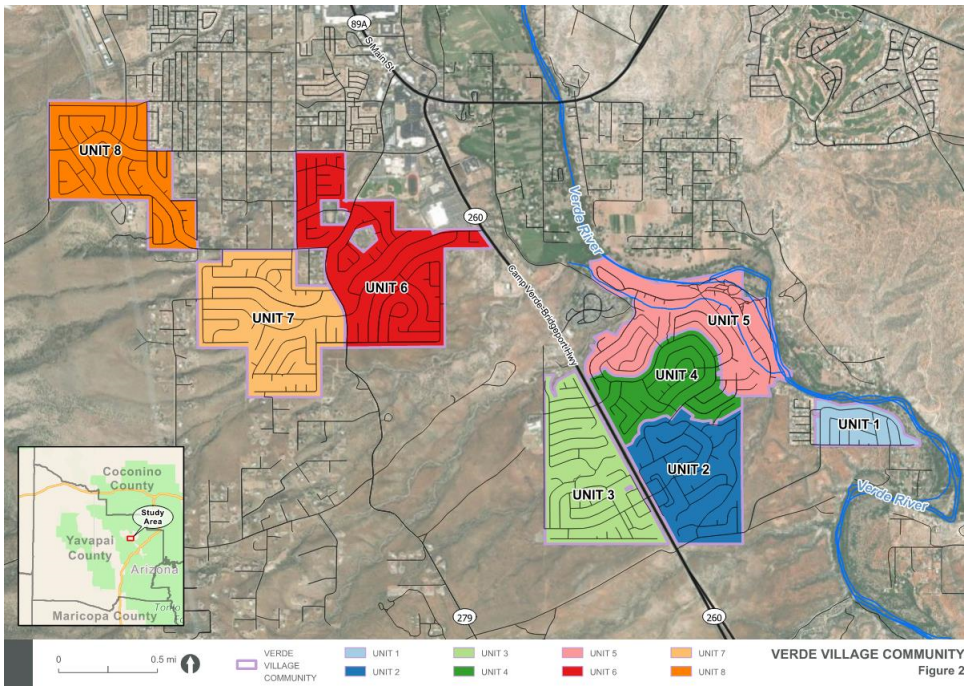
WORKSHOP AGENDA

- Team Introductions
- Project Goals, Understanding, and Limitations
- Review of Alternatives:
  - Collection System
  - Treatment System
  - Beneficial Reuse
- Phasing and Implementation
- Engineer's Opinion of Probable Construction Cost
- Overview of Funding Opportunities
- Evaluation Criteria for Alternatives
- Next Steps and Q&A

2

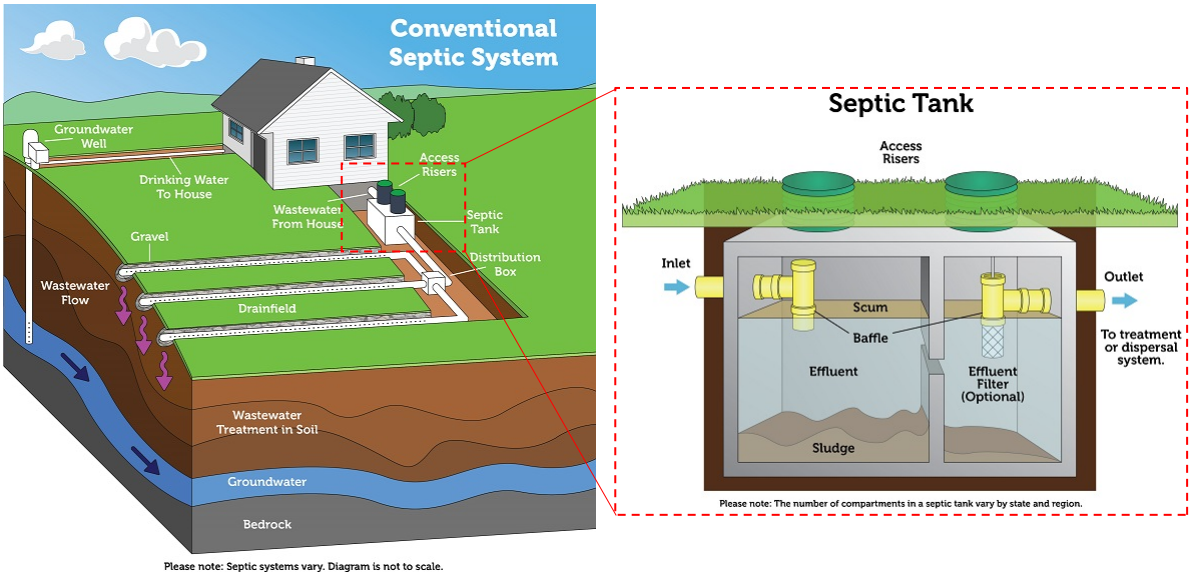

Cottonwood WWTP
E Cottonwood St
S Main
89A
Verde River
UNIT 8
UNIT 6
UNIT 7
UNIT 5
UNIT 4
UNIT 1
UNIT 2
UNIT 3
279
260
Camp Verde-Bridgeport Hwy
Verde River
Yavapai Apache Nation WWTP
Coconino County
Study Area
Yavapai County
Arizona
Maricopa County
Tonto
0
1 mi
WASTEWATER TREATMENT PLANT
VERDE VILLAGE COMMUNITY
UNIT 1
UNIT 2
UNIT 3
UNIT 4
UNIT 5
UNIT 6
UNIT 7
UNIT 8
OVERALL STUDY AREA
Figure 1

3


89A
S Main St
UNIT 8
UNIT 6
UNIT 7
Verde River
260
Camp Verde-Bridgeport Hwy
UNIT 5
UNIT 4
UNIT 1
UNIT 2
UNIT 3
Verde River
Coconino County
Study Area
Yavapai County
Arizona
Maricopa County
Tonto
279
260
0
0.5 mi
VERDE VILLAGE COMMUNITY
UNIT 1
UNIT 2
UNIT 3
UNIT 4
UNIT 5
UNIT 6
UNIT 7
UNIT 8
VERDE VILLAGE COMMUNITY
Figure 2

4

STUDY BACKGROUND



5

PROJECT GOALS

Collection System

Treatment System

Beneficial Reuse

6

PROJECTED FLOWS

Assumptions & Inputs

Parameters	Units	Value	Source
Population	person	11,385	Calculated
Dwellings	unit	4,482	VVCC Data
Avg Household Size	person/unit	2.54	2021 American Community Survey

Projected Daily Flows

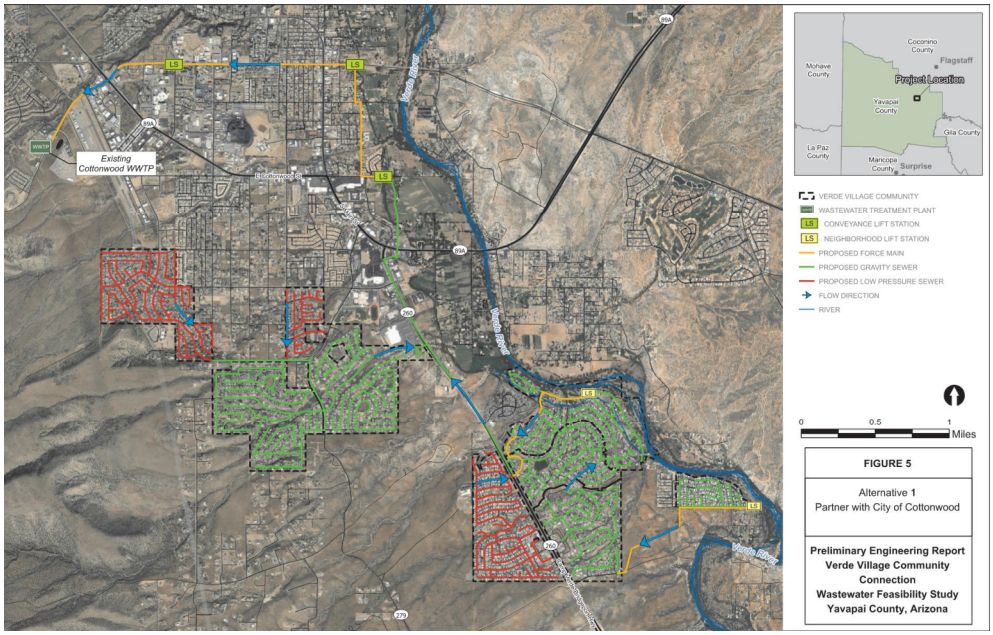
Verde Village Unit	Dwelling Units	Units	Proj. Avg Flow	Proj. Peak Flow
Unit 1	203	gpd	41,252	75,446
Unit 2	509	gpd	103,436	189,172
Unit 3	678	gpd	137,778	251,982
Unit 4	440	gpd	89,414	163,528
Unit 5	586	gpd	119,083	217,790
Unit 6	750	gpd	152,410	278,741
Unit 7	601	gpd	122,131	223,364
Unit 8	639	gpd	129,853	237,487
Outparcels	76	gpd	15,444	28,246
Total	**4,482**	**gpd**	**910,800**	**1,665,756**

7

COLLECTION SYSTEM ALTERNATIVES

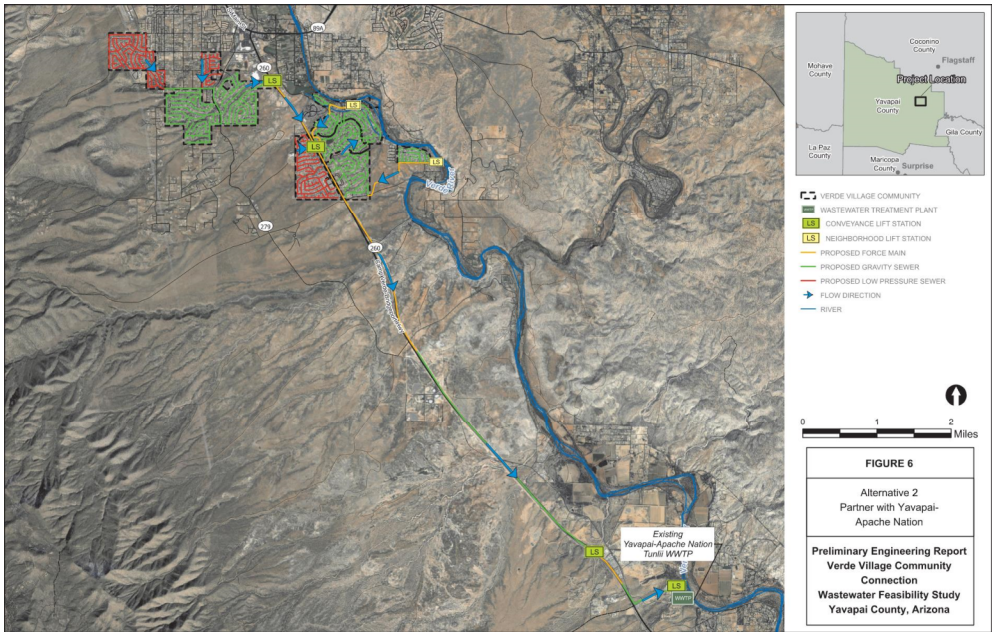
8

ALTERNATIVE 1: PARTNERSHIP WITH CITY OF COTTONWOOD



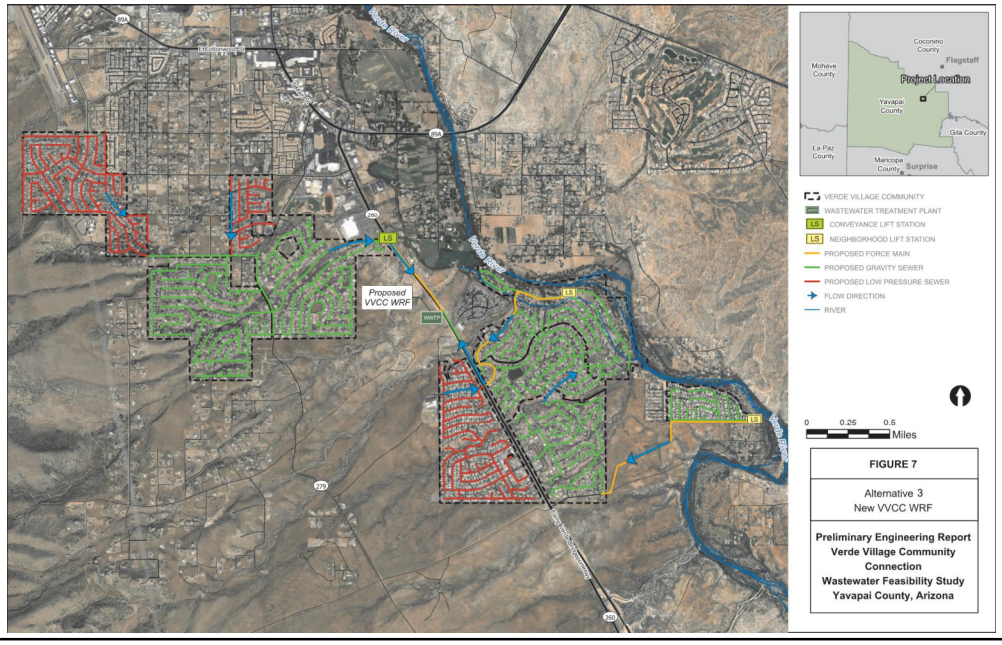
9

ALTERNATIVE 2: PARTNERSHIP WITH YAVAPAI-APACHE NATION



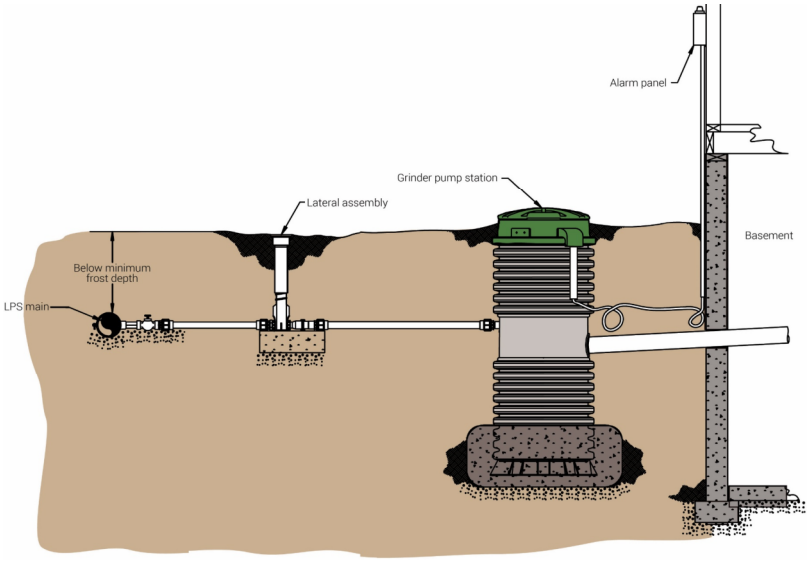
10

ALTERNATIVE 3: NEW VERDE VILLAGE WRF

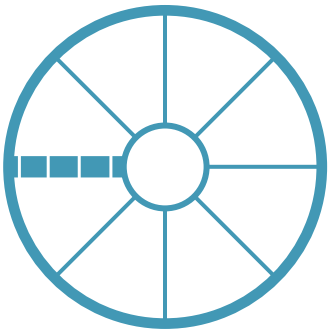


11

LOW PRESSURE SYSTEM



12



TREATMENT SYSTEM ALTERNATIVES

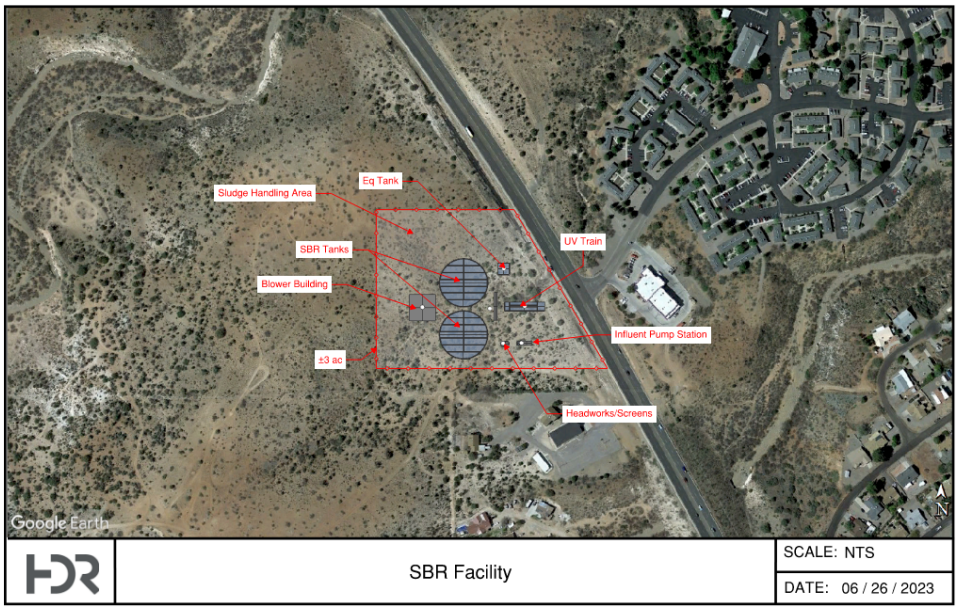
13

TREATMENT SYSTEM

- Alternative 1: Expansion of City of Cottonwood WWTP
- Alternative 2: Expansion of Yavapai-Apache Nation (YAN) WWTP
- Alternative 3: New Verde Village WRF
  - Treatment Options include SBR and MBR plants.

14

SEQUENCING BIOREACTOR (SBR) FACILITY



15

BENEFICIAL REUSE ALTERNATIVES

16

BENEFICIAL REUSE

- Limited reuse customers available in the area.
  - Cemex Camp Verde Plant
  - Yavapai-Apache Rock Quarry
  - Winery (Alcantara Vineyards)
  - Nurseries (Verde River Growers)
- Considerations:
  - Requirements for consistent demand throughout year
  - Overlap of reuse customers with existing utilities in region

17

BENEFICIAL REUSE

- Alternative 1: City of Cottonwood owns/maintains reuse infrastructure and retains ownership of the effluent
- Alternative 2: Yavapai-Apache Nation (YAN) owns/maintains reuse infrastructure and retains ownership of the effluent
- Alternative 3: Verde Village maintains reuse infrastructure and retains ownership of effluent
  - Alternate and/or supplemental water source for Duck Pond
  - Constructed Wetland/Riparian Preserve
  - Aquifer Recharge Well

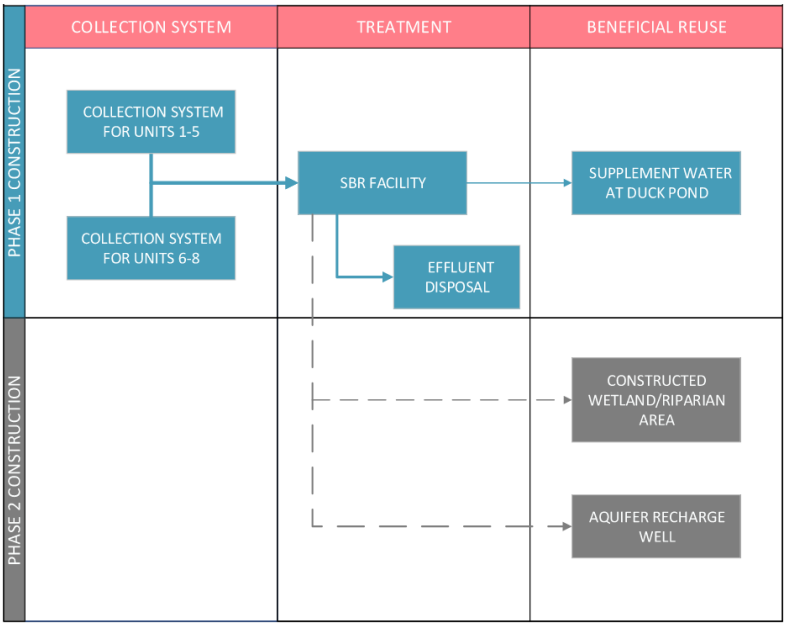
18

ALTERNATIVE 3: VERDE VILLAGE REUSE OPTIONS

Alternative	Description	Benefit	Considerations
Verde Village Duck Pond	Alternate and/or supplemental source of water. Assumes 3-acre pond.	• Reduces cost of purchasing water from Verde River • Reduces diversion of Verde River water to the pond • Maintains community asset	• Quantity of effluent water diverted to the Pond is limited by evaporation rate: ↑Summer; ↓Winter • Permitting requirements • O&M Costs to pump effluent to the pond.
Wetland/Riparian Preserve	Wetland/riparian area to provide final polishing treatment of up to 0.5 MGD.	• Creates wildlife viewing area for community • Provides effluent polishing benefits • May recharge shallow aquifers • Returns water to Verde River	• Permitting requirements • O&M costs to maintain riparian area • Community perception • Land requirements (±10-15 ac)
Aquifer Recharge Well	Install a 1 MGD Aquifer injection well to recharge the Verde Formation aquifer	• Indirectly benefit region by providing a renewable source of water • Secures long-term supply water supply for the area • Increases baseflow to Verde River	• Permitting requirements • Lack of Long-Term Storage Credits available • O&M considerations • Convert to storage and recovery well in future

19

PHASING AND IMPLEMENTATION



20

POTENTIAL FUNDING OPPORTUNITIES

Clean Water
State Revolving Fund

WATER INFRASTRUCTURE FINANCE AUTHORITY OF ARIZONA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

USDA Rural Development
Committed to the future of rural communities.

PUBLIC-PRIVATE PARTNERSHIPS

21

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST (EOPCC)

- Cost values presented in 2022 Dollars
- Cost Estimates are at AACE Class V estimate – Order of Magnitude
  - Used for strategic planning & concept screening
  - Project Definition <5%
  - Expected Range of Accuracy:
    - Low End: -50% to 20%
    - High End: +30% to 100%
- Costs are subject to change during design and market conditions
- 20-yr Lifecycle Cost accounts for capital and O&M

22

SUMMARY OF COSTS BY SYSTEM AND ALTERNATIVES

System	Capital Cost		
	Alt. 1	Alt. 2	Alt. 3
Collection	$163M	$172M	$148M
Lift Station	$6M	$7M	$2M
Treatment	$51M	$32M	$33M
Reuse	$ -	$ -	$10M

System	Annual O&M Cost[1]		
	Alt. 1	Alt. 2	Alt. 3
Collection	$0.7M	$0.8M	$0.7M
Lift Station	$0.5M	$0.6M	$0.1M
Treatment	$1.6M	$0.9M	$0.9M
Reuse	$ -	$ -	$0.05M

Notes:
1. Not adjusted for inflation for beyond Year 1.
2. All values presented in 2022 Dollars. For planning purposes only.

23

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

Alternative		Capital Cost	Annual O&M Cost	20-Yr Life Cycle Cost [1]
1	Partnership w/ City of Cottonwood	$220M	$2.9M	$285M
2	Partnership w/ Yavapai-Apache Nation	$211M	$2.2M	$260M
3	New Verde Village WRF[2]	$193M	$1.7M	$231M

Notes:
1. Present value over 20-yr including Capital and O&M Costs. Assumes 2% discount rate, 3% inflation rate.
2. Includes collection system, SBR treatment plant, Duck Pond improvements, constructed wetland, and injection well.
3. All values shown are in 2022 Dollars. Subject to change during design and market conditions. For planning purposes only.

24

EVALUATION CRITERIA

	Criteria	Description	UoM
Quantitative	Capital Cost	Engineer's opinion of probable cost to implement the alternative, presented in 2022 dollars.	$
Quantitative	20-Year Lifecycle Cost	Engineer's opinion of probable lifecycle cost to operate and maintain the alternative over 20 years, as applicable, presented in 2022 dollars.	$
Qualitative	Constructability	Considers overall construction complexity including procurement, topography, and the overall alignment of the alternative.	Weighted Rank
Qualitative	Ease of Implementation	Considers permit acquisition and on-going renewals, intergovernmental agreements, funding availability, and land acquisitions for the alternative.	Weighted Rank
Qualitative	Reliability & Flexibility	Considers redundancy, safety, and the ability to handle varying daily flows, additional future flows, or meet new potential regulatory requirements in the future.	Weighted Rank
Qualitative	Environmental Impact	Considers the environmental impact to the Verde River and surrounding community during construction and operation of the alternative.	Weighted Rank
Qualitative	Public Support	Considers the overall support of the Verde Village Community for the Alternative.	Weighted Rank
Qualitative	Partner Support	Considers overall support from the City of Cottonwood or Yavapai-Apache Nation in partnering with the Verde Village Community.	Weighted Rank

25

EVALUATION MATRIX

Verde Village Community Connection
Wastewater Feasibility Study
Cottonwood, AZ

Evaluation Matrix

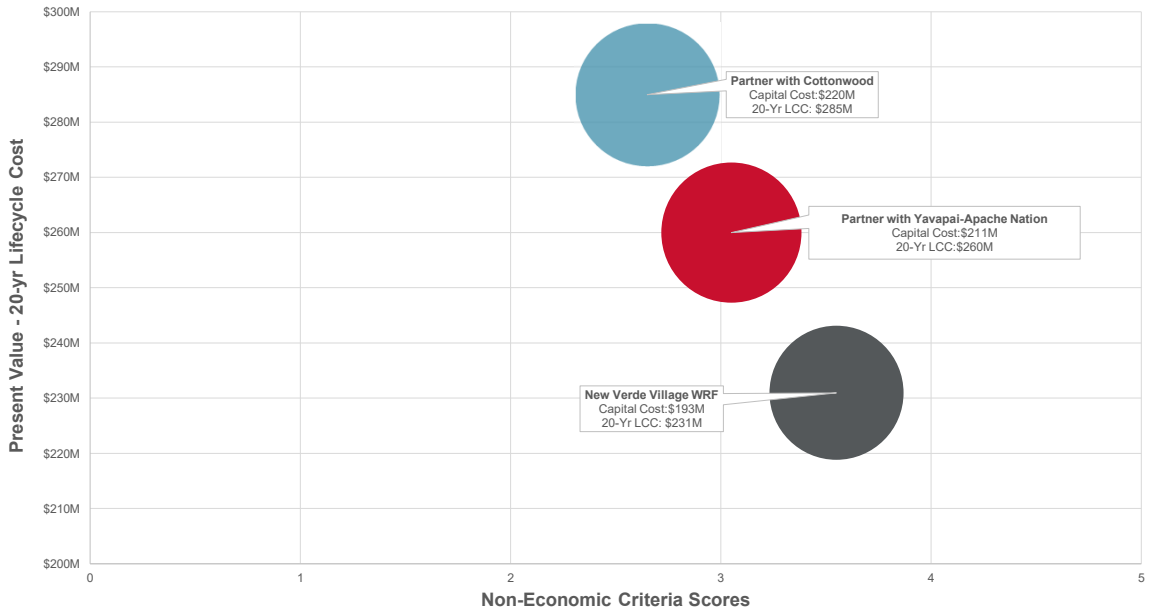
Criteria	Weight	Alternative 1		Alternative 2		Alternative 3	
		Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score
Constructability	10%	1	0.10	2	0.20	3	0.30
Ease of Implementation	20%	2	0.40	1	0.20	3	0.60
Reliability & Flexibility	10%	3	0.30	2	0.20	4	0.40
Environmental Impact	25%	4	1.00	4	1.00	4	1.00
Public Support	15%	3	0.45	3	0.45	3	0.45
Partner Support	20%	2	0.40	5	1.00	4	0.80
Total	100%	15	2.65	17	3.05	21	3.55

Alternatives	
Alternative 1	Partnership with City of Cottonwood
Alternative 2	Parnership with Yavapai-Apache Nation
Alternative 3	Verde Village WRF

Raw Score	Description
1	Least Desirable; Lowest Preference
2	
3	Equally Desirable; Equal Rank
4	
5	Most Desirable; Highest Preference

26

ALTERNATIVE SCORES V. PRESENT VALUE



27

NEXT STEPS FOR VERDE VILLAGE

- Establish intergovernmental agreement and/or sanitary district as needed
- Apply and secure grant funds and financing
- Engineering design development and construction documentation
- Obtain applicable permits
- Construct project

28

NEXT STEPS OF STUDY

- Gather community feedback over 2-week period (10/10 – 10/24) via electronic or hardcopy form.
- Draft Feasibility Report to VVCC Board by 11/10
- 3-weeks Review and Comment period for VVCC by 12/1
- Final Feasibility Report to VVCC Board by 12/20

Take the Feedback Survey via QR or Link:

https://forms.office.com/r/9j7U0GNW1W

29

Questions?

Take the Feedback Survey via QR or Link:

https://forms.office.com/r/9j7U0GNW1W

10/10/2023

30

31