



## Technical Memorandum

To: Juan Perez, PE – COO – Riverside County

From: Joseph C. Caldwell, PE – Water Resources Practice Leader,  
Albert A. Webb Associates

Date: June 17, 2021

Re: Salton Sea North Lake Pilot Demonstration Project Alternatives Analysis –  
Addendum #1: Revised Alternative 1

---

### Introduction

The Salton Sea North Lake Pilot Demonstration Project (Demonstration Project) is being funded through the Proposition 68 grant for the Salton Sea revitalization which includes various habitat and dust suppression projects under the Salton Sea Management Program (SSMP) 10-Year Plan. One of the proposed SSMP 10-year projects and the focus of this analysis is a \$20 Million project for the construction of a demonstration pilot project at the north end of the Salton Sea consisting of approximately 150 acres of both shallow and deep-water fish and bird habitat.

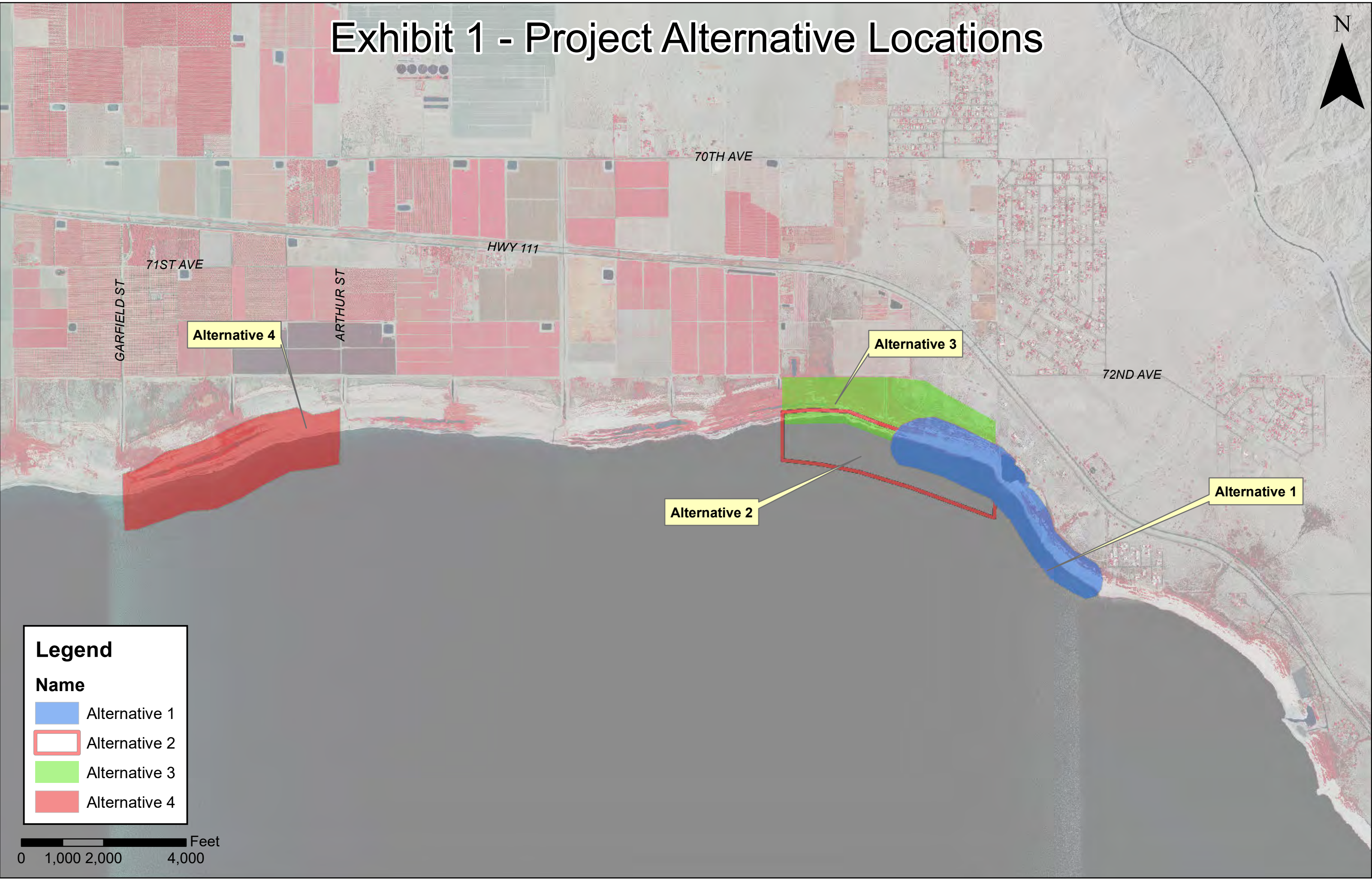
After years of studies and analysis, it is the goal of the Demonstration Project Grant Partner Agencies--Riverside County Transportation Land Management (COUNTY), Salton Sea Authority (SSA), California Department of Water Resources (DWR), and California Natural Resource Agency (CNRA) to deliver a completed project as expeditiously as possible that not only meets state objectives and commitments, but also provides an opportunity to stimulate the local economy and provide recreational opportunities to the region.

The north end of Salton Sea located within Riverside County consists of approximately 23 miles of shoreline. The County of Riverside has requested WEBB to identify potential site locations and conduct a high-level opportunity and constraints analysis. The purpose of this Technical Memorandum is to present the results of an alternatives opportunity and constraints analysis by providing sufficient information to help inform the selection of a preferred alternative for the Demonstration Project.

### Opportunities and Constraints

Four locations were evaluated as part of this Project Alternatives Analysis ("Analysis"). **Exhibit 1** shows where each alternative is located. Each alternative has various opportunities and constraints associated with it. Below is a description of each opportunity and constraint that was evaluated as part of this analysis. This is not a list of every possible opportunity or constraint, but it does contain the most significant considerations to inform the decision of which alternative to proceed with for the design and construction of the demonstration project.

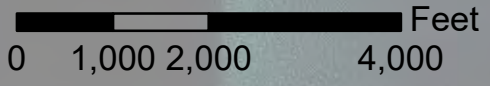
# Exhibit 1 - Project Alternative Locations



**Legend**

**Name**

- Alternative 1
- Alternative 2
- Alternative 3
- Alternative 4



## Water Supply

Water supply is a necessity, regardless of which alternative is selected. Without water there is no project. Based on conceptual level planning the Demonstration Project will require approximately 1,600-2,200 acre-feet of water per year. There are four main water supply strategies that were considered as part of this Analysis – Drain Water, Well Water, Canal Water, and Temporary Use of Canal Water. Below is an overview of each identified strategy. It should be noted that each strategy has advantages and disadvantages, some of which are common to all alternatives and some which are dependent on project location.



*Figure 1 – Drain Lines in Proximity to Project Alternatives*

## Drain Water

The Coachella Valley has an extensive irrigation network that is fed by Colorado River Water that is delivered by the Coachella Canal. A separate network of tile drains and irrigation drainage lines that dewater excess irrigation from fields. Coachella Valley Water District (CVWD) monitors and measures discharges from various drain lines throughout the valley. Drain water typically has a brackish Total Dissolved Solids (TDS) concentration of 2,500-3,000 part per million (ppm). **Figure 1** shows the existing drain lines in proximity to the various alternatives. Drain water is not currently a commodity that CVWD utilizes or sells. Under existing conditions drainage discharges freely flow from the drain lines to the Salton Sea. One potential issue with using drain water is that it currently is the water source for several wetlands between the drain outfalls and the Salton Sea. If existing wetlands are affected, mitigation of the impacts to the existing wetlands will likely be required.

## Well Water

The four alternatives are located within, or immediately adjacent to, the East Whitewater River Groundwater Basin. Lower layers of this aquifer have regularly been used as a source of potable water for residents in the Valley, however recent water quality standards have made the use of this water more difficult due to naturally

occurring constituents in the water. The upper layer of the aquifer is not currently used as a source of potable water. Nearby wells have a reported TDS concentration of 1,200-2,500 ppm. Site specific information for annual yield from shallow wells in this area of the aquifer is not known, however based on discussions with CVWD we would anticipate that two or three shallow wells would need to be constructed to provide water supply for the Demonstration Project solely by well water.

### Canal Water

The Coachella Canal delivers Colorado River water to the Coachella Valley. This water source is not adequate to supply a larger Perimeter Lake Project, but there is capacity to supply the Demonstration Project. Colorado River Water in the Coachella Canal typically has a TDS Concentration of 600-800 ppm. The Coachella Canal was constructed to supply irrigation water to Irrigation District 1 (ID1). All project alternative locations are located just outside of ID1. Based on discussions with CVWD, canal water can also be used in-lieu of pumping groundwater from the East Whitewater River Groundwater Basin. The ability of the various alternatives to use canal water is dependent on the in-lieu program. To qualify for this, groundwater wells would have to be constructed and utilized for a period of one year before canal water could be purchased. Additionally, depending on project location and existing irrigation system capacity, distribution lines from the Coachella Canal would need to be constructed in order to provide canal water to the project site.

### Temporary Use of Canal Water

Another strategy for water supply would be the temporary use of canal water before it is ultimately used for irrigation and other purposes. Under this scenario water would be introduced to one end of the Demonstration Project and an intake pump would be placed at the opposite end of the lake. Canal water would temporarily be detained in the lake as it flows through. Once the canal water flows through the lake it would be pumped upland and reintroduced to the irrigation system. This strategy has some distinct benefits compared to the purchase and use of canal water. Multiple wells would not need to be constructed in order to qualify for the in-lieu use of canal water. There would be some water loss due to evaporation and a more detailed water quality simulation that analyzes the water after it travels through the lake would be needed to ensure that the temporary use of this water does not adversely impact the ultimate irrigation use of the water.

### Environmental Impacts and Permitting

In 2013, an EIS/EIR was prepared for the Species Conservation Habitat ("SCH") project which did not include any specific site evaluation for the proposed Demonstration Project.

A 2017 Addendum to the 2013 EIS/EIR was prepared to include the March 2017 Salton Sea Management Program Phase I: 10-Year Plan. While this expanded the scale of the project to include more of the perimeter north lake, it did not cover the area proposed for the Demonstration Project or analyze impacts specific to the Demonstration Project.

In August 2020, a draft Project Description was circulated by the ACOE which is currently being refined for preparation of the 2020 Draft NEPA Document which will be circulated for public review in 2021. The goal is that the selected site alternative will be covered under the 2020 NEPA Document. However, this draft 2020 document is a NEPA compliance and not a CEQA compliance document.

All the alternatives will require environmental compliance and permitting. Therefore, this analysis will be focused on identification of any site-specific impacts, both direct and more in-depth analysis, including technical studies, will be required once the site location is selected to confirm the appropriate CEQA documentation.

Based on preliminary discussions with CARDNO, on behalf of the State regarding environmental review of the NEPA and Regulatory Permits as well as the proposed SSMP Phase I: 10-Year Plan, it is our understanding that an Individual Permit will not be obtained for the entire overall North Lake and that each project will need to be evaluated/permitted separately.

It is assumed that under any of the Alternatives, project specific CEQA will be required and based on the conversation with CARDNO, Letters of Permission (LOP) and subsequent submittals to the Army Corp of Engineers (ACOE) will also be required.

### Land Ownerships

Each alternative is located on property that is not currently owned by the County or SSA. How many parcels are affected, how many property owners are affected and who those property owners are all important items to consider when selecting a preferred alternative. For each alternative, County GIS Parcels were used to identify this information.

### Infrastructure

The infrastructure required will affect how much it costs to construct each alternative. For the purposes of this Analysis we have identified approximate quantities for the primary construction materials and project elements. The number of linear feet of pipeline to convey water to and from the site, the number of wells and/or pumps required for the alternative, and the linear feet of embankment are quantified for each alternative. These quantities are used to develop planning level costs for each alternative.

### Access

Site accessibility is a consideration in selecting the preferred alternative. The Analysis evaluates what additional right-of-way and infrastructure is required to provide access the site. While accessibility is a positive feature, there are other considerations such as habitat that may be more heavily weighted.

### Recreational Activities

Historically, the Salton Sea was an amenity to local citizens and other visitors. As the sea has lowered, the North Shore Yacht Club and the State Park do not offer the recreational benefits that they once did. To the extent that recreational opportunities can be incorporated into the demonstration project, this will be a benefit for residents and others who are interested in visiting the Salton Sea. Each alternative was evaluated to determine what recreational opportunities exist.

### Cost

The cost of each alternative will play a role in the ultimate site selection. High level cost estimates were developed for each alternative based upon each alternative's infrastructure requirements. Unit costs were applied based upon our experience with constructing similar infrastructure. Due to the conceptual nature of each alternative a contingency of 30% was added to each cost estimate. This analysis resulted in rough order of magnitude costs and provides a good comparison between the various alternatives.

# Exhibit 2 - Alternative 1

N

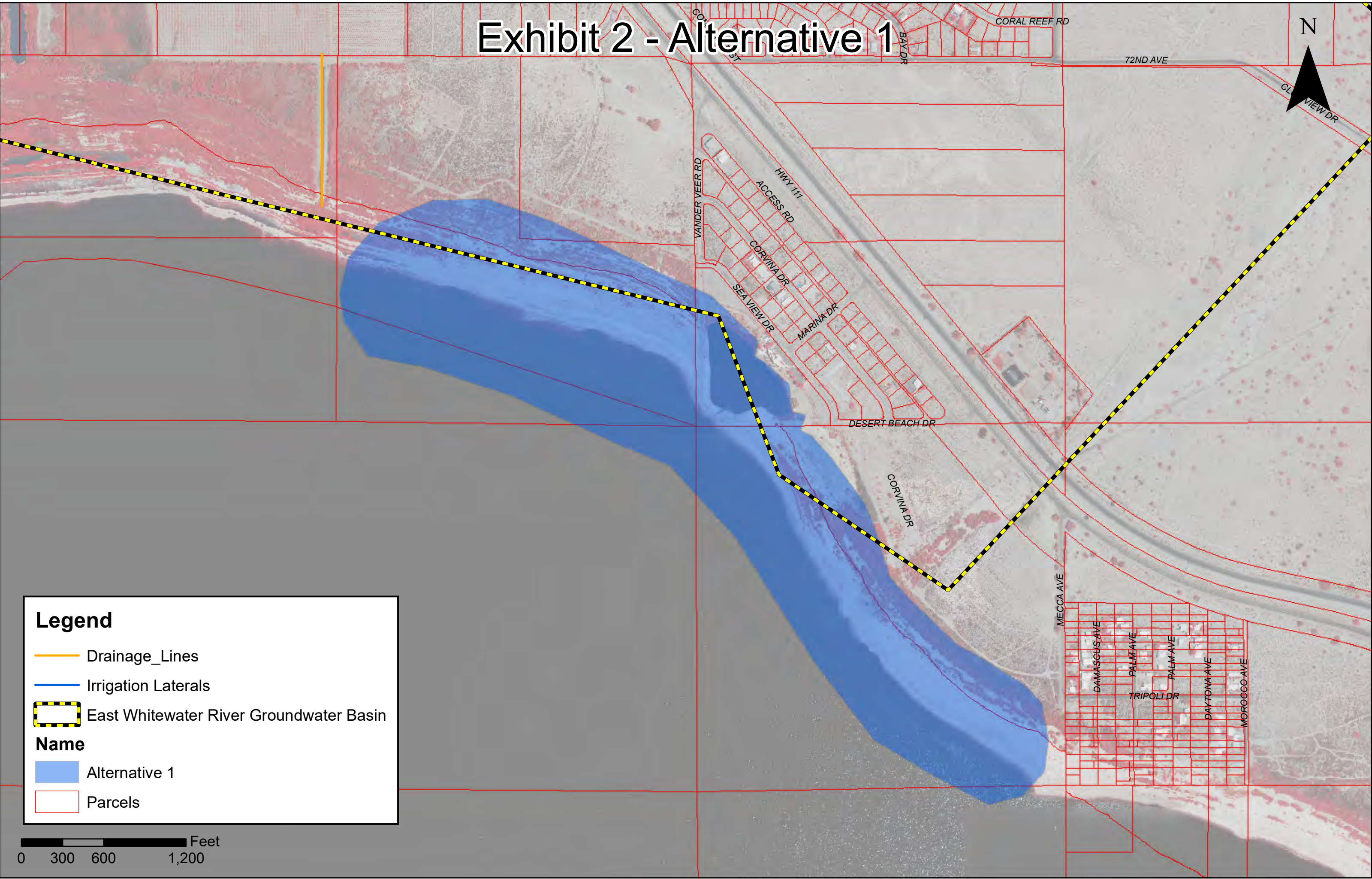
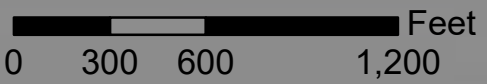


**Legend**

- Drainage\_Lines
- Irrigation Laterals
- ▭ East Whitewater River Groundwater Basin

**Name**

- Alternative 1
- Parcels



## Alternatives Analysis

Four project alternatives area analyzed in this Technical Memorandum. Each alternative was developed in conjunction with Riverside County and the Salton Sea Authority. Project locations were selected based upon the various opportunities and constraints outlined above. The four projects provide a good range of potential sites where the demonstration project could be constructed along the north shore of the Salton Sea. **Exhibit 1** shows the location of each project alternative. A detailed description and analysis of each alternative is contained below.

### Alternative 1

Alternative 1 is located southeasterly of 72<sup>nd</sup> Ave and stretches over to north of Desert Beach. **Exhibit 2** shows the conceptual footprint of this alternative. Alternative 1 is approximately 6,300 feet in length and 1,200 wide and has an approximate footprint of 154 Acres.

#### Water Supply

Well Water, Canal Water, and the Temporary use of Canal Water all appear to all be viable strategies to supply water to Alternative 1. Below is a summary of infrastructure that would be required with each water supply strategy:

#### Well Water

Based upon our preliminary investigations well water is feasible in this location. It is anticipated that between 1,100 and 1,700 ac-ft per year would be required. This would require a continuous flow rate of between 680 and 1,050 gallons per minute. Further investigation would be required to determine the well yield and subsequent number of wells that would be required. For cost estimating purposes, it is anticipated that two wells would need to be constructed in order to supply water for this site.

#### Canal Water

Canal Water is a viable option for Alternative 1. In order to secure this water source new wells would have to be constructed and used for one year, or existing wells would need to be acquired and taken offline. For cost estimating purposes it is assumed that two wells would be constructed and kept as a backup/supplemental water supply source. Approximately 6,000 ft of irrigation line would need to be constructed from existing irrigation lines to the project site.

#### Temporary Use of Canal Water

The Temporary use of Canal Water is also a viable option for Alternative 1. To implement this water supply strategy the existing drain line would need to be diverted around the project so that the water quality is not degraded prior to retuning it to irrigation use. Approximately 11,700 ft of supply line would be required. A 2,000 GPM pump at the opposite end of the project and 14,000 ft of return line would be required.

#### Land Ownership

Alternative 1 has a footprint of approximately 154 Acres. This footprint is over 8 parcels with 4 property owners. **Table 1** below summaries the parcels that would be impacted by Alternative 1. Included in the table is the Owner, Accessor's Parcel Number, Total Parcel Acreage, and Acreage required by the alternative.

**Table 1 - Underlying Land Ownership for Alternative 1**

OWNER	APN	Parcel Acreage	Alternative Acreage
USA 723	723240012	69.50	15.73
USA 723	723240014	87.50	50.46
HOME PRIDE FINANCIAL INC	725210005	39.10	1.42
IMPERIAL IRRIGATION DIST	725210009	25.45	12.04
IMPERIAL IRRIGATION DIST	725210012	45.56	9.22
IMPERIAL IRRIGATION DIST	725210013	49.97	48.43
IMPERIAL IRRIGATION DIST	725220001	320.00	4.09
SPLETTER	735030002	94.79	0.99

### Infrastructure Requirements

Estimated quantities for Alternative 1 are listed below. The infrastructure required for Alternative 1a varies based on which water supply strategy is employed. Due to this a summary based by water use strategy is shown in **Table 2**.

**Table 2 - Underlying Land Ownership for Alternative 1**

	1a		1b		1c	
	(Well Water)		(Canal Water)		(Temporary Well Water)	
Item	Quantity	Unit	Quantity	Unit	Quantity	Unit
Irrigation Line	500	lf	6,000	lf	11,700	lf
Wells	2	ea	2	ea	-	ea
Return Line	-	lf	-	lf	14,000	lf
Pumps	-	ea	-	ea	1	ea
Lake Levee	8,500	lf	8,500	lf	8,500	lf

### Access

Access to Alternative 1 would be taken from the North Shore Yacht Club. There is ample parking at the Yacht Club and no additional infrastructure that would be required to access the site.

### Recreational Opportunities

. The North Shore Yacht Club has existing amenities that could be utilized in conjunction with this Alternative. In addition, a trail with interpretative signage could be constructed around the project and provide walking, running and sightseeing opportunities. Nonpowered and low powered watercraft to traverse between both ends of the project.

### Cost

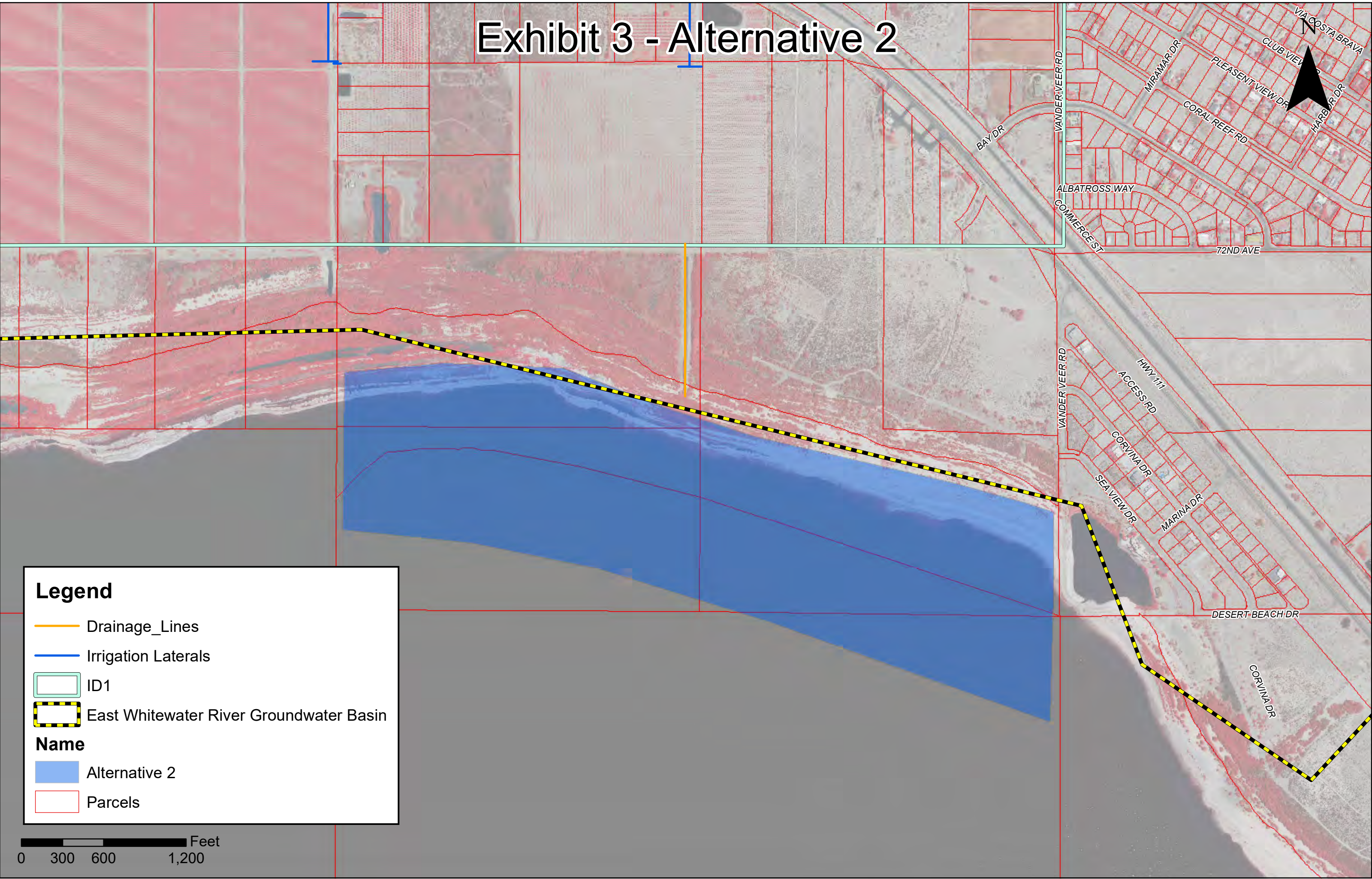
An order of magnitude cost estimate was made for this alternative based on each water supply strategy. To prepare the cost estimates unit costs of \$100/lf for irrigation and return line, \$500,000 per well, \$750,000 per pump station, and \$1000/lf of lake levee were assumed. A 30% Contingency was added to the cost estimate. Annual water costs and right of way costs are not included in this estimate. **Table 3** provides a summary of the Alternative 1 cost based on water supply strategy.



*Table 3 - Estimated Construction Cost for Alternative 1*

<b>Alternative</b>	<b>Order of Magnitude Cost</b>
<b>1a – Well Water</b>	<b>\$12.4 Million</b>
<b>1b – Canal Water</b>	<b>\$13.1 Million</b>
<b>1c - Temporary Well Water</b>	<b>\$14.4 Million</b>

# Exhibit 3 - Alternative 2



**Legend**

- Drainage\_Lines
- Irrigation Laterals
- ID1
- ▨ East Whitewater River Groundwater Basin

**Name**

- Alternative 2
- Parcels



## Alternative 2

Alternative 2 is located northwesterly of the North Shore Yacht Club. **Exhibit 3** shows the conceptual footprint of this alternative. Alternative 2 is approximately 5,200 feet in length and 1,350 wide and has an approximate footprint of 160 Acres. Alternative 2 replicates the project that was submitted as part of the funding request for this demonstration project. It is located such that it would tie into future levees that will be constructed to form the Perimeter Lake. Construction in this location prior to the lake dropping further in elevation would likely be more difficult and expensive.

### Water Supply

Drain Water, Well Water, Canal Water, and the Temporary use of Canal Water all appear to all be viable strategies to supply water to Alternative 2. Below is a summary of infrastructure that would be required with each water supply strategy:

#### Drain Water

Drain Water is a viable source of water for Alternative 2. One drain line directly discharges into this alternative so at a minimum a portion of the water required for this alternative will be supplied by that line. If additional Drain Water is desired for this project, discharge from several drain lines to the west could be diverted to supply water to this alternative. It should be noted that the diversion of water from adjacent drain lines to the west is more difficult with existing lake elevations and would require a pump and supply line to be constructed. While it could be done it there are many obstacles to overcome for a project that will be constructed in the near term.

#### Well Water

Based upon our preliminary investigations well water is feasible in this location. It is anticipated that between 1,100 and 1,700 ac-ft per year would be required. This would require a continuous flow rate of between 680 and 1,050 gallons per minute. Further investigation would be required to determine the well yield and subsequent number of wells that would be required. For cost estimating purposes, it is anticipated that two wells would need to be constructed in order to supply water for this site.

#### Canal Water

Canal Water is a viable option for Alternative 2. In order to secure this water source new wells would have to be constructed and used for one year, or existing wells would need to be acquired and taken offline. For cost estimating purposes it is assumed that two wells would be constructed and kept as a backup/supplemental water supply source. Approximately 3,150 ft of irrigation line would need to be constructed from existing irrigation lines to the project site.

#### Temporary Use of Canal Water

The Temporary use of Canal Water is also a viable option for Alternative 2. To implement this water supply strategy the existing drain line would need to be diverted around the project so that the water quality is not degraded prior to retuning it to irrigation use. Approximately 10,700 ft of supply line would be required. A 2,000 GPM pump at the opposite end of the project and 5,900 ft of return line would be required.

#### Land Ownership

Alternative 2 has a footprint of approximately 160 Acres. This footprint is over 9 parcels with 1 property owner. **Table 4** below summaries the parcels that would be impacted by

Alternative 2. Included in the table is the Owner, Accessor's Parcel Number, Total Parcel Acreage, and Acreage required by the alternative.

**Table 4 - Underlying Land Ownership for Alternative 2**

OWNER	APN	Parcel Acreage	Alternative Acreage
IMPERIAL IRRIGATION DIST	725210009	25.45	24.80
IMPERIAL IRRIGATION DIST	725210006	21.25	14.29
IMPERIAL IRRIGATION DIST	725210011	41.86	5.03
IMPERIAL IRRIGATION DIST	725210007	58.75	40.04
IMPERIAL IRRIGATION DIST	725210013	49.97	15.30
IMPERIAL IRRIGATION DIST	725220001	320.00	20.11
IMPERIAL IRRIGATION DIST	725210006	21.25	2.17
IMPERIAL IRRIGATION DIST	725210011	41.86	16.73
IMPERIAL IRRIGATION DIST	725210013	49.97	23.79

### Infrastructure Requirements

Estimated quantities for Alternative 2 are listed below. The infrastructure required for Alternative 2 varies based on which water supply strategy is employed. Due to this a summary based by water use strategy is shown in **Table 5**.

**Table 5 - Infrastructure Required for Alternative 2 Based on Water Supply Strategy**

Item	2a		2b		2c	
	(Well Water)		(Canal Water)		(Temporary Canal Water)	
	Quantity	Unit	Quantity	Unit	Quantity	Unit
Irrigation Line	500	lf	3,150	lf	10,700	lf
Wells	2	ea	2	ea	-	ea
Return Line	-	lf	-	lf	5,900	lf
Pumps	-	ea	-	ea	1	ea
Lake Levee	8,000	lf	8,000	lf	8,000	lf

### Access

Access to Alternative 2 is very good but not quite as good as Alternative 1. Access would be taken from the North Shore Yacht Club. There is ample parking at the Yacht Club and no additional infrastructure that would be required to access the site.

### Recreational Opportunities

Alternative 2 ranks high of all the alternatives with regard to recreational opportunities. The North Shore Yacht Club has existing amenities that could be utilized in conjunction with this Alternative. In addition, a trail with interpretative signage could be constructed around the project and provide walking, running and sightseeing opportunities. Non-powered and low powered watercraft to traverse between both ends of the project.

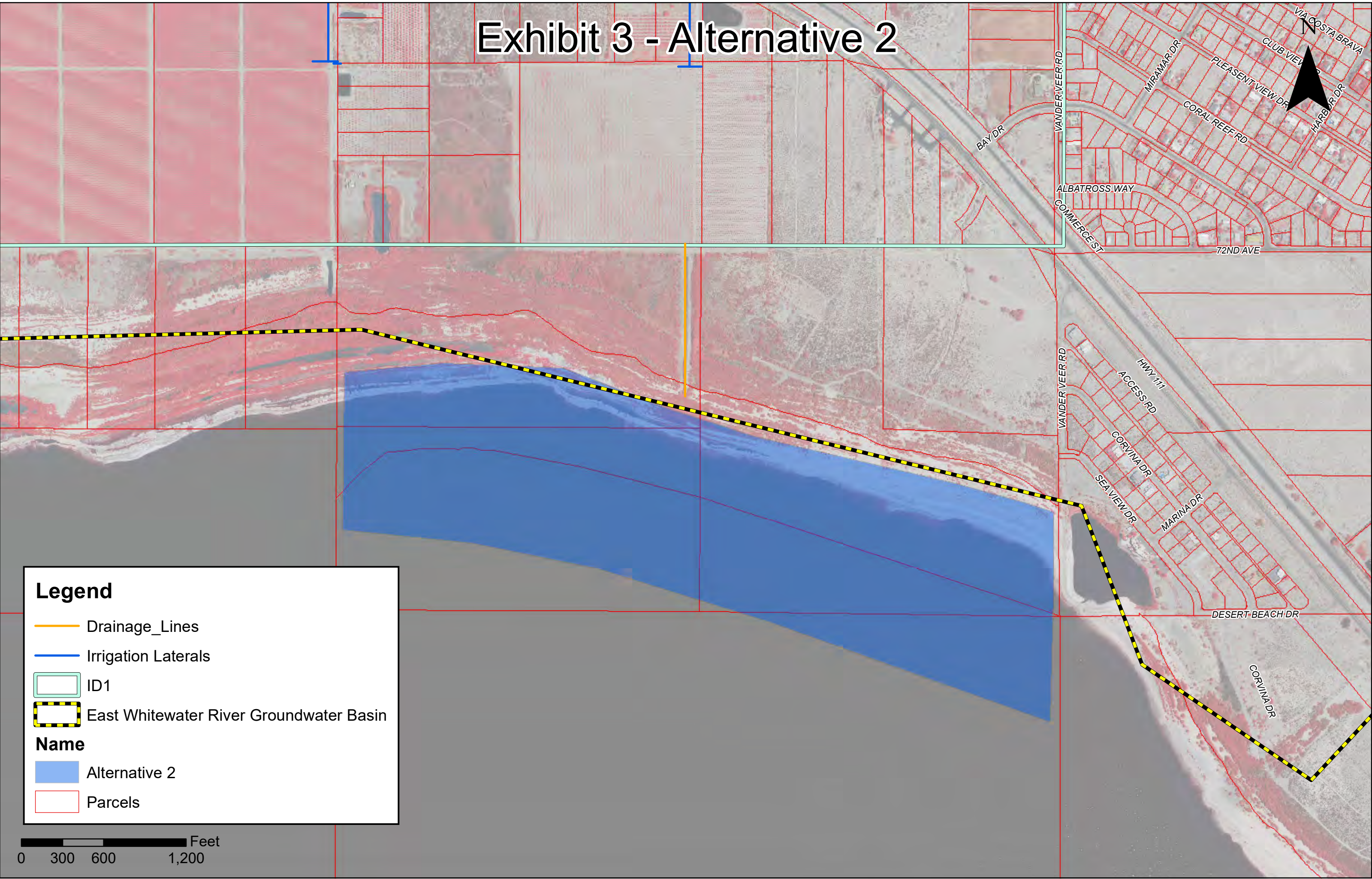
## Cost

An order of magnitude cost estimate was made for this alternative based on each water supply strategy. To prepare the cost estimates unit costs of \$100/lf for irrigation and return line, \$500,000 per well, \$750,000 per pump station, and \$1000/lf of lake levee were assumed. A 30% Contingency was added to the cost estimate. Annual water costs and right of way costs are not included in this estimate. **Table 6** provides a summary of the Alternative 2 cost based on water supply strategy.

*Table 6 - Estimated Construction Cost for Alternative 2*

<b>Alternative</b>	<b>Order of Magnitude Cost</b>
<b>2a – Well Water</b>	\$11.8 Million
<b>2b – Canal Water</b>	\$12.1 Million
<b>2c - Temporary Well Water</b>	\$13.5 Million

# Exhibit 3 - Alternative 2



**Legend**

- Drainage\_Lines
- Irrigation Laterals
- ID1
- ▨ East Whitewater River Groundwater Basin

**Name**

- Alternative 2
- Parcels



### Alternative 3

Alternative 3 is located northwesterly of the North Shore Yacht Club. **Exhibit 4** shows the conceptual footprint of this alternative. Alternative 3 is approximately 5,200 feet in length and 1,350 wide and has an approximate footprint of 160 Acres. Alternative 3 is very similar to Alternative 2 with the exception that is located at a higher elevation and is further upland. This will provide for an easier construction with the current lake elevation. It would also lend itself to connecting to the North Shore Yacht Club Harbor and providing a lake elevation at the historical Salton Sea Elevation.

### Water Supply

Drain Water, Well Water, Canal Water, and the Temporary use of Canal Water all appear to all be viable strategies to supply water to Alternative 3. Below is a summary of infrastructure that would be required with each water supply strategy:

#### Drain Water

Drain Water is a viable source of water for Alternative 3. One drain line directly discharges into this alternative so at a minimum a portion of the water required for this alternative will be supplied by that line. If additional Drain Water is desired for this project, discharge from several drain lines to the west could be diverted to supply water to this alternative. It should be noted that the diversion of water from adjacent drain lines to the west is more difficult with existing lake elevations and would require a pump and supply line to be constructed. While it could be done it there are many obstacles to overcome for a project that will be constructed in the near term.

#### Well Water

Based upon our preliminary investigations well water is feasible in this location. It is anticipated that between 1,100 and 1,700 ac-ft per year would be required. This would require a continuous flow rate of between 680 and 1,050 gallons per minute. Further investigation would be required to determine the well yield and subsequent number of wells that would be required. For cost estimating purposes, it is anticipated that two wells would need to be constructed in order to supply water for this site.

#### Canal Water

Canal Water is a viable option for Alternative 3. In order to secure this water source new wells would have to be constructed and used for one year, or existing wells would need to be acquired and taken offline. For cost estimating purposes it is assumed that two well would be constructed and kept as a backup/supplemental water supply source. Approximately 2,650 ft of irrigation line would need to be constructed from existing irrigation lines to the project site.

#### Temporary Use of Canal Water

The Temporary use of Canal Water is also a viable option for Alternative 3. To implement this water supply strategy the existing drain line would need to be diverted around the project so that the water quality is not degraded prior to retuning it to irrigation use. Approximately 10,700 ft of supply line would be required. A 2,000 GPM pump at the opposite end of the project and 5,400 ft of return line would be required.

#### Land Ownership

Alternative 3 has a footprint of approximately 160 Acres. This footprint is over 8 parcels with 2 different property owners. **Table 7** below summaries the parcels that would be impacted by Alternative 3. Included in the table is the Owner, Accessor's Parcel Number, Total Parcel Acreage, and Acreage required by the alternative.

**Table 7 - Underlying Land Ownership for Alternative 3**

OWNER	APN	Parcel Acreage	Alternative Acreage
HOME PRIDE FINANCIAL INC	725210005	39.10	16.21
IMPERIAL IRRIGATION DIST	725210011	41.86	19.42
IMPERIAL IRRIGATION DIST	725210010	38.94	34.51
IMPERIAL IRRIGATION DIST	725210012	45.56	39.44
IMPERIAL IRRIGATION DIST	725210013	49.97	11.36
IMPERIAL IRRIGATION DIST	725210006	21.25	2.17
IMPERIAL IRRIGATION DIST	725210011	41.86	16.73
IMPERIAL IRRIGATION DIST	725210013	49.97	23.79

### Infrastructure Requirements

Estimated quantities for Alternative 3 are listed below. The infrastructure required for Alternative 3 varies based on which water supply strategy is employed. Due to this a summary based by water use strategy is shown in **Table 8**.

**Table 8 - Infrastructure Required for Alternative 3 Based on Water Supply Strategy**

Item	3a		3b		3c	
	(Well Water)		(Canal Water)		(Temporary Canal Water)	
	Quantity	Unit	Quantity	Unit	Quantity	Unit
Irrigation Line	500	lf	2,650	lf	10,700	lf
Wells	2	ea	2	ea	-	ea
Return Line	-	lf	-	lf	5,400	lf
Pumps	-	ea	-	ea	1	ea
Lake Levee	7,000	lf	7,000	lf	7,000	lf

### Access

Access to Alternative 3 is very good but not quite as good as Alternative 1. Access would be taken from the North Shore Yacht Club. There is ample parking at the Yacht Club and no additional infrastructure that would be required to access the site.

### Recreational Opportunities

Alternative 3 ranks high of all the alternatives with regard to recreational opportunities. The North Shore Yacht Club has existing amenities that could be utilized in conjunction with this Alternative. In addition, a trail with interpretative signage could be constructed around the project and provide walking, running and sightseeing opportunities. Non-powered and low powered watercraft to traverse between both ends of the project.

### Cost

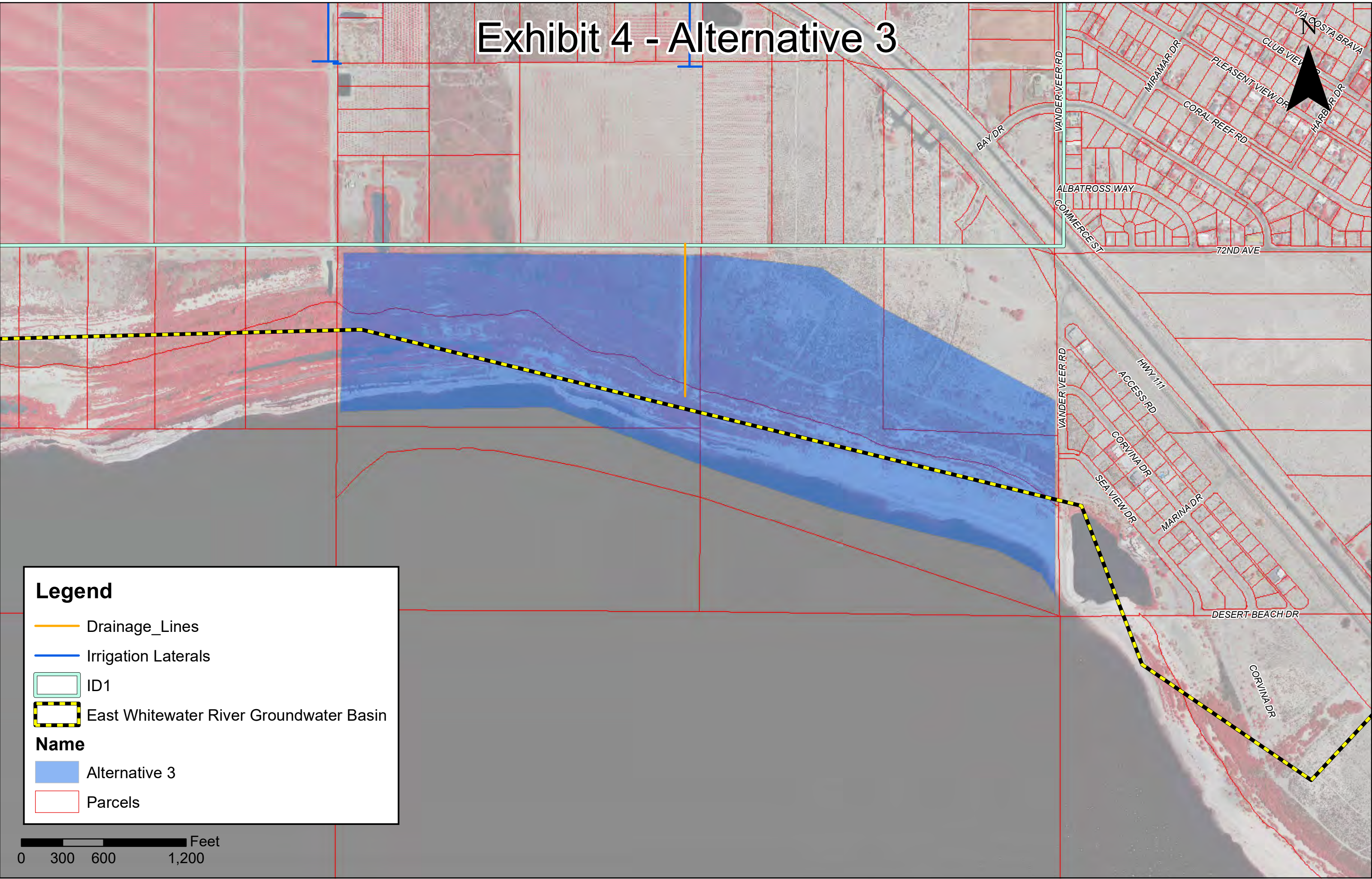
An order of magnitude cost estimate was made for this alternative based on each water supply strategy. To prepare the cost estimates unit costs of \$100/lf for irrigation and return line, \$500,000 per well, \$750,000 per pump station, and \$1000/lf of lake levee were assumed. A 30% Contingency was added to the cost estimate. Annual water costs and right of way costs are not included in this estimate. **Table 9** provides a summary of the Alternative 3 cost based on water supply strategy.



*Table 9 - Estimated Construction Cost for Alternative 3*

<b>Alternative</b>	<b>Order of Magnitude Cost</b>
<b>3a – Well Water</b>	\$10.5 Million
<b>3b – Canal Water</b>	\$10.7 Million
<b>3c - Temporary Well Water</b>	\$12.2 Million

# Exhibit 4 - Alternative 3



**Legend**

- Drainage\_Lines
- Irrigation Laterals
- ID1
- ▨ East Whitewater River Groundwater Basin

**Name**

- Alternative 3
- Parcels



#### Alternative 4

Alternative 4 is located approximately three miles westerly of the North Shore Yacht Club. **Exhibit 5** shows the conceptual footprint of this alternative. Alternative 4 is approximately 5,500 feet in length and 1,600 wide and has an approximate footprint of 193 Acres. Alternative 4 is located immediately south of CVWD’s mitigation project that has been planned and will soon be permitted and constructed. Of all the alternatives, Alternative 4 would demonstrate how Drain Water would be used to promote habitat in the larger Perimeter Lake Project.

#### Water Supply

Drain Water is the logical source of water for Alternative 4. Three drain lines directly discharge into this alternative. In addition, CVWD will be constructing a pipeline from the Coachella Canal to provide Canal Water for their mitigation project that is adjacent to Alternative 4. These two water sources would provide all necessary water to Alternative 4 at little to no cost.

#### Land Ownership

Alternative 4 has a footprint of approximately 193 Acres. This footprint is over 5 parcels with 1 property owner. **Table 10** below summarizes the parcels that would be impacted by Alternative 4. Included in the table is the Owner, Accessor’s Parcel Number, Total Parcel Acreage, and Acreage required by the alternative.

*Table 10 - Underlying Land Ownership for Alternative 4*

OWNER	APN	Parcel Acreage	Alternative Acreage
CVWD	729170016	107.54	89.93
CVWD	729170015	25.07	47.52
CVWD	729170017	56.89	0.02
CVWD	729170012	136.23	0.07
CVWD	729170018	319.92	55.39

#### Infrastructure Requirements

Estimated quantities for Alternative 4 are listed below in **Table 11**.

*Table 11 - Infrastructure Required for Alternative 4*

Item	Alternative 4	
	(Drain Water)	
	Quantity	Unit
Lake Levee	8,400	lf

#### Access

Access to Alternative 4 is the worst of all the alternatives. There is limited public right of way between existing crop fields. Depending on how intense the recreational use it, additional right of way would be required in order to allow for fire access. There is no parking in the area so a parking lot would need to be constructed adjacent to the project in order to accommodate visitors.

## Recreational Opportunities

Alternative 4 does not rank as high as the alternatives with regard to recreational opportunities. There are no existing amenities in that area and the construction of these will add cost of the project. Much like the other alternatives, a trail with interpretative signage could be constructed around the project and provide walking, running and sightseeing opportunities.

### 27. Cost

An order of magnitude cost estimate was made for this alternative based on each water supply strategy. The only major infrastructure that this alternative requires is levee around the lake since water supply is readily available at adjacent to this site. A cost of \$1000/lf of lake levee was assumed. A 30% Contingency was added to the cost estimate. Annual water costs (which are not anticipated in this alternative) and right of way costs are not included in this estimate. **Table 12** provides a summary of the Alternative 4 cost based on water supply strategy.

*Table 12 - Estimated Construction Cost for Alternative 4*

Alternative	Order of Magnitude Cost
4 – Drain Water	\$10.9 Million

# Exhibit 5 - Alternative 4

N



WHEELER ST

GARFIELD ST

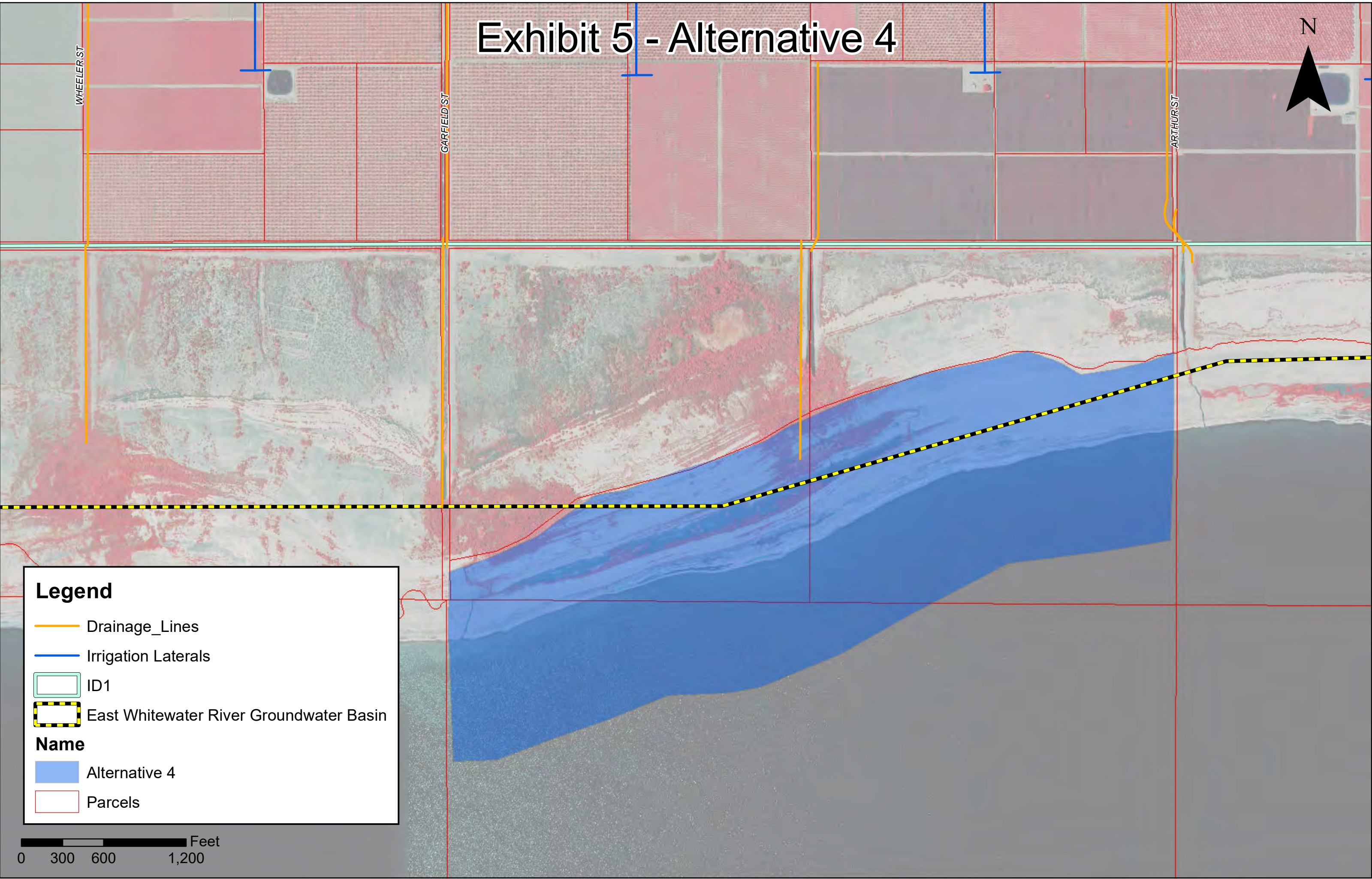
ARTHUR ST

**Legend**

- Drainage\_Lines
- Irrigation Laterals
- ID1
- East Whitewater River Groundwater Basin

**Name**

- Alternative 4
- Parcels



## Summary and Discussion

**Table 13** includes a summary of major the opportunities and constraints of each alternative. All alternatives are viable, and each have their advantages and disadvantages. Ultimately the selection of the preferred alternative will be based on which of all the project objectives is the most important. A project that favors Access and Recreation Opportunities as a priority will be different than a project that favors a readily available water supply vs a project that impacts the fewest number of property owners.

*Table 13 - Summary of Project Alternatives*

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
<b>Property</b>				
Project Footprint	154 Acres	160 Acres	160 Acres	193 Acres
Parcels Impacted	10	9	8	5
Property Owners	4	1	2	1
<b>Water Supply Options</b>				
Drain Water	No	Yes (Partial)	Yes (Partial)	Yes
Well Water	Yes	Yes	Yes	n/a
Canal Water	Yes	Yes	Yes	n/a
Temporary Canal Water	Yes	Yes	Yes	n/a
<b>Offsite Infrastructure</b>	Moderate	Moderate	Moderate	Minor
<b>Access</b>	Good	Good	Good	Poor
<b>Recreation Opportunities</b>	Good	Good	Good	Limited
<b>Environmental and Permitting</b>	TBD	TBD	TBD	TBD
<b>Construction Cost</b>	\$11.8-\$13.5 Million	\$11.8-\$13.5 Million	\$10.5-\$12.2 Million	\$10.9 Million
<b>Design, Permitting, CMI</b>	\$3.7-\$4.3 Million	\$3.5-\$4.0 Million	\$3.2-\$3.7 Million	\$3.3 Million
<b>Annual Water Cost</b>	Yes	Yes	Yes	No