Austin WATER | WATER FORWARD
INTEGRATED WATER RESOURCE PLAN

Austin Integrated Water Resource Planning Community Task Force

Packet Index

April 19, 2018

Austin Integrated Water Resource Planning Community Task Force
April 19, 2018 – 5:00 p.m.
Waller Creek Center, Room 104
625 East 10th Street
Austin, Texas 78701

For more information go to:
Austin Integrated Water Resource Planning Community Task Force

AGENDA

Voting Members:

Sharlene Leurig - Chair	Marianne Dwight	Sarah Richards
Jennifer Walker – Vice Chair	Diane Kennedy	Lauren Ross
Todd Bartee	Perry Lorenz	Robert Mace
Clint Dawson	Bill Moriarty	

Ex Officio Non-Voting Members:
Austin Water: Greg Meszaros
Austin Energy: Kathleen Garrett
Austin Resource Recovery: Sam Angoori
Neighborhood Housing and Community Development: Rebecca Giello
Office of Innovation: Kerry O'Connor
Office of Sustainability: Lucia Athens
Parks and Recreation: Sara Hensley
Watershed Protection: Mike Personett

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1. **CALL TO ORDER – April 19, 2018, 5:00 p.m.**

2. **CITIZEN COMMUNICATION**

   The first 10 speakers signed up prior to the meeting being called to order will each be allowed a three-minute allotment to address their concerns regarding items not posted on the agenda.

3. **APPROVAL OF MEETING MINUTES**
   a. Approval of the meeting minutes from the April 3, 2018 Task Force meeting (5 minutes)

4. STAFF BRIEFINGS, PRESENTATIONS, AND OR REPORTS

a. Presentation on Revised Draft Plan Recommendations and Implementation Outlook - City Staff (45 minutes)
    i. Task Force Discussion and Input (approximately 45 minutes)

5. SUBCOMMITTEE REPORTS

6. VOTING ITEMS FROM TASK FORCE

a. Discuss and consider approval of proposed meeting dates through the end of the plan development process (10 minutes)

7. FUTURE AGENDA ITEMS

8. ADJOURN

Note: Agenda item sequence and time durations noted above are subject to change.

The City of Austin is committed to compliance with the American with Disabilities Act. Reasonable modifications and equal access to communications will be provided upon request. Meeting locations are planned with wheelchair access. If requiring Sign Language Interpreters or alternative formats, please give notice at least 2 days (48 hours) before the meeting date. Please call Austin Integrated Water Resource Planning Community Task Force, at 512-972-0194, for additional information; TTY users route through Relay Texas at 711.

For more information on the Austin Integrated Water Resource Planning Community Task Force, please contact Marisa Flores Gonzalez at 512-972-0194.

MINUTES

The *Austin Integrated Water Resource Planning Community Task Force* convened in a Regular Meeting on April 3, 2018 at Waller Creek Center, Conference Rm 104, 625 E 10th Street, in Austin, Texas.

Members in Attendance:

Sharlene Leurig - Chair	Diane Kennedy	Lauren Ross
Jennifer Walker – Vice Chair	Robert Mace	Sarah Richards
William Moriarty	Todd Bartee	
Marianne Dwight	Perry Lorenz	

Ex-Officio Members in Attendance:
Lucia Athens, Chris Herrington

Staff in Attendance:
Greg Meszaros, Kevin Critendon, Daryl Slusher, Teresa Lutes, Marisa Flores Gonzalez, Joe Smith, Mark Jordan, Prachi Patel, Helen Gerlach, Bruk Berhanu, Shannon Halley, Katherine Jashinski

Additional Attendees:
John Burke, Geoffrey Tahuahua, Craig Smith, Stefan Schuster, David Foster, Megan Wanek, Bill Bunch

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1. **CALL TO ORDER**
   Sharlene Leurig, Chair, called the meeting to order at 4:10 p.m.

2. **CITIZEN COMMUNICATION: GENERAL**
   David Foster spoke about posting of Task Force information and coordination with CodeNEXT.
   Megan Wanek spoke about coordination with CodeNEXT.
   Bill Bunch spoke about posting of Task Force information, coordination with CodeNEXT, and the IWRP implementation timeline.

3. **APPROVAL OF MEETING MINUTES**
   The meeting minutes from the March 20, 2018 Austin Integrated Water Resource Planning Community Task Force regular meeting were approved on Member Moriarty's motion and Member Walker's second on a 9-0-1-1 vote with Member Richards abstaining and Member Dawson absent.

4. **STAFF BRIEFINGS, PRESENTATIONS, AND/OR REPORTS**
   a. Presentation on Revised Draft Plan Recommendations was provided by Marisa Flores Gonzalez, Austin Water. This presentation was followed by Task Force discussion and input and questions and answers.
   b. The Task Force decided to hold a special called meeting focused on further discussion of the implementation timeline that will meet prior to the next regularly scheduled Task Force meeting.

5. **SUBCOMMITTEE REPORTS**
   None

6. **VOTING ITEMS FROM TASK FORCE**
   None

7. **FUTURE AGENDA ITEMS**
   None

Chair Leurig adjourned the meeting at 6:43 pm.

PRESENTATION

Austin WATER

WATER FORWARD
INTEGRATED WATER RESOURCE PLAN

Water Forward Task Force Meeting

April 19, 2018

Agenda

- Schedule Through End Of Plan Development Process
  - Task Force vote on August, September, and October Dates
- Presentation of Revised Draft Plan Recommendations
  - Task Force Questions, Discussion, and Input

Schedule Through End Of Plan Development Process

Schedule

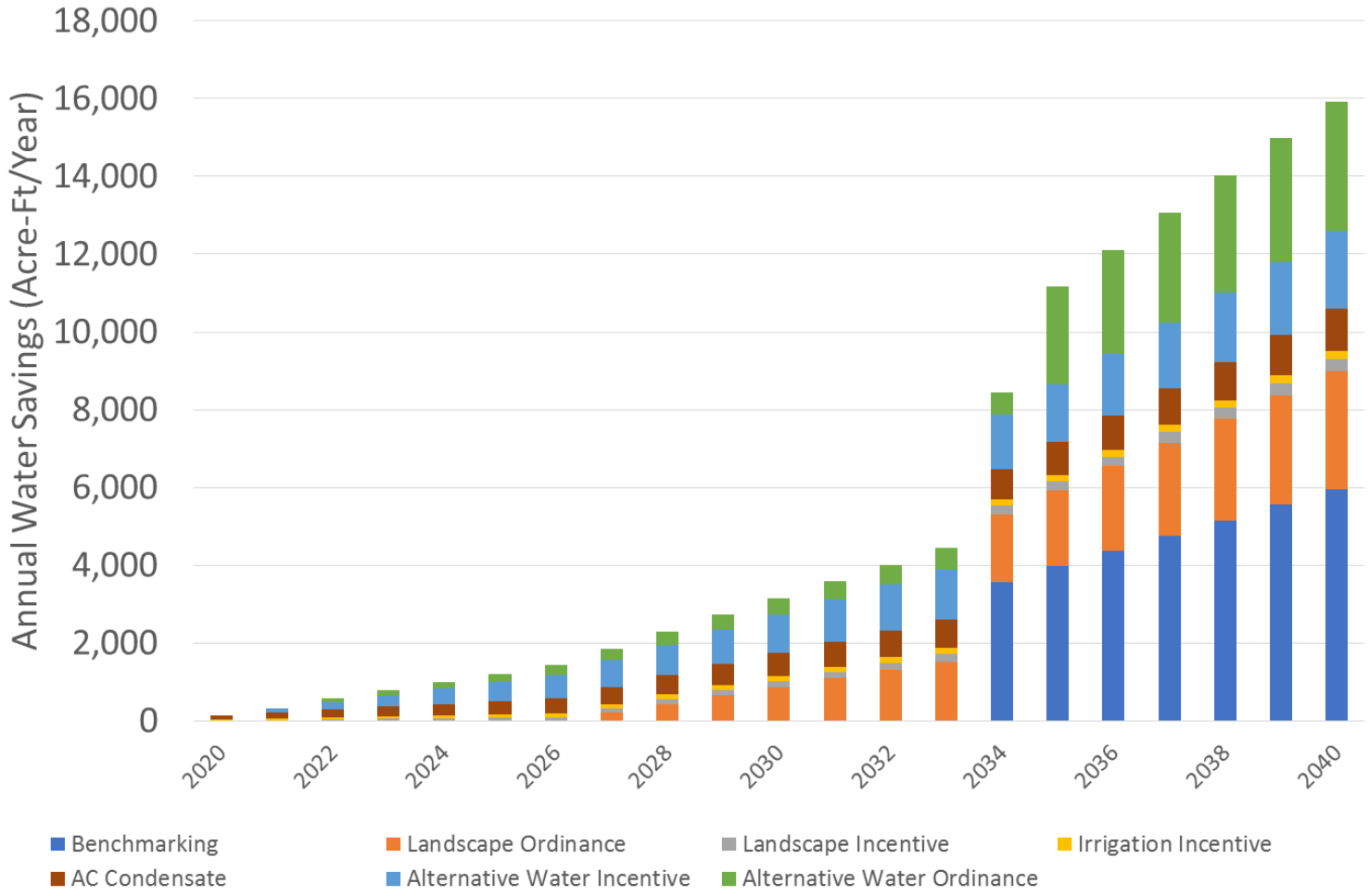
Date	Event	
Apr. 19th	Task Force Meeting	Presentation of and TF input on revised adaptive management plan
May 1st	Task Force Meeting	High level walk through of draft plan report Vote on TF Meeting Dates post-June
Jun. 5th	Task Force Meeting	TF input on draft plan report
Summer 2018	Boards and Commissions Outreach	Presentation of plan recommendations
Aug. 2018	Task Force Meeting	TF review of revised plan report
Sept. 2018	Task Force Meeting	Recommendation for action on final plan
Sept/Oct. 2018	W/WW Commission Meeting	Review and recommendation for action on final plan
Oct/Nov. 2018	City Council Meeting	Action on final plan

Proposed Post-June 2018 Task Force Meeting Dates

August 7st
September 4th
October 2nd

Revised Draft Adaptive Management Plan

Near Term Demand Management Option Savings Estimates*



Estimates subject to change dependent on many factors including growth rates, development trends, specific ordinance and program design, etc.

*Not including demand management savings from AMI, Water Loss Control – Utility-Side, and CII Ordinances.

Year 2025 Water Savings Estimates

Demand Management Strategy	2025 Water Savings Estimate (AF/Year)
Benchmarking	-
Landscape Ordinance	-
Landscape Incentive	80
Alternative Water Ordinance	209
Alternative Water Incentive	496
AC Condensate Reuse	346
Irrigation Incentive	83

Estimates subject to change dependent on many factors including growth rates, development trends, specific ordinance and program design, etc.

*Not including demand management savings from AMI, Water Loss Control – Utility-Side, and CII Ordinances.

Discussion Goals

- Workshop Discussion of Adaptive Management Framework

- Parking lot for other/future items


AUSTIN WATER
100
YEARS
RELIABLE SERVICES

BACKUP MATERIALS

Draft Outline of Plan Recommendations

Hybrid Portfolio Planning Context

- Plan development targeted at being adaptable for a variety of potential futures as a way to deal with climate, drought, and other uncertainties
- Planning context for identified needs and strategies to meet the needs
    - Focus was on Scenario B – Period of Record (Observed Hydrology) adjusted to reflect the potential future effects of climate change
    - Hybrid Portfolios were developed to meet identified Type 1, 2, and 3 needs

Core Colorado River Supplies

- Colorado River supply will continue to be Austin's core supply in the future
- Action steps to protect and enhance this supply include:
    - Continued participation in the Lower Colorado River Authority/City of Austin Water Partnership
    - Continue to engage on potential water supply development in the basin, which may include regional partnerships as a way to implement supply or demand management options
    - Continued communication and information sharing with other entities in the basin
    - Continued participation in LCRA's Water Management Plan update processes
    - Continued participation in the Texas Water Development Board-administered Regional Water Planning process
    - Broaden our understanding of basin-wide issues, including both upstream and downstream issues
    - Share information and work with others to study potential future climate change impacts

Implementation of Best Management Practices

- Continue to implement best management practices and options identified as implementation components
    - Best management practice options
        - Require or incentivize government-recognized energy and water efficiency-labeled residential and commercial fixtures
            - Included in baseline assumptions in portfolios
        - Incentivize or require toilet, urinal, and bathroom faucet aerator efficiencies
            - Included in baseline assumptions in portfolios
        - Lake Austin Operations
            - Implementation during drought periods
    - Options identified as implementation components
        - Water rates and fees to promote water use efficiency while maintaining affordability
        - Customer education enhancements
        - Use of social media programs and web-based content to promote conservation

Hybrid 1 Portfolio Makeup for Each Planning Horizon		Average Drought	2040 Yield Target	2070 Yield Target	2115 Yield Target
Future Additional Portfolio Elements					
D1	Advanced Metering Infrastructure	Both	3,882	5,766	9,371
D2	Water Loss Control-Utility Side	Both	9,326	10,918	13,064
D3	Commercial, Institutional, and Industrial Ordinances	Both	1,063	1,063	1,063
D4	Development-focused Water Use Benchmarking and Budgeting	Both	5,953	11,670	25,228
D5	Landscape Transformation Ordinance	Both	3,038	7,428	15,050
D6	Landscape Transformation Incentive	Both	321	633	929
Alternative Water Incentives and Ordinances					
D7	Irrigation Efficiency Incentive	Both	205	427	394
D8	Lot Scale Stormwater Harvesting	Both	329	869	2,275
D9	Lot Scale Rainwater Harvesting	Both	1,550	4,032	9,251
D10	Lot Scale Gray Water Harvesting	Both	2,126	5,617	12,667
D11	Lot Scale Wastewater Reuse	Both	1,323	3,672	7,875
D12	AC Condensate Reuse	Both	1,084	2,711	5,150
S1	Aquifer Storage and Recovery	Drought	60,000	60,000	90,000
S2	Brackish Groundwater Desalination	Both	-	5,000	16,000
S3	Direct Non-Potable Reuse	Both	12,000	25,000	54,600
S4	Direct Potable Reuse	Drought	-	-	-
S5	Indirect Potable Reuse	Drought	11,000	20,000	20,000
S6	Additional Supply from LCRA	Both	-	-	-
S7	New Off Channel Reservoir w/ Lake Evaporation Suppression	Both	-	25,000	25,000
S8a	Seawater Desalination (Import Option)	Both	-	-	-
S8b	Conventional Groundwater (Import Option)	Both	-	-	-
S9	Community Scale Distributed Wastewater Reuse	Both	3,154	14,467	30,049
S10	Community Scale Sewer Mining	Both	1,000	2,211	5,284
S11	Community Scale Stormwater Harvesting	Both	158	236	504
S12	Community Scale Rainwater Harvesting	Both	-	-	-
	Remaining Regional Supply	Both	N/A	N/A	N/A
Existing Portfolio Elements					
	DCP Implementation	Drought	N/A	N/A	N/A
	COA Run of River	Both			
	LCRA Firm Supply	Both			
	Remaining Regional Supply	Both			

D1 – Advanced Metering Infrastructure

2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
596	3,882	5,766	9,371

Option Description:

Implement customer facing programs that provide real-time water use information, including commercial customer benchmarking. Savings are achieved through identification of customer-side leaks, behavior modification, and other water-saving opportunities. Implemented through Advanced Metering Infrastructure (AMI). Assumes meter deployment by 2024 (dependent upon Council approval).

Targeted Customer Sectors, End Uses, and Development Types (new, existing, or both):

Sectors: Single Family Residential (SFR), Multifamily Residential (MFR), Commercial (COM)
End Uses: Leaks
Both new and existing developments

D2 – Water Loss Control – Utility Side

2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
3,108	9,326	10,918	13,064

Option Description:

This measure represents an aggressive leak detection, correction, and prevention program to reduce the ILI to 2.7 by 2020 and further reduce and sustain a 2.0 ILI from 2040 to 2115. The measure analysis focuses on four pillars of real water loss control: (1) active leak detection, (2) response to leaks, (3) pressure management, and (4) pipeline and asset management selection, installation, maintenance, renewal, and replacement. This option represents savings from reductions in real losses and has potential synergies with strategies like Advanced Metering Infrastructure (AMI) which may also target apparent losses. Real losses are almost entirely comprised of leaks in the distribution system whereas apparent losses are almost entirely comprised of meter inaccuracies.

Targeted Customer Sectors, End Uses, and Development Types (new, existing, or both):

Sectors: System-wide
End Uses: Water losses (NRW)
Both new and existing developments

D3 – Commercial, Institutional, and Industrial (CII) Ordinances

2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
1,063	1,063	1,063	1,063

Option Description:

Require older cooling towers to meet water efficiency benchmarks and use efficient equipment and require efficiency standards for steam boilers in new development. No assumptions made for boilers as it is thought to be a small incremental amount of savings. This would change city code to require: 1) all cooling towers to meet same efficiency equipment standards currently only required for new and replacement towers since 2008 (makeup and blowdown submeters, conductivity controller, drift eliminator and overflow alarm) and achieve 5 cycles of concentration (added to code December 2010); and 2) all steam boilers to have conductivity controllers, makeup meters, steam condensate return systems and blowdown heat exchangers for steam boilers. These code changes were approved by Council action in June 2017.

Targeted Customer Sectors, End Uses, and Development Types (new, existing, or both):

Sectors: MFR, COM, and COA
End Uses: HVAC
Existing development

D4 – Development-focused Water Use Benchmarking and Budgeting

2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
-	5,953	11,670	25,228

Option Description:

By 2020, as part of an education and outreach program, this option would require submittal of water use estimates for new development. City staff will provide potential water use efficiency and alternative water recommendations and information on available incentive and rebate programs. This information will tie into the development of databases to be used to develop benchmarks for efficient water usage for various development types. Implementation of the measure will look for ways to tie into the Service Extension Request (SER) and Austin Energy Green Building (AEGB) programs. Before 2040 (currently planned for implementation by FY 2032), this option is expanded to include requirement of water use estimate submittals for new development concurrent with preliminary plan submittal to be reviewed by City staff and a requirement that new development built post-2025 meet a benchmark water budget usage that is lower than comparable existing buildings (compliance mechanism to be determined).

Targeted Customer Sectors, End Uses, and Development Types (new, existing, or both):

Sectors: SFR, MFR, COM, and COA
End Uses: All
New development

D5 – Landscape Transformation Ordinance

2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
-	3,038	7,428	15,050

Option Description:

Implement ordinances to encourage water use efficiencies and reduce water needs for outdoor irrigation and other goals through regionally appropriate landscapes with an emphasis on landscape functionality (Implementation of this option could include implementing turf grass area, irrigated area, and/or irrigation area limitations). Note that current Landscape Ordinance has existing requirements for landscaped areas, plant selection, and irrigation systems for Commercial and Multifamily properties. As there is no current plan review process for single family residential, the existing Landscape Ordinance does not currently apply to this sector. Savings from this option would primarily come from implementing a new ordinance targeting single family residential (currently planned for implementation by FY 2025).

Targeted Customer Sectors, End Uses, and Development Types (new, existing, or both):

Sectors: SFR, MFR, COM
End Uses: Outdoor Irrigation
New development

D6 – Landscape Transformation Incentive

2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
-	321	633	929

Option Description:

Implement incentives to encourage water use efficiencies and reduce water needs for outdoor irrigation and other goals through regionally appropriate landscapes with an emphasis on landscape functionality (implementation of this option could include increasing WaterWise landscape rebates for SFR and MFR and implementing a new WaterWise landscape rebate for COM beyond City of Austin Land Development Code requirements). The current WaterWise landscape rebate offers $35 for every 100 sq ft ($0.35/sq ft) converted with a minimum of 500 sq ft but has a very low participation rate. The maximum rebate is $1,750 per property (currently planned for implementation by FY 2022).

Targeted Customer Sectors, End Uses, and Development Types (new, existing, or both):

Sectors: SFR, MFR, COM
End Uses: Outdoor Irrigation
Existing development

D7 – Irrigation Efficiency Incentive

2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
42	205	427	394

Option Description:

Expand current irrigation rebate programs to include irrigation system controllers system controllers that make flow data accessible and are capable of responding to leaks and high flow situations. There are ~89,300 existing single family residential irrigation systems and ~3,500 commercial/multi-family irrigation systems on parcels greater than 1 acre. COM/MF systems less than one acre (and therefore not under annual inspection requirements) account for approximately 30% of COM/MF irrigation system permits on average. Therefore, there are an estimated 5030 total COM/MF irrigations systems as of 2015.

Targeted Customer Sectors, End Uses, and Development Types (new, existing, or both):

Sectors: SFR, MFR, COM
End Uses: Outdoor Irrigation
New and existing development

Alternative Water Incentives and Ordinances

#	Option Name	Targeted Sector and End Use (All New Development)	Initial Assumption: Savings Achieved Via Incentive or Ordinance?	2040 (AF/yr)	2070 (AF/yr)	2115 (AF/yr)
D8	Lot Scale Stormwater Harvesting	MFR Outdoor Irrigation	Incentive 50%, Ordinance 50%	180	496	1,391
		COM Outdoor Irrigation	Incentive 50%, Ordinance 50%	149	373	885
D9	Lot Scale Rainwater Harvesting	SFR Outdoor Irrigation	Incentive	937	2,410	5,088
		MFR Outdoor Irrigation	Incentive 50%, Ordinance 50%	54	151	425
		COM Outdoor Irrigation	Incentive 50%, Ordinance 50%	82	209	498
		MFR Outdoor Irrigation and Toilet Flushing	Ordinance	195	556	1,562
		COM Outdoor Irrigation, Toilet Flushing, and Cooling	Ordinance	281	706	1,678
D10	Gray Water Harvesting	SFR Outdoor Irrigation	Incentive	244	631	1,336
		SFR Outdoor Irrigation, Toilet Flushing, and Clothes Washing	Incentive	571	1,461	2,860
		MFR Outdoor Irrigation, Toilet Flushing, and Clothes Washing	Ordinance	991	2,702	6,832
		COM Outdoor Irrigation and Toilet Flushing	Ordinance	321	823	1,638

D11	Building Scale Wastewater Reuse	MFR Outdoor Irrigation, Toilet Flushing, Clothes Washing, and Cooling	Ordinance	1,323	3,672	7,875
S11	Community Scale Stormwater Harvesting	SFR, MFR, COM, COA Outdoor Irrigation	Incentive	48	48	48
		SFR, MFR, COM, COA Outdoor Irrigation, Toilet Flushing, Clothes Washing, and Cooling	Incentive	109	188	455

Option Description:

Alternative Water Incentive:

This option would offer an incentive to encourage the installation and use of lot scale rainwater harvesting, lot scale stormwater harvesting, lot scale graywater reuse, lot scale blackwater reuse, or community scale stormwater harvesting. Incentive program details would be developed through subsequent implementation processes including interdepartmental coordination. This option is currently planned to be implemented by FY 2022 as an expansion of existing rebate programs.

Alternative Water Ordinance:

This option would require on-site (building-scale) alternative water use of rainwater, stormwater, graywater, blackwater, AC condensate, centralized reclaimed, and/or decentralized reclaimed (decentralized reclaimed includes both distributed wastewater reuse and sewer mining options). Should this option be incorporated into IWRP plan recommendations, actual new ordinance details would need to be developed through subsequent implementation processes with future additional stakeholder and public input opportunities.

This option is currently planned to be implemented as part of a phased approach. The initial phase of implementation would explore, through a stakeholder engagement and ordinance development process, requiring dual plumbing and use of alternative waters to meet a portion of indoor and outdoor non-potable demands for new large commercial and multifamily buildings (with a potable back-up required). This initial ordinance is currently planned to be implemented by FY 2022.

The second phase of implementation would build on the previous phase by exploring, through a stakeholder engagement and ordinance development process, expanding the ordinance's applicability to potentially include mid-size new commercial and multifamily (with a potable back-up required). This expanded ordinance is currently planned to be implemented by FY 2035.

D12 – AC Condensate Reuse Ordinance

Implementation Year	2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
Already in code	100	1,084	2,711	5,150

Option Description:

Require collection and reuse of condensate water from Air Handling Units (AHUs) for cooling systems from new development with cooling capacity over 200 tons.

Targeted Customer Sectors, End Uses, and Development Types (new, existing, or both):

Sectors: MFR, COM, COA
End Uses: Cooling
New and existing development

S1 – Aquifer Storage and Recovery

2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
0	60,000	60,000	90,000

Option Description:

Aquifer storage and recovery is a strategy in which water (ex: potable drinking water) can be stored in an aquifer during wetter periods and recovered for use during drier periods. Carrizo-Wilcox ASR (Conventional) option includes facilities to pipe treated drinking water from the City of Austin's distribution system to an ASR wellfield for injection and storage in the Carrizo-Wilcox aquifer. Facilities also include a pump station and storage tank to convey recovered water from the ASR wellfield to the City of Austin distribution system. To date, only preliminary costs for an ASR pilot are include in the AW capital improvements plan (CIP). CIP costs and operations and maintenance costs will need to be added in future budgets.

S2 – Brackish Groundwater Desalination

2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
0	0	5,000	16,000

Option Description:

Desalination is the process of removing dissolved solids from seawater or brackish groundwater, often by forcing the source water through membranes under high pressure. The specific process used to desalinate water varies depending upon the total dissolved solids, the temperature, and other physical characteristics of the source water but always requires disposal of concentrate that has a higher total dissolved content than the source water. Disposal may take the form of an injection well, evaporation beds, or an ocean outfall diffuser.

S3 – Direct Non-Potable Reuse (Centralized Reclaimed)

2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
0	12,000	25,000	54,600

Option Description:

Through its Water Reclamation Initiative (WRI) program, AW provides highly treated wastewater effluent for non-potable uses such as irrigation, cooling, manufacturing, and toilet flushing. Austin's direct reuse (purple pipe) system currently supplies approximately 4,600 AF per year. To meet projected demands, an additional 28,000 AFY are needed for direct municipal purposes by year 2070. An additional 10,500 AFY were projected for steam electric needs in Travis County. AW will continue implementation of the centralized reclaimed water (purple pipe) system master plan with consideration of potential expansion. Implementation of both centralized and decentralized reclaimed options will be informed by and will coordinate with one another.

- Centralized and Decentralized Reclaimed Water
    - This includes the Centralized Reclaimed Water (Purple Pipe) System and decentralized reclaimed options: community scale distributed wastewater reuse and community scale sewer mining.
    - Initial steps for decentralized reclaimed options will include additional refinement of geospatial analysis and potential project identification. Later steps will include design and construction of decentralized reclaimed projects.

S5 – Indirect Potable Reuse

2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
0	11,000	20,000	20,000

Option Description:

This option would convey highly treated reclaimed water from one treatment train at South Austin Regional (SAR) WWTP to Lady Bird Lake and subsequently divert water by a potential new intake pump and piping system downstream of Tom Miller Dam to the Ullrich WTP to meet city demands. This approach would supplement water releases from Lakes Buchanan and Travis to extend water supplies during severe drought. This option is a drought strategy that would be recommended for implementation in the event of 400,000 AF of combined storage or less in Lakes Buchanan and Travis. In addition, this option would capture available spring flows into Lady Bird Lake and convey the water to Ullrich WTP through a potential new intake pump and piping system.

S7 – New Off Channel Reservoir w/ Lake Evaporation Suppression

2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
0	0	25,000	25,000

Option Description:

This strategy would involve the construction of a new off-channel reservoir in the Austin region. The approximate size of this reservoir would be about 25,000 AF. An evaporation suppressant would be applied during summer months to reduce water lost through evaporation.

S9 – Community Scale Distributed Wastewater Reuse

2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
0	3,154	14,467	30,049

Option Description:

Distributed Wastewater Reuse is defined for the purpose of this project as the collection of wastewater from the sewerage system in new development areas, treatment to Type 1 quality, and reuse at the local/community scale. These facilities would be completely separate from the centralized wastewater collection system. Facilities may be located at the site of existing local WWTP, or at new potential sites. Reuse via a dual (purple) pipe system will supply irrigation, landscaping, toilet, laundry (clothes washing), and cooling demands. Treatment plants are sized to meet demand and peak wet weather flow. Reuse from this option is not considered for outdoor end uses in Critical Water Quality Zones, floodplains, or the Edwards Aquifer Recharge Zone.

S10 – Community Scale Sewer Mining

2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
0	1,000	2,211	5,284

Option Description:

Local Wastewater Scalping (or 'Sewer Mining') is defined for the purpose of this project as involving the extraction of wastewater from the existing centralized wastewater collection system, treatment to Type 1 quality, and reuse at the local/community scale. The treatment plant is situated close to both the demand and to the sewer extraction point, to reduce reticulation and pumping costs. This can be located either within existing open space or within a new development.Reuse via a dual (purple) pipe system will supply irrigation, landscaping, toilet and potentially also laundry (clothes washing) and cooling demands. Treatment plant wastes (sludge) from the treatment process are discharged to the centralized wastewater collection system for subsequent treatment at the downstream WWTPs.Reuse from this option is not considered for outdoor end uses in Critical Water Quality Zones, floodplains, or the Edwards Aquifer Recharge Zone. All scenarios assume back-up supply from the centralized water distribution system.

S11 – Community Scale Stormwater Harvesting

2020 Yield (AF/Yr)	2040 Yield (AF/Yr)	2070 Yield (AF/Yr)	2115 Yield (AF/Yr)
0	158	236	504

Option Description:

Stormwater harvesting is defined for the purpose of this project as the collection of stormwater runoff from urban areas (e.g. impervious surfaces including roads, pavements and roofs), for treatment and reuse for irrigation/landscaping or reuse for dual pipe systems at the community scale. Implementing stormwater harvesting in new developments provides an opportunity to plumb buildings with internal connections for toilet flushing, clothes washing or to cooling towers. Retrofitting existing buildings with internal connections to a dual supply source can be cost prohibitive and/or practically difficult, and so it is assumed for the purposes of this study that stormwater harvesting for existing developed areas would be used solely for irrigation/landscaping of public open space.

Other Options

Other options that progressed through screening but were not included in Hybrid 1 could be considered at a future point as the plan is reevaluated on a five-year cycle. Options include community-scale rainwater harvesting, direct potable reuse, additional LCRA supply, import options like seawater desal and conventional groundwater.

Future Steps

- Post plan adoption, convene the Water Forward Task Force on a quarterly basis to support ongoing plan implementation efforts
- Determine funding and resource requirements to implement plan strategies and programs
- Update Integrated Water Resource Plan, plan recommendations, and adaptive management plan on a five-year cycle

Metrics to Monitor Conditions and Implementation Success

- Demands
    - How are water demands tracking with plan projections?
- Supplies
    - Ratio of supply capacity to demand
- Project implementation tracking
    - Progression of projects and programs compared to estimated project milestones
    - Estimated savings from implemented demand management options
    - Estimated yield from implemented supply options

REVISED DRAFT

04/19/2018

Water Forward

Implementation Outlook and Adaptive Management Plan

AW will continue implementation of Advanced Metering Infrastructure and Water Loss Control utility initiatives.
AW will continue to monitor AC Condensate Reuse and CII Ordinances that have recently been adopted into code.
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Ongoing Utility Initiatives	8	D1	**Advanced Metering Infrastructure**	Implement customer facing programs that provide real-time water use information. Savings achieved through identification of customer-side leaks, behavior modification, etc.	3,882
	9	D2	**Water Loss Control - Utility Side**	Leak detection, correction, and prevention program to reduce the Infrastructure Leakage Index (ILI) to 2.7 by 2020 and further reduce and sustain a 2.0 ILI from 2040 to 2115.	9,326
	10	D3	**Commercial, Institutional, and Industrial (CII) Ordinances**	Already in Code - Require older cooling towers to meet water efficiency benchmarks and use efficient equipment and require efficiency standards for steam boilers in new development.	1,063
	11	D12	**AC Condensate Reuse**	Already in Code - Require collection and reuse of condensate water from Air Handling Units (AHUs) for cooling systems from new development with cooling capacity over 200 tons.	1,084
	12	D8, D9, D10, D11, S11	**Phase 1 Dual Plumbing and Alternative Water Ordinance Development**	Stakeholder process will explore requiring dual plumbing and use of alternative waters for new large Commercial and Multifamily development (with a potable backup).	3,344
	13		Evaluation of potential implementation approaches	Evaluation to include refinement of ordinance applicability, location in code, enforcement considerations.	
	14		Preliminary stakeholder outreach		
	15		Develop draft ordinance language		
	16		Stakeholder outreach and draft code language changes as needed		
	17		Boards and Commissions and Council action		
	18		Implementation and monitoring		
	19		Approach refinement and/or implementation of other option(s) in subsequent plan update cycle		
	20		Maintain approach and continue monitoring		
	21		**Phase 2 Dual Plumbing and Alternative Water Ordinance Development**	Stakeholder process will explore expanding ordinance's applicability to potentially include mid-size new commercial and multifamily (with a potable back-up required).	
	22		Evaluation of potential implementation approaches	Evaluation to include refinement of ordinance applicability, location in code, enforcement considerations.	
	23		Preliminary stakeholder outreach		
	24		Develop draft ordinance language		
	25		Stakeholder outreach and draft code language changes as needed		
	26		Boards and Commissions and Council action		
	27		Implementation and monitoring		
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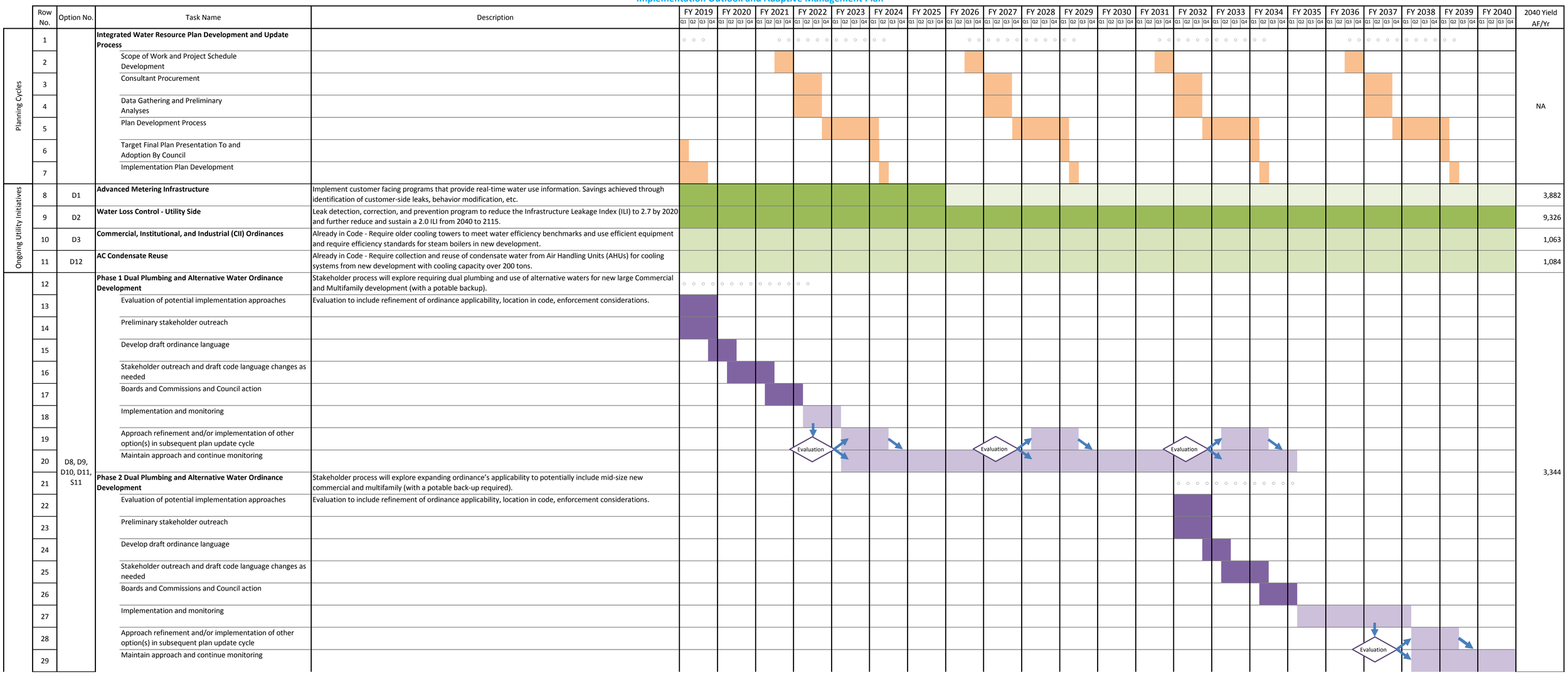

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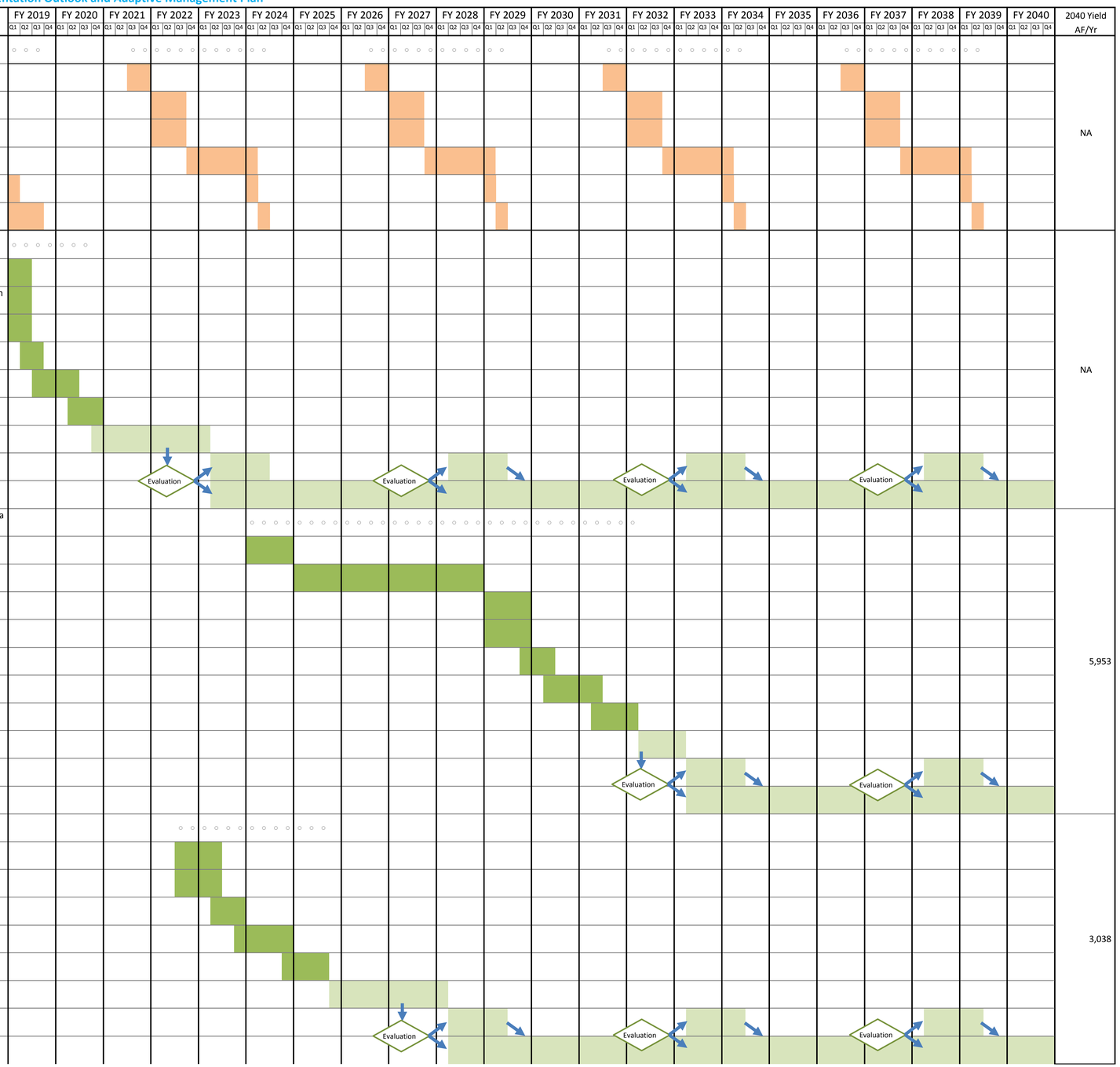
Developer or customer installed, owned, and operated	30		**Phase 1 Development-focused Water Use Benchmarking and Budgeting - Submittal Process Development**	Stakeholder process to explore requiring submittal of water use estimates for new development.	NA
	31		Development of water usage calculator		
	32		Evaluation of potential implementation approaches	Determination if an ordinance is needed - If so, process will include refinement of ordinance applicability, location in code, enforcement considerations	
	33		Preliminary stakeholder outreach		
	34		Develop draft ordinance language if needed		
	35		Stakeholder outreach and draft code language changes as needed		
	36		Boards and Commissions and Council action		
	37		Implementation	City staff will provide potential water use efficiency and alternative water recommendations and information on available incentive and rebate programs.	
	38		Approach refinement and/or implementation of other option(s) in subsequent plan update cycle		
	39		Maintain approach and continue monitoring		
	40	D4	**Phase 2 Development-focused Water Use Benchmarking and Budgeting Ordinance Development**	Stakeholder process will explore requiring new development to submit a water usage estimate and comply with a water budget - compliance mechanism to be determined.	5,953
	41		Public stakeholder process in advance of benchmark development	Stakeholder process will explore development of benchmarks to be applied to buildings developed post-2025.	
	42		Data gathering and development of water usage database		
	43		Evaluation of potential implementation approaches (refinement of ordinance applicability, location in code,		
	44		Preliminary stakeholder outreach		
	45		Develop draft ordinance language		
	46		Stakeholder outreach and draft code language changes as needed		
	47		Boards and Commissions and Council action		
	48		Implementation and monitoring	Starting in FY 2032, water budgets will be applied to development built post-2025.	
	49		Approach refinement and/or implementation of other option(s) in subsequent plan update cycle		
	50		Maintain approach and continue monitoring		
	51	D5	**Landscape Transformation Ordinance**	Stakeholder process will explore requiring single-family residential to limit turf-grass area and include additional requirements for existing COM and MFR ordinance	3,038
	52		Evaluation of potential implementation approaches (refinement of ordinance applicability, location in code,		
	53		Preliminary stakeholder outreach		
	54		Develop draft ordinance language		
	55		Stakeholder outreach and draft code language changes as needed		
	56		Boards and Commissions and Council action		
	57		Implementation and monitoring		
	58		Approach refinement and/or implementation of other option(s) in subsequent plan update cycle		
	59		Maintain approach and continue monitoring		



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	60	D8, D9, D10, D11, S11	**Alternative Water Incentive**	Expansion of existing rebate program - incentive would encourage the use of rainwater harvesting, stormwater harvesting, graywater reuse, and blackwater reuse.	1,984
	61		Evaluation of potential implementation approaches	Evaluation to potentially include amount and/or type of incentive to offer.	
	62		Preliminary stakeholder outreach		
	63		Program development and cost-benefit analysis		
	64		Stakeholder outreach and incentive program refinement as needed		
	65		Boards and Commissions Input		
	66		Program implementation and monitoring		
	67		Approach refinement and/or implementation of other option(s) in subsequent plan update cycle		
	68		Maintain approach and continue monitoring		
	69	D6	**Landscape Transformation Incentive**	Expansion of existing rebate program - incentive would encourage water use efficiencies and reduce water needs for outdoor irrigation through regionally appropriate landscapes	321
	70		Evaluation of potential implementation approaches	Evaluation to potentially include amount and/or type of incentive to offer.	
	71		Preliminary stakeholder outreach		
	72		Program development and cost-benefit analysis		
	73		Stakeholder outreach and incentive program refinement as needed		
	74		Boards and Commissions Input		
	75		Program implementation and monitoring		
	76		Approach refinement and/or implementation of other option(s) in subsequent plan update cycle		
	77		Maintain approach and continue monitoring		
	78	D7	**Irrigation Efficiency Incentive (Expand existing rebate program)**	Expansion of existing rebate program - incentive would encourage use of include irrigation system controllers.	205
	79		Evaluation of potential implementation approaches	Evaluation to potentially include amount and/or type of incentive to offer.	
	80		Preliminary stakeholder outreach		
	81		Program development and cost-benefit analysis		
	82		Stakeholder outreach and incentive program refinement as needed		
	83		Boards and Commissions Input		
	84		Program implementation and monitoring		
	85		Approach refinement and/or implementation of other option(s) in subsequent plan update cycle		
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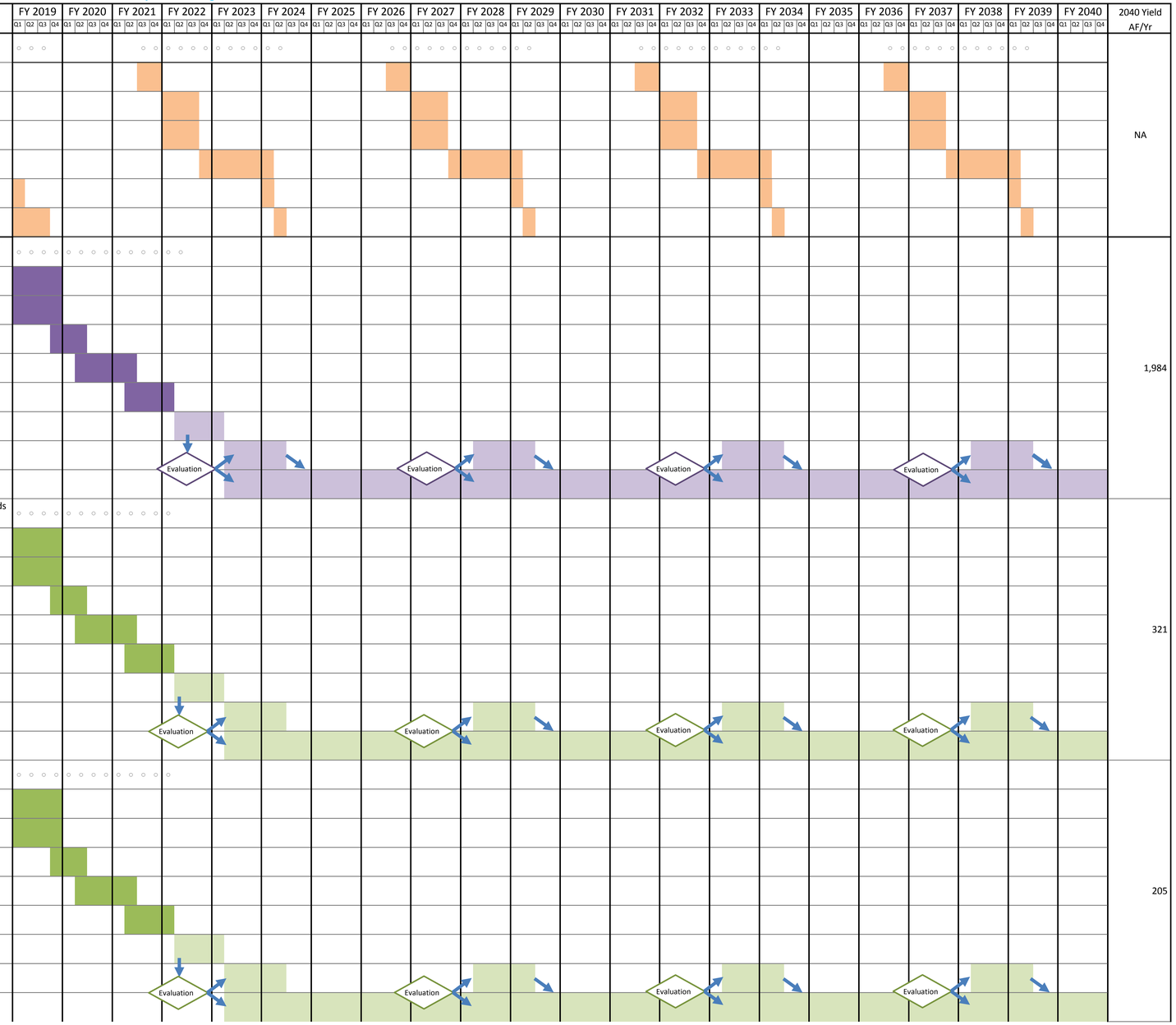

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Potentially a combination	87	S3	**Centralized Reclaimed System (Direct Non-Potable Reuse)**	Implementation to focus on Reclaimed Master Plan through 2040.	12,000
	88		Approach refinement and/or implementation of other option(s) identified in plan update cycle		
	89		Maintain approach and continue implementation		
	90	S9, S10	**Decentralized Reclaimed (Community Scale Distributed Wastewater Reuse and Sewer Mining)**		4,154
	91		Refinement of decentralized option analysis		
	92		Approach refinement and/or implementation of other option(s) in subsequent plan update cycle		
	93		Future additional decentralized reclaimed project identification		
	94		Decentralized reclaimed project design and construction	Implementation will consider timing and location of new development opportunities.	
Utility constructed, owned and operated	95	S1	**Aquifer Storage and Recovery**		60,000
	96		Further Study and Modeling, Permitting, Land Acquisition	Initial steps will include further study for pilot and full project, further modelling for operational considerations, land acquisition, legal and permitting considerations, and piloting	
	97		Pilot Design, Construction, and Testing		
	98		Approach refinement and/or implementation of other option(s) in subsequent plan update cycle		
	99		Design of full-scale ASR facility		
	100		Construction of full-scale ASR facility		
	101		ASR fill/refill cycles		
	102	S5	**Indirect Potable Reuse**	Note: Option could be accelerated if required in a drought situation.	11,000
	103		Approach refinement and/or implementation of other option(s) in subsequent plan update cycle		
	104		Alternatives Analysis, Permitting, and Public Outreach		
	105		Design		
	106		Construction		
	107	S7, S2	**New Off Channel Reservoir and Brackish Groundwater Desalination**		NA
	108		Continued study and refinement of option	This phase to include public outreach and possible exploratory land acquisition efforts.