EVALUATION OF WATER SYSTEM OPTIONS FOR THE NORTH DAVIS MEADOWS COUNTY SERVICE AREA

July 2018

Yolo County Natural Resources Division

Table of Contents

Executive Summary

North Davis Meadows is a residential community in unincorporated Yolo County, approximately 1-mile north of the City of Davis, just west of Highway 113. The North Davis Meadows County Service Area (CSA) was established June 1, 1987 and provides water service, among other services, to the North Davis Meadows (NDM) residential community of approximately 250 residents through 95 existing water service connections. The community is currently provided water service by two groundwater wells, however the wells and existing infrastructure do not meet drinking water quality standards, nor minimum fire flow safety standards. Historically, the NDM water system has experienced reported **nitrates** both above and below the maximum contaminant levels in the two primary drinking water wells. Nitrates in drinking water can come from natural, industrial, or agricultural sources (including septic systems, storm water run-off, and fertilizers). Levels of nitrate in drinking water can also fluctuate throughout the year. In 2009, the CSA was issued Compliance Order No. 12-09 for "failing to provide a reliable and adequate supply of pure, wholesome, healthful and potable water."

The wells are metered, but the homes are not, and as such, the community pays a flat rate for all water: $1,831 per connection, per year which includes landscaping, street lighting and storm drainage services. It is important to note that the CSA is currently operating at a deficit of approximately $808,000 and will have to increase assessments under any alternative to address the deficit.

On March 20, 2018, following positive surveys of the community and successful Proposition 218 proceedings, the County Board of Supervisors unanimously approved a project to connect NDM to the City of Davis's public water system. The approved project would supply the NDM community with municipal water for all uses, including residential, irrigation, and fire supply. The Proposition 218 protest vote narrowly passed: 46 protest votes were submitted; 48 were needed to mount a successful protest.

At the direction of the County Administrator, the County is re-evaluating alternative water system options for the purpose of ensuring that all options are well understood by the community. New Point of Use (POU) regulations present additional implications that needed review for both the NDM community and other county locations.

Since 2009, the CSA and NDM community have evaluated several alternatives to either upgrade or replace the water system. These alternatives, or variations of them, include:

- replacement of the existing wells with deeper, larger wells;
- consolidation of the water system with the City's public water supply; and
- a hybrid alternative that would connect the community to City water for residential uses and rely on groundwater for irrigation purposes.

Variations of these three alternatives have been explored and evaluated by the CSA over the last nine years with various levels of community support. The alternatives listed above were found by the CSA to not achieve the **dual mandates of a clean drinking water supply and sufficient flow capacity** and were

inconsistent with the Yolo County Board of Supervisors' adopted Strategic Plan goals of a) addressing service delivery and critical infrastructure needs and b) ensuring a reliable water supply.

This report evaluates the costs and risks associated with three alternatives that have recently been discussed by the NDM community.

- Full consolidation with the City of Davis for all water uses (the current, approved project);
- A Dual Use project that would connect the residents to the City of Davis for potable (indoor) water and fire suppression flows. This alternative would continue to rely on groundwater wells for non-potable (outdoor) uses; and
- Two new groundwater wells for all water uses (indoor, outdoor, and fire flow) with infrastructure upgrades. This alternative is discussed and analyzed both with and without Point of Use treatment.

All three alternatives may be eligible for long-term, low interest financing through the State Water Resources Control Board's State Revolving Fund loan program ("SRF"). The SRF program will only fund projects, or portions of projects, that provide drinking water. This means that only the portion of the Dual Use alternative that connects the NDM residents to the City for potable drinking water would be eligible for SRF funding.

As mentioned above, the community currently enjoys a flat rate for water service. State law (AB 2572, 2004) required that meters be installed as a condition of approval of any state funded water project. Furthermore, Public Utilities Code section 781 requires all water operators to "charge customers for potable water based on the actual volume of deliveries, as measured by the water meter." This means that if the CSA accepts state financing for any water system alternative meters will be installed and the CSA will be legally required to charge each connection based on their actual water consumption and abandon the current flat rate structure.

A high level summary of the current alternatives, costs, pros and cons, and risk analysis is provided on the following page. Risk factors include:

- water quality reliability,
- water supply reliability,
- anticipated longevity of system,
- cost/frequency/responsibility of operations and maintenance (O&M), and
- uncontrollable external factors such as future regulation, drought and land subsidence.

For the purposes of this evaluation, risk is categorized as "high," "medium," or "low" and refers to the likelihood of future intervention and, in some categories, expenditure. For example, if an alternative is ranked as "low risk" for water quality, it means that there is a low risk that the quality of the drinking water supplied will require future intervention by the CSA or community.

Current Project – Full Consolidation with City of Davis

Cost

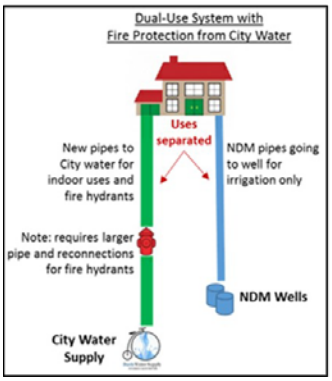
Project Construction	Annual Water Consumption Est.	Estimated Annual Charges per parcel
$8.3M total ($4,157 per parcel/year)	$3,655 - $6,215	$7,813 - $10,365

Risk Analysis

Water Quality	Water Supply	System Longevity	O&M	External Factors
LOW	LOW	LOW	LOW	LOW

This alternative is estimated at moderate capital improvement cost (relative to all scenarios) and ensures the lowest overall risk to the NDM community and the CSA. This scenario likely results in the highest charge for water use among the alternatives, though that may be offset by the City assuming full responsibility for future repair, rehabilitation and replacement through their water rates. The full consolidation relieves the residents and the CSA from the burden of operating and independently financing the water system, as well as future water quality or groundwater use regulation. Full discussion of the current project begins on page 12 of this report.

Alternative A – Dual Use



Cost

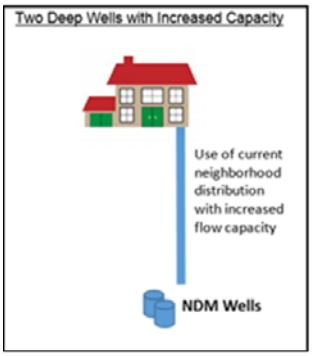
Project Construction	Annual Water Consumption Est.	Estimated Annual Charges per parcel
$12.2 M total ($9,242 per parcel/years 1-4) ($5,174 per parcel/years 5-30)	$3,200	$ 12,442 years 1-4 $ 8,374 years 5-30

Risk Analysis

Water Quality	Water Supply	System Longevity	O&M	External Factors
LOW	LOW	MED	MED	MED

This alternative results in the highest capital improvement costs, moderate water charges, low risk to consumer health, low risk for fire flow and capacity issues, but includes moderate risk related to the continued reliance on wells and groundwater for irrigation purposes due to uncertainty of future regulation of groundwater extraction related to the implementation of the Sustainable Groundwater Management Act. This alternative's continued reliance on wells (for irrigation purposes) should be treated as an ongoing capital improvement issue as the typical useful life of a well is approximately 30 years in this region per the Consumer Product Index. Full discussion of this alternative begins on page 16.

Alternative B – New Wells with Infrastructure Upgrades



Cost

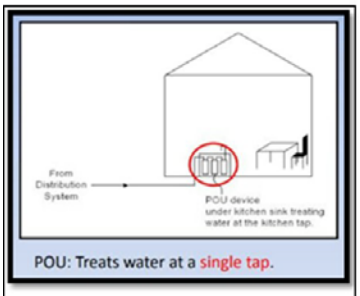
Project Construction	Annual Water Consumption Est.	Estimated Annual Charges per parcel
$4.6 M to $6.6 M ($2,090 - $2,998 per parcel/year))	$2,000/year	$ 4,090 -$4,998/year plus $ 8,505 per parcel (one time deficit repayment)

Risk Analysis

Water Quality	Water Supply	System Longevity	O&M	External Factors
MED/HIGH	MED	MED	MED	MED

This alternative is projected to be the least expensive to construct and provides for flat rate charges for water consumption, however there is uncertainty as to how long the CSA can continue to utilize flat rate water charges. If State funding is utilized, water meter installation will be required as a condition of approval of a loan or grant. This is a "long-term, short-term" solution as all current issues will present themselves at a future date. Full discussion of Alternative B begins on page 19.

Alternative B + C – New Wells with Infrastructure Upgrades plus POU



This alternative could be coupled with Alt. B (New Wells) should the CSA experience water quality issues at a later date

Cost

Project Permitting	POU Installation	Estimated Annual Charges per parcel
$250,000 (Initial Application) $100,000 (Every 3 years)	$166,750 ($1,755 per connection, one time)	$1,520 (Testing and membrane replacement)

Risk Analysis

Water Quality	Water Supply	System Longevity	O&M	External Factors
MED/ HIGH	MED	MED	LOW/MED	HIGH

Temporary POU treatment for consumer health concerns and the associated monitoring is relatively low risk with 100% participation (which is an uncertainty). If new wells are installed and permitted, and fail to meet a new or known contaminant in the future, the POU could be considered if all of the criteria are met. Costs associated with a permanent solution to address water quality and water supply reliability are extremely likely to increase in the interim. Full discussion of POU begins on page 22.

Introduction

Yolo County has been utilizing County Service Areas (CSA) for over 20 years to provide services to County residents residing in certain unincorporated communities. The County Service Area Law (Government Code §25210.1 et seq.) was created in the 1950s to provide a means of providing services that are not otherwise available in areas where residents are willing to pay for the service. The basic premise of a CSA is to fund a service that the County would not otherwise be able to fund through traditional sources (property tax, sales tax, fuel tax, etc.) by creating a direct assessment or fee that a property owner pays for a particular service or improvement. The most common type of service and associated assessment is for road and drainage maintenance in new subdivisions, but there are others ranging from lighting to fire protection. As the name implies, a CSA is administered by County Staff under the direction of the County Board of Supervisors, advised by a CSA Advisory Committee comprised of CSA residents. A CSA may be established to provide any one or more of the following types of extended services within an unincorporated area:

> *Extended police protection, structural fire protection, local park, recreation, or parkway facilities and services, extended library facilities and services, television translator station facilities and services, low-power television services; and any other governmental services, referred as miscellaneous extended services, which the County is authorized by law to perform, and which the County does not also perform to the same extent on a County-wide basis both within and outside city boundaries.*

The North Davis Meadows County Service Area was established June 1, 1987 and provides water service, among other services, to the North Davis Meadows (NDM) residential community. The NDM community is located in the mid-southern portion of Yolo County, about 1-mile north of the City of Davis and includes both the North Davis Meadows I and North Davis Meadows II residential subdivisions. The North Davis Meadows I subdivision homes began construction in the mid-1980s, and North Davis Meadows II was annexed in 1995. Currently, the NDM population is estimated at approximately 250 people. The CSA provides 95 water service connections in NDM and contracts with the City of Davis to provide water system operation and maintenance services.

Following the May 3, 2018 North Davis Meadows community meeting, Yolo County staff took action to summarize and further evaluate the information currently available on the options the community has considered to address NDM's water quality and fire protection needs. This report summarizes options for the North Davis Meadows CSA to meet California State **drinking water quality standards** and **fire protection requirements**. This evaluation utilized data from existing engineering reports, technical memorandums, consultant assessments and recommendations, and conversations with State and local regulatory staff.

Background

The NDM water supply comes from two groundwater wells. NDM well #1 is located in the original NDM subdivision (NDM 1), east of Fairway Drive between Larkspur Place and Lupine Court. The well is 31 years old and 490 feet deep, and draws water from two aquifers. NDM well #2 is located east of North Davis Meadows Subdivision II (NDM II), beyond the end of Black Hawk Place near the municipal golf course. Well #2 is approximately 22 years old. While the wells are metered, the homes are not, and as such, the community pays a flat rate for all water ($1,831 per connection, per year; includes landscaping, street lighting and storm drainage services).

This system draws water from four aquifers at depths in the 200' – 400' range, and is connected to the NDM I water system. There is also a standby well available to the NDM CSA system; however, this well is used to irrigate the Davis Municipal Golf Course, but has been approved for domestic use (Yolo County LAFCO, 2006). The 2006 Municipal Services Review/Sphere of Influence report prepared for NDM states that the CSA wells and water system are maintained and operated by the City in a manner similar to, and in accordance with, the standard of wells in the City of Davis. According to a 2014 Consumer Confidence Report, the average lifespan for a well in Davis is 31 years.

On March 20, 2018, following positive surveys of the community and successful Proposition 218 proceedings, the County Board of Supervisors unanimously approved a project to connect NDM to the City's public water system. The approved project would supply the NDM community with municipal water for all uses, including residential, irrigation, and fire supply. The Proposition 218 protest vote narrowly passed: 46 protest votes were submitted; 48 were needed to mount a successful protest.

At the direction of the County Administrator, the County is re-evaluating alternative water system options for the purpose of ensuring that all options are well understood by the community. New Point of Use (POU) regulations present additional implications that needed review for both the NDM community and other county locations.

Notes and Caveats

Cost Estimates

It is important to note that all of the costs associated with the alternatives discussed in this document, with the exception of the currently approved project of full consolidation with the City of Davis, are rough estimates. The full consolidation cost estimate is based on 100% design specifications and an accompanying rate study. More honed cost estimates for alternatives could be obtained, but at the expense of the NDM CSA.

Financing

All costs not directly related to drinking water supply (i.e. irrigation water in dual use alternative) are NOT eligible for a low interest, long term loan from the State Revolving Fund (SRF funding). The CSA and community would have to determine the best method of financing those ineligible costs. For the purposes of this assessment, all costs, except where specified, are assumed to be paid over 30 years for the purpose

of demonstrating the relative differences in cost of each alternative. A bond financing scenario may provide for a 20 or 30-year repayment term at a higher interest rate, increasing the annual costs to each parcel.

CSA Deficit

In addition, regardless of the project, the CSA is operating at a deficit and needs to repay the County approximately $808,000 for costs incurred to date. These costs include engineering, CEQA studies, project management, rate study and a loan to address the sewer deficit (note: the sewer deficit loan will be relieved with a connection to the City of Davis for water).

Metered Water Connections

Any alternative involving connecting to the City for drinking water will result in the installation of water meters at each connection within the North Davis Meadows community. A State law (AB 2572, 2004) requires meters be installed in all potable water systems by 2025. This law does not apply to North Davis Meadows as a small community water system because it has fewer than 300 connections[1], however this law requires that meters be installed for any water project funded by the State. Should the CSA obtain State funding for any part of any water project, it will be required to meter each connection. The impact of additional new legislation remains unclear at this time:

> *A new state law (AB 1668, Friedman, 2018) caps indoor residential water use at 55 g/day per person by 2022. It is unclear how the CSA would comply with this new mandate. Consequence of non-compliance is $ 1,000 -$10,000/day fine to the CSA. One way to ensure compliance would be installation of water meters at each connection. However, per PUC section 781, all metered connections shall "charge customers for potable water based on the actual volume of deliveries, as measured by the water meter." This means that if meters are required to demonstrate compliance with AB 1668, the CSA will be legally required to charge each residence on their actual water consumption and abandon the current flat rate structure. There will be an additional cost to manage such a program.*

Water meters can provide operational efficiencies such as pinpointing water leaks and may also provide financial incentives to conserve water. Over 25 years of local data collection (since approximately 1992) demonstrates that, on average, 74% of newly metered customers reduce their water use by 25% from their previous flat rate.[2] Outside of California, a British study demonstrated a 10% water use reduction after meters were installed and a German study (City of Hamburg) demonstrated an 18% reduction in water use once meters were installed. The US Environmental Protection Agency (EPA) conducted a comprehensive survey in 2006[3] that concluded that nearly 33% of water utilities charge a flat rate for water and states that: "this billing method offers a high degree of certainty for users, it does not provide a(n) incentive to conserve because the quantity of water used has no effect on a user's bill. This can be a

[1] Per Yolo County Environmental Health Division, June 2018
[2] Water conservation data provided by Sacramento Suburban Water District from a study conducted from 2004-2011, evaluating data from 1992 to 2011
[3] https://www.epa.gov/dwstandardsregulations/community-water-system-survey

problem in drought-stricken areas or areas where water supplies are strained by growth or multiple and competing demands."

Sustainable Groundwater Management Act

In the midst of a major drought, California Governor Jerry Brown signed what is perhaps the most significant legislative water initiative in California in half a century: the Sustainable Groundwater Management Act of 2014 (SGMA). The act consists of three legislative bills, Senate Bill SB 1168 (Pavley), Assembly Bill AB 1739 (Dickinson), and Senate Bill SB 1319 (Pavley). The legislation provides a framework for long-term sustainable groundwater management across California. Under the roadmap laid out by the legislation, local and regional authorities in medium and high priority groundwater basins have formed Groundwater Sustainability Agencies (GSAs) that oversee the preparation and implementation of a local Groundwater Sustainability Plan (GSP).

Yolo County is a member of the Yolo Subbasin Groundwater Sustainability Agency Joint Powers Authority[4] (YGSA), participating in the development of the Yolo GSP along with 23 other local public agencies. The GSP is required to be approved by the State Department of Water Resources (DWR) by 2022.

Among other powers, the YGSA has the power to require meters on all groundwater extractions (with the exception of those domestic wells that draw less than 2 acre feet per year), to curtail groundwater extractions during drought or overdraft events, to limit groundwater extractions that are not for beneficial use, and to impose fees and fines on groundwater extractors.

The GSP is currently under development, with the first step being a complete water model for the Yolo Subbasin. This model, developed by the Stockholm Environmental Institute, will provide the YGSA with the data needed to develop its groundwater extraction thresholds and the accompanying regulations.

As noted above, the County is an active participant, at both the staff and elected level, in the development of future local groundwater regulations. It is too early in the GSP development process to determine if, or how, the GSP might affect the North Davis Meadow community if they continue to rely on groundwater for their community drinking water needs.

Additional Study Required

Finally, all alternatives to the current project of full consolidation will require a new rate study and compliance with the requirements of Proposition 218. A new application for SRF funding (and/or bond issuance or other financing mechanism) would also be required.

[4] More information can be found on the YGSA website: Yologroundwater.org

Existing Conditions

The current water supply and distribution system is deficient in both **water quality** and **water quantity**.

Drinking Water Quality

Historically, the NDM water system has experienced reported **nitrates** both above and below the maximum contaminant levels in the two primary drinking water wells. Nitrates in drinking water can come from natural, industrial, or agricultural sources (including septic systems, storm water run-off, and fertilizers). Levels of nitrate in drinking water can also fluctuate throughout the year. In 2009, the CSA was issued Compliance Order No. 12-09 for "failing to provide a reliable and adequate supply of pure, wholesome, healthful and potable water." In other words, the NDM water system has reported nitrate levels in excess of the maximum allowable contaminant levels, or Maximum Contaminant Level (MCL). Other known contaminants within the NDM groundwater supply are **aluminum** and **iron**.

In addition, the NDM water supply exceeds the MCL for **hexavalent chromium**. A Compliance Order (CC0001107) was issued on April 6, 2015 indicating that both wells exceeded the MCL for the first quarter of 2015, and requiring corrective action. Due to a May 2017 Superior Court ruling, the State Water Resources Control Board (SWRCB) has withdrawn the hexavalent chromium MCL, though new regulations are expected in the future.

> Hexavalent Chromium MCL Status*: On July 1, 2014, California adopted the first drinking water standard for chromium 6 (hexavalent chromium) in the nation. The MCL for Hexavalent Chromium in drinking water was set at 10 ppb, while the rest of the United States continued to use the Total Chromium federal MCL of 100 ppb to regulate Hexavalent Chromium. In May 2017 the Sacramento Superior Court issued its final ruling in a case challenging the regulation that set a MCL of 10 parts per billion (ppb) for chromium-6. In California Manufacturers and Technology Association and Solano County Taxpayers Association v. State Water Resources Control Board, the court ordered the State Water Board to withdraw its current MCL and establish a new MCL upon conducting an economic feasibility of compliance. In reaching its decision, the court rejected many of the state's responses to comments raising concerns about the economic feasibility of meeting the MCL at 10 ppb, especially for small water systems lacking economies of scale. In remanding the MCL, the court stated that the State Water Board should pay particular attention to small water systems and their users. The current practice is to comply with the EPA standard described above until the State Water Resources Control Board releases new standards that comply with/address the Court's 2017 ruling. While this temporary suspension of the hexavalent chromium state standard provides regulatory relief to the NDM community, this relief is only temporary. The SWRCB will release standards for hexavalent chromium in the future and hexavalent chromium is a known constituent within the NDM groundwater supply.*

Section 116650 (d) and 116650 (e) of the California Health and Safety Code state that in addition to the issuance of a citation, the State Board may assess a penalty in an amount not-to-exceed $1,000 per day for each day that a violation occurred, and for each day that a violation continues to occur. A separate penalty may be assessed for EACH violation and shall be in addition to any liability or penalty imposed under any other law.

North Davis Meadows has been issued citations for nitrate, aluminum and iron. The maximum $1,000 per day fines could be issued for EACH violation, so the CSA could be issued a fine of $3,000 per day based on current contaminants exceeding adopted public health standards.

Water System Capacity

The Davis Fire Department has determined that current well output is **insufficient to meet minimum fire flow demand**. In a June 13, 2018 meeting with the City of Davis Fire Marshal, City of Davis Public Works the City of Davis Fire Department clarified that 1,000 gallons per minute (gpm) is adequate fire flow for the NDM community due to their house size and in-home automatic fire sprinkler systems. While the City of Davis requires 1,500 gpm within City limits, they will accept the Fire Department's approval of 1,000 gpm[5]. The California Department of Public Health (CDPH) has determined that the required maximum daily demand (MDD) is 425 gpm.

Table 1 – System Flow Requirements

Requirement*	GPM	Duration/Redundancy
2016 CA Fire Code	1,000 gpm	20 psi for 1 continuous hour
CDPH MDD	425 gpm	100% redundancy
Maximum Required Capacity	**1,425 gpm***	**20 psi for 1 hour**

**The system must be capable of producing both the fire flow and MDD simultaneously, using any combination of stored water and well capacity with the largest source of water (highest producing well) out of service*

In addition to not meeting fire capacity, the lack of sufficient production and storage capacity puts an increased strain on the wells, reducing their overall lifespan, which should typically be about 30 years.

Summary of Existing Conditions

The current well system does not meet drinking water **quality** regulations nor public health and fire system **quantity** demands. **The life of each well is negatively impacted by overuse** to meet current demand.

[5] Engineering models used the City of Davis fire flow standard of 1,500 gpm @ 20psi for 2 hours. On June 13, 2018 the City of Davis Fire Department and Public Works confirmed 1,000 gpm @ 20 psi for 1 hour is acceptable for this project. Additional engineering and modeling has yet to be done based on this change. This change may reduce the pipe size and construction costs.

Previous Efforts

Since 2009, the CSA and NDM community have evaluated several alternatives to either upgrade or replace the water system. These alternatives, or variations of them, include:

- replacement of the existing wells with deeper, larger wells;
- consolidation of the water system with the City's public water supply; and
- a hybrid alternative that would connect the community to City water for residential uses and rely on groundwater for irrigation purposes.

Variations of these three alternatives have been explored and evaluated by the CSA over the last nine years with various levels of community support. Alternatives previously explored and **rejected in prior CSA evaluations** include:

- City water for residential uses, with wells for irrigation and fire flow[6];
- Rehabilitation of the existing wells; and
- Replacement of existing wells with new deep wells (with or without Point of Use treatment).

The alternatives listed above were found by the CSA to not achieve the dual mandates of a clean drinking water supply and sufficient flow capacity.

A description of the current alternatives, costs, pros and cons, and risk analysis is provided below. For the purposes of this report, risk factors include:

- water quality reliability,
- water supply reliability,
- anticipated longevity of system,
- cost/frequency/responsibility of operations and maintenance (O&M), and
- uncontrollable external factors such as future regulation, drought and land subsidence.

For the purposes of this evaluation, risk is categorized as "high", "medium", or "low" and refers to the likelihood of future intervention and, in some categories, expenditure. For example, if an alternative is ranked as "low risk" for water quality, it means that there is a low risk that the quality of the drinking water supplied will require future intervention by the CSA or community.

Point of Use treatment ("POU"), treatment at a primary tap inside of each home - usually the kitchen tap, is included in this analysis as Alternative C, though POU requires a permit renewal process every three years. There is no guarantee that NDM could meet the initial permit requirements and continue to meet the eligibility requirements over the long-term and thus POU should not be considered a "solution" to the water quality and supply issues described above. Further discussion is provided on page 22.

[6] If NDM connects to the City of Davis for potable water, the Fire Chief requires fire flow protection also be connected with the City's water system.

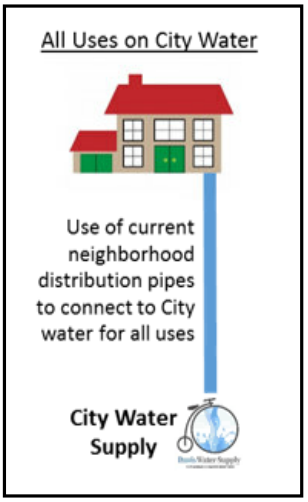
Water Supply Alternatives

This section provides an updated review of three implementable options for the North Davis Meadows CSA to implement a permanent solution to provide safe drinking water to the residents of the CSA that meets State of California water quality requirements and fire protection requirements. This section estimates costs associated with construction of the project, operations, and maintenance. A conceptual evaluation of risk and other relevant factors is also included. Scenarios evaluated include:

- The current project - Full consolidation with the City of Davis public water system;
- Dual Use – City water for potable and fire protection with wells for irrigation; and
- Wells – New deep wells for all uses, upgrades for fire protection, and POU (Alternative C) added to this option if the water quality fails future drinking water regulations.

A cost comparison of all alternatives analyzed is provided on page 26 of this document.

Current Project – Full consolidation with City public water system



As discussed in the introduction above, this alternative is the most fully-developed project with engineering and design nearly complete[7]. In March 2018, Proposition 218 proceedings were held and the Board unanimously approved moving forward with full consolidation with the City. The first fee increase in conjunction with the March Proposition 218 proceedings will be on the November 2018 property tax bill. It is anticipated that the project would take 4-6 months to construct at a cost of $8.3M. This project is eligible for a 30-year low interest loan from the State Water Resources Control Board's "State Clean Water Revolving Loan Fund" (SRF). Further information of costs is described in Table 2 below.

Table 2 – Estimated Costs for Full Consolidation

	Project Construction	Estimated Annual Average Water Service	Estimated Annual Charges per parcel
NDM Resident Analysis	$8.3 M total project cost ($4,157 annual loan repayment per connection over 30 years)	$6,215	**$10,365**
City of Davis Analysis[8]	$8.3 M ($4,157 annual loan repayment over 30 years)	$3,655.66	**$7,813**

[8] Estimated based on El Macero water usage based on actual 2016 aggregate data, adjusted for NDM lot size, and using 2019 City rates. Further discussion is provided on page 13.

City Water Rates

There has been discussion amongst the North Davis Meadows community expressing concerns that a full consolidation with the City for all water uses (indoor and outdoor) will result in significantly higher water consumption charges than the community currently pays (current charges are $1,831 per connection, per year; includes landscaping, street lighting and storm drainage services). City of Davis Public Works staff provided the estimated water charges for North Davis Meadows shown in the table below. These estimates were obtained by extracting water use and water charge averages for the City, the El Macero community, and the Willowbank community. The data was adjusted to account for the increased lot sizes within the North Davis Meadows community.

Table 3 – City of Davis Estimated Water Charges

	City of Davis 2016 avg. water use & bill	**Willowbank** 2016 avg. water use & bill	**El Macero** 2016 avg. water use & bill	**North Davis Meadows** Estimated using El Macero averages adjusted for lot size
Indoor Use (Nov 2015-Feb 2016	5.9 CCF	6.9 CCF	11.2 CCF	11.2 CCF
Summer Use (June – Aug 2016)	15.5 CCF	42.7 CCF	48.8 CCF	96 CCF
Annual Use (2016)	121.0 CCF	269.0 CCF	331.0 CCF	745 CCF
Annual Water Bill (**2018** water rates)	**$704** ($557 consumption)	**$1,462** ($1,240 consumption)	**$1,748** ($1,525 consumption)	**$3,650** ($3,430 consumption)
Annual Water Bill (2019 water rates)	**$763.05 (+8%)**	**$1,586.01 (+8%)**	**$1,896.63 (+8%)**	**$3,969.52 (+8%)**

Residents could see their water bill more than double if they move forward with the full consolidation with the City. However, as noted below, the City's water rates are inclusive of O&M (including water quality treatment), replacement and repair, and long-term Capital Improvement Plan (CIP) costs. In contrast, relying on wells commits the community to bearing the full cost of operations and maintenance, as well as repair, rehabilitation, and replacement of the wells into perpetuity.

Discussion of Pros and Cons

Pros:

- This is the only alternative that relieves the CSA, and therefore the NDM community, of all responsibility for water quality, system capacity, and long-term operations and maintenance of the system. The residents of NDM will only be responsible for maintenance of that portion

of the system between their home and the connection point located within the street/right-of-way.

- Over 75% of the existing pipe infrastructure within the NDM neighborhood can be used with this alternative.
- The construction and related costs are eligible for a long-term, low interest loan through the state's SRF program. Costs for water treatment, monitoring and regulatory compliance, and system repair/replacement are diluted with a much larger rate payer base (City: 16,000 connections vs NDM: 95 connections). A larger ratepayer base and adequate reserves allow the City to leverage existing revenues into future large scale system upgrades for water quality and supply.
- In addition, this alternative includes installing water meters, which can be described, for the ratepayer, as both a "pro" and a "con." Potential undesirable impacts from being metered are described in the paragraph below. Installation of water meters allows the residents to understand their water consumption and incentivizes voluntary water conservation leading to reduced water bills. It also ensures that those that are conserving water are not underwriting the cost of those connections who are using large amounts of water. Water meters are often useful in pinpointing leaks within the water distribution system.
- As the City primary water source is treated surface water, though they do use treated groundwater to meet operation needs, from the Woodland-Davis Clean Water Agency, this alternative ensures that NDM will be in compliance with future water quality regulations and groundwater regulations that will likely arise as a result of the Sustainable Groundwater Management Act.
- Engineering costs incurred for development of the full consolidation can be repaid over 30 years as part of a SRF loan.
- The cost estimates are the most developed of the three scenarios. The costs are anticipated to be less than estimated following the new fire flow modeling.

Cons:

- The primary negative impact from this project is cost. The anticipated construction cost is $8.3 million (over 30 years with a low-interest SRF loan), and is estimated to be higher than the wells alternative.
- The on-going cost of water usage is significantly increased for both indoor and outdoor uses as all water supplied will be City of Davis municipal water.
- City water rates, though relatively stable, are anticipated to increase over time.

Table 4 – Risk Assessment of Current Project: Full City Consolidation

Water Quality	Water Supply	System Longevity	O&M	External Factors
LOW	LOW	LOW	LOW	LOW

Summary of Current Project

This alternative is estimated at moderate capital improvement cost (relative to all scenarios) and ensures the lowest overall risk to the NDM community and the CSA. This scenario likely results in the highest charge for water use among the alternatives, though that may be offset by the City assuming full responsibility for future repair, rehabilitation and replacement through their water rates. The full consolidation relieves the residents and the CSA from the burden of operating and independently financing the water system, as well as future water quality or groundwater use regulation.

Alternative A – Dual Use: City water + Ag well for irrigation

This alternative, and variations of it, have been previously considered, as well as the rehabilitation or replacement of the existing wells. This alternative includes the estimated costs to repair the existing wells, as residential water quality and adequate fire flow would be assured by connecting to the City water supply. If needed, it is estimated that a new "irrigation only" well could be installed for $700,000 - $1M. Additional costs include addressing the CSA's deficit.

It is important to note that construction of the current project to consolidate with the City of Davis does not preclude installation and use of an agricultural well at a later date.

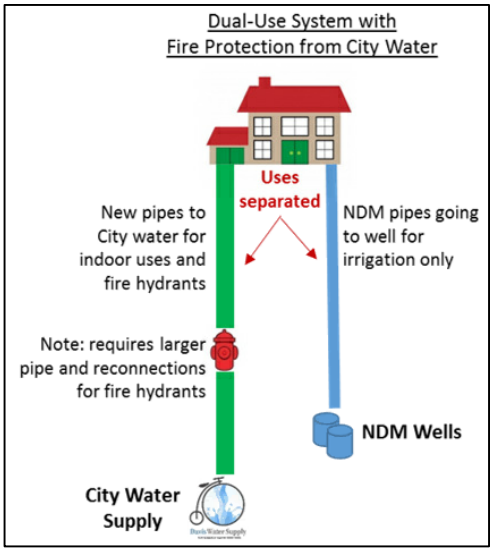


Table 5 – Roughly Estimated Costs for Alternative Dual-Use Consolidation (based on prior dual-use project)

Project Construction	City Water Service (Indoor Uses)	County Water Service (Outdoor Uses)	Estimated Annual Charges per parcel
$12.2M[9] (Year 1-4 annual charge: $9,242 Year 5-30 annual charge: $5,174)	$1,200 annually	$2,000 annually (plus ag well replacement cost every 30 years)	Year 1-4 **$12,442** Year 5-20 **$8,374**

Discussion of Pros and Cons

Pros:

- This alternative relieves the CSA and the NDM community of the burden of ensuring both safe residential water quality and adequate water supply to meet fire flow requirements.
- While City water rates are higher than current NDM expenses, long-term maintenance and operations costs are built into the City's water rates.
- This scenario proposes a separate untreated groundwater system for irrigation purposes, ensuring lower costs for outdoor water uses.
- This scenario includes the installation of water meters for the City water supply, offering residents the opportunity to lower their water charges by reducing indoor water consumption.

[9] Roughly Estimated Construction Costs from 2017: $9.1M + 15% contractor's market premium: $1,365,000 + Decommission of old wells: $240,000 + New irrigation well: $700,000 + Repayment of County loan: $800,000 = $12,205,000 total rough estimate. Decommissioning of old wells and costs related to city consolidation are SRF eligible.

Cons:

- Well life is typically about 30 years in this region according to the Consumer Product Index as published by U.S. Bureau of Labor and Statistics. Once the NDM community pays off construction costs associated with this alternative, if not before then, it is likely that new wells will be needed. The CSA should increase the assessment amount now, or in the very near future, to establish a reserve for the purpose of future well replacement. Establishing a reserve to fund the eventual replacement of the wells would significantly increase the assessment amount described above.
  For example, the current estimated costs to install a new agricultural well range from $700,000 - $1M. The CSA should collect the cost to construct both installation of a new ag well and funds to eventually replace the ag well.
- This option has the highest initial construction costs due to the construction of dual water delivery systems, though some residents may find the tradeoff for less expensive irrigation water worth the higher upfront costs.
- All costs incurred that are **not** related to drinking water consolidation are ineligible for SRF funding (typically long- term, low interest loans). The balance would be the sole responsibility of the CSA at market interest rates. In addition, if SRF funding is utilized for the drinking water project components the state will require a meter for each connection in the water system.
- This scenario provides for a flat charge (the cost to operate the wells/number of connections) for irrigation water, disincentivizing voluntary water conservation as does not take into account a new reserve which should be established to fund the eventual replacement of the wells.
- It is unknown what impact the implementation of the Sustainable Groundwater Management Act may have on the unmetered use of groundwater for irrigation.
- More frequent inspections and related costs will be required to ensure that cross-contamination does not occur. This alternative is the most complicated among the options from the design and construction perspectives.
- The City has determined that it will no longer provide operation and maintenance services for NDM wells. A new operator would have to be selected and system evaluation made to familiarize the new operator with the irrigation system.
- The CSA would continue to be water purveyors under this scenario and would have on-going system operation and maintenance costs.
- It is unknown what level of effort and expense would be required to operate and maintain the irrigation system.

Table 6 – Risk Assessment of Alternative A: City Consolidation + Wells

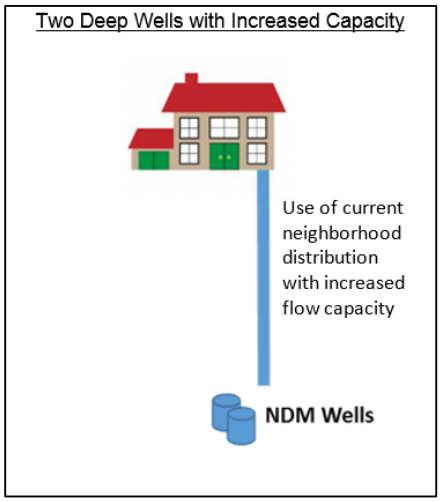
Water Quality	Water Supply	System Longevity	O&M	External Factors
LOW	LOW	MED	MED	MED

Summary of Alternative A: Dual Use

This alternative results in the highest capital improvement costs, moderate water charges, low risk to consumer health, low risk for fire flow and capacity issues, but includes moderate risk related to the continued reliance on wells and groundwater for irrigation purposes due to uncertainty of future regulation of groundwater extraction related to the implementation of the Sustainable Groundwater Management Act. This alternative's continued reliance on wells (for irrigation purposes) should be treated as an ongoing capital improvement issue as the typical useful life of a well is approximately 30 years in this region per the Consumer Product Index.

Alternative B – New Wells for all uses plus System Upgrades

This alternative consists of installing two new wells, at a depth of approximately 900 feet to tap into a deeper aquifer, presumably reaching a water supply that meets drinking water quality standards. There is sufficient space within the current well areas to install the wells and meet regulatory setbacks. Additional infrastructure upgrades are included in this alternative to ensure that maximum daily demand and fire flow capacity are met. Estimated construction costs are the lowest of the three alternatives presented, though additional costs include repayment of the loan of $808,000 (and growing) from the County to the CSA and $240,000 for decommissioning and destruction of the current wells. Costs related to meeting the State of California water quality standards are eligible for an SRF low-interest loan.



Initial estimates for drilling the recommended triple completion monitoring wells, which are needed to ensure that water quality and capacity meet standards, run from $500,000 to $700,000. Additional test/monitoring well costs could be obtained at further CSA expense. These costs may be eligible for SRF reimbursement if full capacity wells that meet current drinking water standards are installed.

While the lowest cost alternative, this alternative is fraught with the most uncertainty, including estimated costs, described in detail in the pros and cons discussion below.

Table 7 – Estimated Costs for New Wells with System Upgrades

Project Construction	Repayment of Costs Incurred	Water Charge/Operating Cost per parcel[10]	Estimated Annual Charges per parcel[11]
$4.6M - $6.6M ($2,090-$2,998 per parcel per year into perpetuity)	$8,505 (one time)	$2,000/year	$4,090-4,998 annually ($8,505 one-time payment)

Note: Costs were derived from 2010 and 2012 engineering memos and likely need to be readjusted to account for increases in labor costs (+20%) and the price of steel (+30%) (*per Dan Morris, Eaton Pumps, Woodland*).

Discussion of Pros and Cons

Pros:

- This alternative is likely the least expensive alternative. The project cost estimates do not include a provision to meter each connection and provides for a flat rate water charge. However, should the CSA utilize a SRF loan (or any other state funds) meters will be a

[10]O&M costs are unknown and not estimated at this time. With additional engineering study these costs would be better estimated.

[11] Includes construction costs, repayment of County loan, well decommissioning, and operating costs

requirement of the funding agreement. Meter installation has been estimated at $1,000 - $2,000 connection and will vary from home to home. Per PUC section 781, all metered connections shall "charge customers for potable water based on the actual volume of deliveries, as measured by the water meter." This means that if meters are required to demonstrate compliance with AB 1668, the CSA will be legally required to charge each residence on their actual water consumption and abandon the current flat rate structure. There will be an additional cost to manage such a program.

- It is anticipated that most of the existing distribution infrastructure can be utilized.
- Installation of new wells with sufficient capacity and infrastructure for fire protection should ensure system longevity (approx. 30 years).
- Instead of decommissioning and destroying the existing wells, they could be put on "standby" status, preserving the community's ability to reactivate them at a later date. There are maintenance and monitoring requirements, and additional costs, associated with standby wells. Those requirements would be determined though the permitting process.
- Due to newer construction standards and materials, new wells are less likely to experience damage from land subsidence or to be impacted by fluctuating groundwater levels than rehabilitated wells, though that risk remains uncertain.
- Should the exploratory monitoring wells not yield positive results, the CSA and NDM community can select another alternative without bearing the full cost of the project.

Cons:

- This alternative extends the CSA and the NDM community's burden of ensuring both safe residential water quality and adequate water supply to meet fire flow requirements.
- There is high uncertainty that continued reliance on groundwater will meet future drinking water quality regulations, such as a revised MCL for hexavalent chromium or other contaminants.
- The State Water Board permitting agency (Yolo County Department of Community Services & Yolo County Local Primacy Agency) will only issue permits for new wells if they meet the current State water quality standards as described in Title 22 of the California Code of Regulations. Should water quality be insufficient, there are well head treatments, secondary treatments, and point of entry treatments available that would satisfy Title 22 regulations. These alternative treatments would need to be explored before the County Division of Environmental Health, acting on behalf of the State, would accept an application for Point of Use treatment.
- New state law (AB 1668, Friedman, 2018) caps indoor residential water use at 55 g/day per person by 2022. It is unclear how the CSA would comply with this new mandate. Consequence of non-compliance is $1,000 -$10,000/day fine to the CSA. One way to ensure compliance would be installation of water meters at each connection. As described above, if meters are installed the CSA will be legally compelled to move to a consumption based rate structure.
- The estimated costs related to meet water quality standards are eligible for SRF funding. The NDM community would have to finance fire protection related costs at market rates. All O&M costs are likewise born by the NDM community.

- The wells will likely need replacement in +/- 30 years at an unknown future cost (cost to be the same or likely higher than current estimated project cost), which the CSA should begin collecting and saving for now.
- This scenario provides for a flat charge (the cost to operate the wells/number of connections) for all water, disincentivizing voluntary water conservation. Those that reduce water consumption will not see reduced water charges.
- It is unknown what impact the implementation of the Sustainable Groundwater Management Act may have on the unmetered use of groundwater.
- The City has determined that it will no longer provide operation and maintenance services for NDM wells, so a new operator would have to be selected and assessments made to familiarize the new operator with the water system.
- It is unknown what level of effort and expense would be required to operate and maintain the water system.

Table 8 – Risk Assessment of Alternative B: New Wells with System Upgrades

Water Quality	Water Supply	System Longevity	O&M	External Factors
MED/HIGH	MED	MED	MED	MED

Summary of Alternative B: New Deep Wells

This alternative is projected to be the least expensive to construct and provides for flat rate charges for water consumption, however there is uncertainty as to how long the CSA can continue to utilize flat rate water charges. If State funding is utilized, water meter installation will be required as a condition of approval of a loan or grant. AB 1668 might also require meters. There is medium to high risk associated with future regulatory compliance, project longevity and future maintenance costs. This is a “long-term, short-term” solution as all current issues will present themselves at a future date.

Alternative B+C: Short-Term Point of Use (POU) Feasibility

This alternative would be coupled with Alternative B if, at a future date, the new deep wells do not meet the State of California's water quality standards, such as when the new minimum contaminant level for Hexavalent Chromium is established. As described above, the Yolo County Environmental Health Division would not approve a new groundwater connection unless it met drinking water quality standards, standing alone or with centralized treatment, such as well head treatment or tertiary treatment.

Point of Use (POU) water treatment involves the installation of reverse osmosis filters (or similar) at one tap within each home, typically the kitchen tap (see Figures 1 and 2 below). POU regulations were adopted by the State Water Resources Control Board (SWRCB) in February 2018, though permitting, monitoring, and compliance is delegated by the SWRCB to the local jurisdiction, in this case the Yolo County Division of Environmental Health. The regulations are adopted by the Water Board, but the POU regulations are yet to be finalized by the Office of Administrative Law.

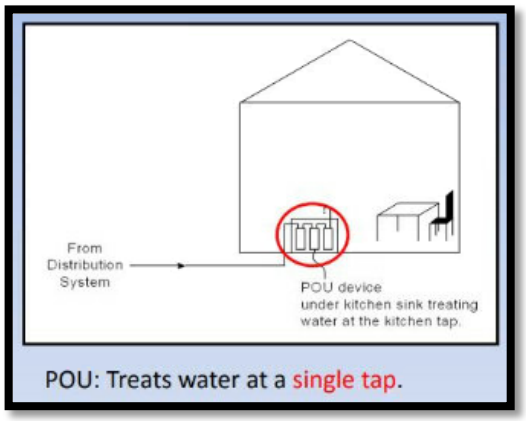


Figure 1 – Point of Use Diagram

POU is a treatment measure available to small community water systems with fewer than 200 connections and is limited to three years or until funding for centralized treatment is available, whichever occurs first. In order to obtain a temporary permit for POU treatment the community must demonstrate that:

- Centralized treatment, or an alternative water source, is economically infeasible;
- The estimated cost of centralized treatment, per household, plus the median water bill from the most recent 12 months is greater than 2% of the median household income (MHI) of the customers served by the water system[12];
- There is no substantial community opposition; specifically, that no more than 25 percent of the total number of customers voted against POUs; and
- 100% of connections participate and are verified to be compliant though the proposed monitoring program.

County staff have serious concerns that the NDM community could demonstrate that centralized treatment is economically infeasible. "Back of napkin" estimates utilizing the published formula indicate that the cost of centralized treatment by consolidating with the City of Davis may meet the test for POU. However, other centralized treatments, such as well head treatment and tertiary treatment, have not

[12] Cost of currently proposed (City consolidation) centralized treatment per household is $4,157/year. The median water bill from the most recent 12 months is $1,200. Together these amounts total $5, 357. The Median Household Income (MHI) threshold for the total to be greater than 2% is $267,850. This means if the MHI of NDM is <$267,850 then the cost of centralized treatment is economically infeasible at the time of the calculation and POU can be considered if all other criteria are met.

been investigated. It is unknown if an approved centralized treatment option that differs from consolidation with the City of Davis would effectively meet the economically infeasible criteria.

In addition, the POU permit application is required to contain: income verification (income survey), a POU treatment strategy, POU operations and maintenance program, POU monitoring program, and ongoing verification of 100% community participation.

Estimated consultant costs to prepare the initial POU application, including an income verification survey, range from $100,000 - $250,000. Solicitation of formal estimates through the public solicitation process by the CSA, at the expense of the NDM community, would likely provide a narrower range of costs. Should a permit application be successful, the cost for permit renewal every three years would likely decrease to a range of $75,000- $100,000 per renewal.

Figure 2 – Typical Point of Use Configuration

Staff has identified serious concerns regarding the feasibility of the NDM community obtaining short-term regulatory relief through POU treatment including: demonstration that permanent solutions are infeasible (including other, more reliable treatment types such as well head or secondary treatment), current and future income eligibility, and securing 100% community participation. Data from the 2016 American Community Survey[13] and published by the U.S Census Department indicates that the median household income for the 95616 zip code is $57,683. Further discussion is provided in the pros and cons discussion below.

Table 9 – Estimated Costs for Temporary POU Treatment (these costs are in addition to the construction costs for Alternative B)

Permitting	POU Installation	POU up-front cost per connection (one time)	Annual POU Maint. cost per connection
$250,000 (Year 1, one-time cost: $2,632 per connection) $100,000 (Every third year for renewal: $1,052 per connection)	$166,750 (Year 1, one time: $1,755 per connection)	$4,387	$1,520 (Testing and membrane replacement)

Note: The permitting charge (high estimate used above) will be incurred regardless of permit issuance or denial. This charge could be as much as $2,632 per parcel.

[13] Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

Discussion of Pros and Cons

Pros:

- A permitted POU solution would be coupled with new wells, as described in Alternative C.
- POU could provide short-term regulatory relief at a relatively low cost.
- There is low risk to consumer health based on **known contaminants** in the existing groundwater supply with 100% compliance.

Cons:

- POU is temporary measure and is not intended for long-term regulatory relief.
- Consumer health is **not protected** against microbial/bacterial contaminants through POU treatment, exposing the community to health risks, and possibly triggering a requirement for chlorination of the water supply in addition to the POU treatment.
- Permit issuance and renewal are contingent upon a demonstration that a centralized treatment is unavailable or economically infeasible. Further, there are additional feasible and implementable alternatives discussed previously in this report, including dual use, and well head or secondary treatment, that have lower costs than full consolidation that are available to the NDM community.
- Permit issuance and renewal are **contingent upon demonstration by the community that centralized treatment is not immediately economically feasible**. Income verification survey, if initially successful, will expire at the conclusion of the next federal census (2020). While many residents in the NDM community state they are on fixed incomes, current housing prices in the area (3-4x higher than the original home prices, currently ranging from $900K - $2M) dictate that each home sold in the NDM community will require the purchaser to have a MHI well above the state median, raising the NDM community MHI with each home sold/purchased.

  County Assessor data shows that 47 of the existing 94 homes, (exactly 50% of the homes) within the NDM community are currently owned by the original purchaser, explaining how many of the residents could be living on a fixed income. However, there are currently (June 2018) four homes within the NDM community for sale, ranging from $975,000 - $1.8M. Using lending industry criteria (mortgage payment not exceeding 25% of income) the minimum income requirement for a $1M mortgage is $228,000 per year.

  Should income verification allow for a temporary three-year permit for POU, it is extremely unlikely that the community would qualify for an extension or reissuance in three years due to the substantial increase in MHI that is expected to occur as homes turn over to new residents. Meanwhile, the costs associated with a permanent consolidation solution to assure regulatory compliance will only increase, particularly costs associated with labor and construction materials.
- The required monitoring to ensure compliance with a POU permit is burdensome and will require all residents to allow for monthly/quarterly/annual inspections and water sampling. The CSA would bear all costs associated with the required monitoring.
- Based on community discussion related to POU treatment, it is unlikely that the NDM community could demonstrate 100% community participation, though that could change in future community conversations.

- Permit issuance for a POU system requires the water purveyor/permit holder, in this case the CSA, to own all infrastructure associated with the POU system. All existing in-home POU systems would be replaced with new identical CSA purchased units.

Table 10 – Risk Assessment of Alternative C: Temporary POU Treatment

Water Quality	Water Supply	System Longevity	O&M	External Factors
MED/ HIGH	MED	MED	LOW/MED	HIGH

O&M is labeled as both "low" and "medium" because O&M of actual POU devices is low risk, while O&M of well infrastructure is medium risk under existing and future conditions, with regulatory uncertainties resulting from future regulations on water quality and groundwater extraction. Water quality risk from known contaminants is low, but POU does not protect against water borne or bacterial contaminants and is therefore rated at medium/high, instead of medium. External factors are labeled as high risk due to the uncertainty that POU could be approved, and if approved, renewed beyond the initial permit term.

Summary of Alternative B + C: New Deep Wells + POU

Temporary POU treatment for consumer health concerns and the associated monitoring is relatively low risk with 100% participation (which is an uncertainty).

If new wells are installed and permitted, and fail to meet a new or current contaminant in the future, the POU could be considered if all of the above mentioned criteria are met.

Costs associated with a permanent solution to address water quality and water supply reliability are extremely likely to increase in the interim.

Roughly Estimated Cost and Risk Comparison

	Roughly Estimated Cost and Risk Comparison			
	City Water *(Current Project)*	**City Water + Ag Well** *(Alternative A)*	**New Wells Only** *(Alternative B)*	**POU** *(Alternative B+C)*
Construction Cost	$8.3M	$11.2M ($1.2M non-SRF/$10M SRF)[14]	$3.5M - $5.5M	$166,750 (up front) ($1,756/parcel)
Well Deconstruction	Included in construction cost	$240,000	$240,000	N/A
Project Costs Incurred to Date[15] (Added to Total Costs to Finance)	Included	$260,000 not included in construction cost	$808,000	N/A
Total Costs to Finance	**$8.3M**	**$11.665M + PM time + rate study**	**$4.6-6.6M + PM time + rate study + possible future treatment**	**$167k (Plus Alt C)**
Financing	SRF	SRF + Other for SRF non-eligible costs	SRF + Other for costs incurred to data	TBD
Additional Project Management & Rate Study	–	Unknown PM Rate Study est.: $25,000	Unknown PM Rate Study est.: $25,000	+/-$100,000 every 3 years
Annual O&M Cost	Built into City water rate	$9,500	$122,000	$136,955
Capital Replacement Cost	Built into City water rate	Unknown	Unknown	Unknown
Installation of water meters	Built into project cost	Built into project cost	$1,000-$2,000 per connection	$1,000-$2,000 per connection
Variable O&M Costs (i.e. backflow evaluation and membrane replacements.)	Built into City water rate	$12,350 every 3 years	Unknown	$22,325 every 3 years
Risk Assessment	**LOW/LOW**	**LOW/MED**	**MED/MED**	**MED/HIGH**

[14] The current SRF interest rate is fixed at 1.8%, though the rates are adjusted annually. The rate in effect at the time of award is fixed for the term of the agreement. Outside private financing rates are vary so widely that they are impossible to estimate with any certainty.

[15] Costs associated with the full consolidation water project, most of which have already been expended. These costs were included in the total project cost for the full consolidation. Alternative solutions will need to pay for the work completed to date in additional to new project costs.