MEMORANDUM

TO:	Erica Kidd, Watershed Manager, Lake Auburn Watershed Protection Commission, Maine
FROM:	Rebecca Balke and Eileen Pannetier, Comprehensive Environmental Inc.
SUBJECT:	**Peer Review of FB Environmental Associates *A Regulatory, Environmental, and Economic Analysis of Water Supply Protection in Auburn, Maine* dated October 2021 and the supplemental Lake Auburn Model Technical Memorandum dated August 1, 2022**
JOB NUMBER:	222-5
DATE:	**December 5, 2022**

The Lake Auburn Watershed Protection Commission requested CEI to perform a peer review of a recent study and technical memorandum prepared by FB Environmental Associates (FBE) that evaluated local regulatory scenarios and their impact on the water quality of Lake Auburn. The purpose of the review is to evaluate the conclusions drawn as they pertain to development and water quality impacts on Lake Auburn.

The following documents were reviewed by CEI as part of this evaluation:

- A Regulatory, Environmental, and Economic Analysis of Water Supply Protection in Auburn, Maine prepared by FB Environmental Associates, Horsely Witten Group and the University of Maine, dated October 2021.
- Lake Auburn Model Technical Memorandum addressed to Eric Cousens, City of Auburn, prepared by Laura Diemer, FB Environmental Associates, dated August 1, 2022.
- Memo addressed to Eric Cousens, John Blaise prepared by Sid Hazelton, P.E., Superintendent of AWD, dated August 8, 2022.
- Lake Auburn Watershed Management Plan prepared by CEI, dated April 19, 2010.
- Lake Auburn Diagnostic Watershed Study prepared by CEI, dated March 13, 2013.

CEI performed a peer review of the FBE study and subsequent technical memorandum to evaluate the assumptions used to estimate buildout conditions and associated loads under various buildout scenarios and the conclusions drawn from these assumptions as they pertain to the protection of Lake Auburn. This was a qualitative analysis of the information provided and did not involve any modeling or independent buildout analysis. A summary of these findings is provided in this memorandum, with supporting background information and details of the review provided in **Attachment A**.

CEI Review and Findings

FBE's 2021 study concluded that Lake Auburn is nearing its assimilative capacity for nutrient load (even with the partial alum treatment) and cannot bear additional nutrient loads without diminishing water quality and its associated benefits. FBE found no net environmental economic, or social benefit supporting expansion of development in the Lake Auburn watershed. FBE also concluded that even if reduced development through conservation or other means is achieved in the headwater towns, any additional development in Auburn has an outsized negative impact since its drainage area goes directly to the lake. CEI agrees with these findings and considered these in its evaluation. The following summarizes the key findings from CEI's evaluation:

Proposed Zoning Changes

The proposed revised septic regulation is presented as a way to improve treatment of new septic systems by preventing clustering of systems and allowing systems to take advantage of the finer textured surface soils for treatment. The increased buildable area from the septic systems is proposed to be offset with changes in zoning density in the RR district, and assuming no new development will occur in the AG district. This was shown to result in less potential development than would occur under the existing zoning regulations. CEI has the following comments and recommendations regarding the proposed zoning changes:

1. It was difficult to compare the various buildout scenarios and their impacts on the lake, as some of the buildout assumptions changed from the 2021 to 2022 study, yet the phosphorus load analysis was not updated to reflect these changes and true differences in loads. The change in phosphorus load and impact on the lake should consistently reflect final assumptions for comparison. All buildout analysis should be updated to show phosphorus loads using consistent assumptions.
2. The final analysis ignores potential development in the AG district, including the increased buildable area from the revised septic regulations. It is unlikely that no additional development will occur in the AG district, even given the existing restrictions on development and the suggestion of changes to prevent new agriculture in the watershed. There is nothing preventing future development from occurring in this district and relaxing the septic system requirements increases the potential buildable area in this district.
3. Relaxing the septic system regulations opens the door for future development in the AG district. It could also potentially increase the rate of development; however, this would require additional evaluation to confirm. If the desired outcome of the proposed 2022 ordinance changes is a reduction in potential developable sites and better treatment of septic systems, there are other ways to achieve the same goal without relaxing the septic

requirements and without creating potential new buildable areas. CEI recommends that the following alternatives be evaluated:

a. Maintain the existing depth restrictions, but allow for amendment of sandy soils to provide better treatment. This prevents expansion of buildable areas while improving the treatment capabilities of septic systems in sandy soils;
b. Allow only one septic system per lot to avoid clustering;
c. Prohibit development within the 300-foot buffer of waters considering septic systems closest to the lake pose the greatest risk of passing contaminants such as nutrients, pathogens, and viruses. This removes some of the uncertainty of the models in the most critical areas of the watershed;
d. Continue with zoning to reduce the density of development (e.g., RR to LDCR).

4. The filtration waiver is based on meeting certain water quality criteria, so the impact of zoning changes on the waiver would depend on how the regulatory changes actually affect pollutant loads over time. Models are not always a reliable indicator of real-life questions. For example, weather forecasters rely extensively on models to predict the weather, and these forecasts are often wrong. In theory, the predicted phosphorus levels indicate that water quality can be maintained, but the relationship between total in-lake P and turbidity is not well studied.

Continued Alum Treatment

FBE assumed that alum treatment would continue in perpetuity to control internal phosphorus loadings from the lake. There should be an analysis of sediment and water column before repeated alum treatments are undertaken. The approach and steps to decision making should be laid out in detail to assist in making good assumptions.

Gracelawn Road Area Boundary Change

FBE Figure 3-1 (**Attachment B**) shows groundwater contours in the vicinity of the sand and gravel operations and former City of Auburn landfill along Gracelawn Road. The contours reveal a localized groundwater mound, where the groundwater is higher than the surrounding area, causing it to flow in all directions away from the mound, rather than following expected regional groundwater flow patterns towards the lake.

CEI cautions the City from discounting this area from the watershed entirely, particularly under a future development scenario. Development of the land surface can change the existing infiltration rates, decrease depth to groundwater, alter flow rates and patterns and potentially impact localized groundwater conditions, potentially impacting the water boundary in this area. This requires a

more detailed evaluation of potential development scenarios and their impact on both localized groundwater and surface water runoff.

Attachments:

- Attachment A: Supporting Background Information and Review Details
- Attachment B: FBE Figure 3-1 from A Regulatory, Environmental, and Economic Analysis of Water Supply Protection in Auburn, Maine, by FB Environmental Associates, October 2021

Attachment A

Supporting Background Information and Review Details

Supporting Background Information and Review Details

Peer Review of FB Environmental Associates *A Regulatory, Environmental, and Economic Analysis of Water Supply Protection in Auburn, Maine* dated October 2021 and the supplemental Lake Auburn Model Technical Memorandum dated August 1, 2022

Background

Lake Auburn is the sole public water supply for over 39,000 consumers residing in Auburn, Lewiston, and a portion of Poland. Due to its long history of excellent water quality, Lake Auburn's water supply has been granted a 'Filtration Avoidance' waiver by the US Environmental Protection Agency (EPA) for nearly 30 years, bypassing certain treatment requirements under federal drinking water law and saving the need for a costly filtration plant, estimated at a capital cost of $35-$45 million.

Lake Auburn has been faced with declining water quality over the last 10 years, reaching a tipping point circa 2010 where key environmental thresholds were reached or passed. Specifically, levels of phosphorus, a key nutrient for the growth of aquatic algae, rose above 10 parts per billion and elevated the risk of algae blooms. This was addressed through the application of alum in 2019 to reduce high internal phosphorus loads from the bottom sediments in the lake that had accumulated over the last several decades from discharges from the watershed. This provides some time to address phosphorus inputs from the watershed through watershed management efforts.

Based on this history, FBE was commissioned by the City of Auburn, Maine to provide a comprehensive analysis of the regulatory, environmental, and economic benefits and costs for scenarios that will maximize long-term public water supply protection of Lake Auburn, to guide future management decisions. Key findings from the FBE study, completed in October 2021, included:

- Lake Auburn is nearing its assimilative capacity for nutrient load (even with the partial alum treatment) and cannot handle much more additional nutrient load without diminishing water quality and its associated benefits. FBE found no net environmental economic, or social benefit supporting expansion of development in the Lake Auburn watershed.
- More development cannot be allowed in the Auburn portion of the watershed even with low impact development (LID) requirements implemented in Auburn. Even if reduced development through conservation or other means is achieved in the headwater towns, any additional development in Auburn has an outsized negative impact since its drainage area goes directly to the lake.
- It was recommended to revise the septic system requirements of the Lake Auburn Watershed Overlay District Ordinance to incorporate the Maine Subsurface Wastewater Disposal Rules, including provisions that allow for mounded leach fields and other State-approved alternative designs where there is not a native, in-situ, 36-inch vertical separation

between the bottom of the organic horizon and the bedrock, water table, or other restrictive layer. FBE identified that this would allow more areas to be developed with the potential for over 100 new homes in the watershed over existing ordinances, however, stated that restrictions on developable land are better left to base and resource protection zoning than to septic design standards.

- FBE recommended to update the Lake Auburn Watershed Overlay District Ordinance to reflect the revised watershed boundary, reducing the existing watershed boundary by 148 acres in the Gracelawn Road area. This was based on groundwater flow studies around the sand and gravel operations and groundwater monitoring data around the former City of Auburn landfill which groundwater to flow away from Lake Auburn.

At the conclusion of the study, the City of Auburn requested FBE to evaluate proposed ordinance changes, in the City of Auburn only, for their potential effects on land use and development in the Lake Auburn watershed and associated impacts to lake water quality. FBE presented its analysis and findings in the Lake Auburn Model Technical Memorandum addressed to Eric Cousens, City of Auburn, dated August 1, 2022. A summary of the proposed ordinance changes evaluated, included:

- an increased agricultural buffer strip from 50 feet to 100 feet – this does not change the number of building lots, rather reduces phosphorus inputs by converting existing tilled agricultural land to open space, thus reducing phosphorus loads;
- allowing for siting of septic systems where there is 12 inches of in-situ vertical separation between the bottom of the disposal field and the limiting factor (e.g., seasonal groundwater table, bedrock, or other impervious layer) and with at least 24 inches of suitable natural soil or fill material below the bottom of the disposal field. This allows for alternative systems such as mounded septic systems to be installed to meet these conditions, whereas existing regulations require 36" vertical separation from the surface and 24" of native soil below the bottom of the disposal field;
- defining sandy or gravelly soil as sand or gravel outwash or stratified drift as shown on Table 4D (profiles 5 or 6 and some 11) of the State of Maine Subsurface Wastewater Disposal Rules 10-144 Chapter 241 and prohibiting installation of septic systems in these soils within 400 feet to the normal high-water mark (vs. 300-feet) – this reduced the number of buildable lots by 23 from the "Business as Usual" model (baseline buildout analysis considered under existing ordinances). FBE stated that this new model run likely underestimated new building potential as physical field application of the Table 4D rules would likely be less restrictive but there is no way of knowing the extent of the difference without field evaluations by a Licensed Site Evaluator. For comparison purposes, they removed the 23 homes predicted under the "Baseline as Usual" buildout scenario.
- Rural Residential (RR) was rezoned to Low Density County Residential (LDCR), increasing the lot size from 1 to 3 acres.

- while not a zoning change, FBE also made adjustments to the buildout assumptions that they claimed more accurately apply existing ordinances. Specifically, the model update assumed no development in the Agriculture and Resource Protection (AG) district due to the restrictive standards existing for development in this district. This removed 928 acres of buildable area and 74 projected buildings compared to the "Business as Usual" buildout scenario included in the October 2021 study.
- reducing the threshold where a phosphorus control plan (PCP) is required from 575 square feet to 200 square feet, essentially capturing accessory dwelling units, as primary households were already required to prepare a PCP. FBE considered its LID buildout assumptions to be nearly equivalent to requiring a PCP, which was supported by the load estimates associated with PCP restrictions vs. LID restrictions (e.g., the load estimated with the application of LID was similar to the load allowed under the ordinance and PCP requirements).

Based on this analysis, FBE concluded that the ordinance changes directly reduced the total buildable area by 27 acres and the number of projected new buildings by 58 (after adjusting for the "Business as Usual" scenario to also remove development in the AG), indicating that the expansion of buildable area with the lifting of the septic system siting restriction (changing from 36" to 12") was effectively offset by the reduction of buildable area with the rezoning of RR to LDCR (changing from 1-acre to 3-acre minimum lot size).

FBE also noted a phosphorus load reduction of 6 kg/yr compared to the "Business as Usual + LID" scenario included in the October 2021 study, however, did identify that there were limitations to directly comparing the results of the "Business as Usual" scenario to the 2022 model update. FBE did not remodel the "Business as Usual + LID" scenario presented in the October 2021 report to show the phosphorus reduction associated with no future development in the AG district, thus the load reduction is expected to be less than 6 kg/yr.

CEI Review and Findings

Buildout Assumptions

The FBE buildout analysis included in the October 2021 study assumes a worst-case buildout scenario based on the allowable development for the zoning district. The method used to estimate potential development by FBE is as follows:

1. FBE identified and subtracted land unavailable for development due to physical constraints, including environmental restrictions (e.g., steep slopes, existing buildings, wetlands, resource protection zones, hydric soils, and conserved land), zoning restrictions (e.g., shoreland zoning, street ROWs, minimum lot sizes, and building setbacks), and practical design considerations (e.g., lot layout inefficiencies). FBE applied an efficiency

factor of 66% for all zoning districts based on prior experience. It is unknown if and how FBE considered non-conforming lots in this analysis.
2. The remaining buildable land was subdivided to the smallest units allowed under current zoning and a point representing a building was placed in each unit.
3. LAWPC-owned lands were considered to be protected from development indefinitely (in the "Business as Usual" and "Max Development – LAWPC Lands Remain Protected" buildout scenarios).
4. County level soil data was used to restrict development from areas with less than 36 inches to groundwater or some restrictive layer where septic systems are not allowed, as well as from areas within sandy soils within 300 feet of the Lake Auburn shoreline.
5. Lakes and ponds were given a 100-foot setback.
6. Other waterbodies, streams and wetlands were given a 75-foot setback.

CEI generally agrees with the assumptions applied in the October 2021 evaluation. However, in the updated modeling analysis presented in the August 1, 2022 memo, FBE assumed no additional buildings would be allowed in the AG district under existing and proposed ordinance changes due to restrictions to development in this district. CEI assumed this was due to the agricultural income requirements to develop in this district combined with the observed declining agricultural trends in the watershed.

Due to the changes in buildout assumptions from the 2021 study to the 2022 technical memorandum, it was difficult to compare the various buildout scenarios and their impacts on the lake. To better understand each of the buildout scenarios and the impact on future development, CEI created a summary table (Table 1 at the end of this document) of existing and projected increases in buildings under three key buildout scenarios, including:

1. "Business as Usual" – this buildout reflects the potential number of additional homes under the existing zoning regulations and assumed future development will occur in the AG district based on current zoning densities.
2. "Max Development – LAWPC Lands Remain Protected" – this buildout removes the development restrictions associated with septic systems on land with less than 36 inches to groundwater and on land with sandy soils within 300 feet of the shoreline. It also included rezoning of 51 parcels (59 buildable acres) from AG and RR to General Business (GB) and Neighborhood Business (NB).
3. "2022 Ordinance Changes Baseline Buildout" – this buildout incorporates the proposed 2022 ordinance changes outlined under the Background section above and assumes no new development will occur in the AG district.

Although agricultural land use has been declining in the watershed, it is unlikely that no additional development will occur in the AG district. CEI believes that FBE's original assumptions of 74 homes under existing zoning regulations and 101 homes with relaxed septic regulations is more realistic than no new development. Even if no new agriculture is proposed in the AG district in the

future, as has been suggested, it seems to reason that some development would still be allowed, and therefore should not be discounted in any future development scenario. Without language specifically prohibiting further development in the AG district, there is always a possibility for more buildings.

To allow for a more representative comparison between scenarios, adjustments were made to remove the village rezoning impacts from the "Max Development – LAWPC Lands Remain Protected" scenario so that this scenario represented existing zoning ordinances with relaxed septic system requirements. Further adjustments were made to include the same assumptions for future development of the AG district in all three cases, including no development in the AG district as assumed in FBE's 2022 model update and some development in the AG district as assumed in FBE's October 2021 buildout scenarios. These are presented in Tables 2 and 3 (at the end of this document), respectively.

Under the assumption that no development would occur in the AG district, the "2022 Ordinance Changes Baseline Buildout" showed a reduction of 57 buildings from the "Business as Usual" scenario. Under the assumption that development would occur in the AG district, a reduction of 30 buildings was demonstrated. In both cases, the proposed 2022 zoning changes showed that rezoning the RR to LDCR would offset the buildable land created through relaxation of the septic requirements, but less so when development in the AG district occurs.

LID Assumptions

CEI reviewed the LID assumptions used by FBE to reduce phosphorus loads from the residential development that does occur in the watershed. We found these assumptions to be in line with the reductions that would be achieved with a phosphorus control plan under the Phosphorus Control Ordinance. CEI used similar phosphorus load reductions in its 2010 buildout analysis.

While the phosphorus control requirements do limit the amount of area that can be developed, this only needs to be demonstrated at the time of development and it is not uncommon for homeowners to disturb additional areas over the years. This would require continued monitoring and enforcement in any scenario.

Relaxing Septic Restrictions

In its October 2021 study, FBE recommended that the City of Auburn update the septic system regulations contained in the Lake Auburn Watershed Overlay District Ordinance to align with the State Plumbing Code requirements with an increase in depth to groundwater, bedrock or other restrictive layers of 36 inches, rather than the shallower depths allowed by the less protective tiers in the State code. FBE noted that the State code was last updated in 2015 to require a depth of between 12-24 inches of native soil below the leach field. Prior to this update, the requirement was as little as 9 inches in many cases. FBE also noted that the Maine requirements are less stringent than other New England states. The recommendation was presented as a simple approach to

revising the language to maintain both the greater depth to groundwater requirements but also allows for alternative onsite septic disposal approaches that can improve phosphorus control from septic systems. It would also allow projects in the watershed to use innovative and alternative designs in place of a traditional septic system leach field, including drip irrigation and proprietary devices. FBE noted that such a change could increase development potential by over 100 homes in Auburn and suggested that changes to zoning densities be used to control the amount of development. FBE then modeled proposed 2022 ordinance changes to demonstrate that density changes could offset the increase in buildable areas presented with an update to the septic regulations.

This is not the first-time modification of the septic ordinance has come up. CEI performed a Lake Auburn Watershed Septic System Analysis in October 2009 to evaluate whether the septic design criteria should be modified consistent with the state's less stringent criteria. The key findings of the evaluation were:

1. Other New England States require 3+ feet of vertical separation and at least 2 feet is needed – the soils beneath a leach field serve to filter pollutants from the wastewater. The greater the vertical distance through the soil, the greater the treatment. Most studies reveal a minimum of 24" vertical separation for adequate pollutant removal, regardless of soil type.
2. The Lake Auburn watershed has coarse soils – The geology of the Lake Auburn watershed is characterized by coarse soils and some gravel, unlike the lodgement (basal) tills found in much of Maine. These coarse materials do not filter pollutants as well as finer materials and may require greater vertical separation distances to treat.
3. Phosphorus, an important pollutant of Lake Auburn, can get to the lake if septic systems are too close – Some studies have found long-term migration of phosphorus in the groundwater zone, with phosphorus above background levels detected up to 250 feet away from the septic system. Nitrate travels rapidly away from septic systems.
4. More lenient septic requirements increases phosphorus loads to Lake Auburn – Both failing and non-failing septic systems can contribute phosphorus and other pollutants to the Lake. Allowing for more lenient septic design requirements within the watershed will allow for the placement of septic systems where they are not currently allowed. This also results in an increase in impervious area in the watershed and increased phosphorus loadings from stormwater runoff.
5. Changes to the Lake Auburn Watershed Overlay District (LAO) ordinance may put the filtration waiver at risk – The LAO and other watershed control programs in place at the time the filtration waiver was granted were key factors in granting the waiver and changes to these programs, particularly changes that allow for more growth and net loadings to the Lake, could put the District at risk for losing that waiver.

FBE confirmed that Maine state septic requirements continue to be less stringent than other states, despite the recent change to require 12-24" of native soil rather than 9". The State made the

requirements more stringent for a reason and it's not unreasonable to consider this could be tightened further in the future as well.

FBE also mentioned the watershed's sand and gravel aquifer and concern that the existing ordinance has led to the preferential siting of some septic systems on deep formations of sand and gravel aquifer that are not appropriate for septic systems without the importation of suitable reactive soils that the recommended ordinance revisions would allow. CEI agrees that coarse sand and gravels do not filter as well as fine materials and amendment of these soils may be appropriate, but does not have to be tied to a relaxation of the existing depth restrictions.

Phosphorus loads still remain a concern, both from septic systems located close to the lake and from the associated development of the site. While the increase in buildable areas associated with a relaxed septic regulation can be offset with other zoning regulations to control density, the City should be aware that alternative septic designs, such as mounded systems do require more consideration and care during installation and to ensure they are maintained to continue functioning properly and to prevent breakouts. This is something that will not show up in the models, but can present an increased risk to the lake. Additionally, considering that systems closest to the lake pose the greatest risk of passing contaminants such as nutrient, pathogens, and viruses, consideration should be given to prohibiting systems within a certain distance to surface waters in the watershed, such as the 300-foot buffer. This removes some of the uncertainty of the models in the most critical areas of the watershed.

Impacts to the filtration waiver are also a concern. The filtration waiver is based on meeting certain water quality criteria, so the impact on the waiver would depend on how the regulatory changes actually affect pollutant loads over time. In theory, the predicted phosphorus levels indicate that water quality can be maintained, but the relationship between total in-lake P and turbidity is not well studied.

Predictive Lake Model and Continued Alum Treatment

CEI did not perform a detailed review of FBE's predictive lake modeling, however, their conclusions and assumptions make sense based on our limited understanding. We agree that an in-lake phosphorus concentration of less than 10 ppb is widely understood to be suitable for this lake and others similarly situated. FBE predicts that a 900 kg/yr phosphorus load will result in an in-lake phosphorus concentration of 9 ppb. The three conditions of warm air temperature, total in-lake phosphorus greater than 10 ppb and extreme rain events were identified as the factors likely to cause a severe bloom that increase in-take turbidity concentrations. We generally agree with these conclusions.

CEI has also reviewed FBE's assumptions in modeling that alum treatments would continue to be used to control internal loading of phosphorus from sediment. We generally agree with the approach, however, there should be an analysis of sediment and water column before repeated

alum treatments are undertaken. The approach and steps to decision making should be laid out in detail to assist in making good assumptions.

Gracelawn Road Area Boundary Change

FBE recommended that 148 acres of the watershed in the Gracelawn Road area be removed from the watershed. This was based on hydrogeologic studies of the sand and gravel operations and former City of Auburn landfill along Gracelawn Road, which showed groundwater to flow away from Lake Auburn. CEI did not review the referenced hydrogeologic studies as part of this evaluation. The only information provided was in the October 2021 FBE study, which includes Figure 3-1 showing the mapped groundwater contours taken from one of the hydrogeologic studies. The groundwater contours reveal a localized groundwater mound, where the groundwater is higher than the surrounding area, causing it to flow in all directions away from the mound, rather than following expected regional groundwater flow patterns towards the lake. However, CEI cautions the City from discounting this area from the watershed entirely, particularly under a future development scenario. Development of the land surface can change the existing infiltration rates, decrease depth to groundwater, alter flow rates and patterns and potentially impact localized groundwater conditions, potentially impacting the watershed boundary in this area. This requires a more detailed evaluation of potential development scenarios and their impact on both localized groundwater and surface water runoff.

Table 1. Existing and Potential New Buildings for Various Buildout Scenarios in Auburn, Maine as Presented in FBE Reports

Development Scenario:	**Existing**	**Business as Usual**	**Max Development – LAWPC Lands Remain Protected**	**2022 Ordinance Changes Baseline Buildout[1]**
Assumptions:		Existing ordinances.	Removed septic restrictions. Includes rezoning 51 parcels from AG and RR to NB and GB.	Proposed 2022 ordinance changes. No future development in AG.
Agriculture and Resource Protection (AG)	77	74	101	0
General Business (GB)	2	0	44	0
Low Density Country Residential (LDCR)	47	16	24	79
New Business (NB)	0	0	130	
Rural Residential (RR)	218	143	279	0
Suburban Residential (SR)	75	6	9	6
Total	419	239	587	85

[1]FBE updated its buildout assumptions for the AG district in its 2022 modeling update. These updates assumed no new development would occur in the AG district due to the restrictive zoning. Updates were not made to the "Business as Usual" scenario to reflect this, but were discussed as a limitation for comparing the phosphorus loads between the two scenarios.

Table 2. Existing and Potential New Buildings for Various Buildout Scenarios in Auburn, Maine Adjusted for Comparison – No Development in AG[1]

Development Scenario:	Existing	Business as Usual	Max Development – LAWPC Lands Remain Protected	2022 Ordinance Changes Baseline Buildout
Assumptions:		Existing ordinances. Adjusted to remove buildings from AG for comparison with 2022.	Removed septic restrictions. Adjusted to remove buildings from AG, GB and NB for comparison with 2022.	Proposed 2022 ordinance changes. No future development in AG.
Agriculture and Resource Protection (AG)	77	~~(74)~~ **0**	~~(101)~~ **0**	0
General Business (GB)	2	0	~~(44)~~ **0**	0
Low Density Country Residential (LDCR)	47	16	24	79
New Business (NB)	0	0	~~(130)~~ **0**	
Rural Residential (RR)	218	143	279	0
Suburban Residential (SR)	75	6	9	6
Additional Adjustments[2]	--	-23	-23	--
Total[3]	419	~~(239)~~ 142	~~(587)~~ 289	85

[1]To allow for a more representative comparison between buildout scenarios where no development is assumed to occur in the AG district, development in AG was removed from all buildout scenarios and the proposed village district rezoning in "Max Development – LAWPC Lands Remain Protected" to convert 59 acres of AG and RR districts to GB and NB districts was removed. This illustrates the projected increase in development from existing conditions ("Existing"), to buildout conditions under existing zoning ("Business as Usual"), to buildout conditions under existing zoning with relaxed septic system requirements ("Max Development – LAWPC Lands Remain Protected"), to buildout conditions under the 2022 proposed zoning ("2022 Ordinance Changes Baseline Buildout"). Values removed are shown in gray strikeout with those added shown in bold black font.

[2]There were 23 projected new buildings identified within the 300-foot buffer under the "Business as Usual" and "Max Development – LAWPC Lands Remain Protected" that the 2022 ordinance changes conservatively excluded due to the limitations of using the Table 4D soil profiles. These were removed from the two 2021 buildout scenarios.

[3]**Assuming no further development in the AG district, the 2022 ordinance changes directly reduced the total buildable area by 27 acres and the number of projected new buildings by 57 in comparison to the "Business as Usual" scenario** (142-85=57). The results show that the rezoning of RR to LDCR offsets the additional building lots allowed from relaxing the septic restrictions.

Table 3. Existing and Potential New Buildings for Various Buildout Scenarios in Auburn, Maine Adjusted for Comparison – Includes Development in AG[1]

Development Scenario:	**Existing**	**Business as Usual**	**Max Development – LAWPC Lands Remain Protected**	**2022 Ordinance Changes Baseline Buildout**
Assumptions:		Existing ordinances.	Removed septic restrictions. Adjusted to remove buildings from GB and NB for comparison with 2022.	Proposed 2022 ordinance changes. No future development in GR. Adjusted to add buildings to AG.
Agriculture and Resource Protection (AG)	77	74	101	~~(0)~~ **101**
General Business (GB)	2	0	~~(44)~~ **0**	0
Low Density Country Residential (LDCR)	47	16	24	79
New Business (NB)	0	0	~~(130)~~ **0**	
Rural Residential (RR)	218	143	279	0
Suburban Residential (SR)	75	6	9	6
Additional Adjustment[2]	--	-23	-23	--
Total[3]	419	~~(239)~~ 216	~~(587)~~ 390	~~(85)~~ 186

[1]To allow for a more representative comparison between buildout scenarios where development is assumed to occur in the AG district, potential development in the AG district was added to the "2022 Ordinance Changes Baseline Buildout". For simplicity purposes, it was assumed to be the same as that predicted for the "Max Development – LAWPC Lands Remain Protected" scenario that also considered the relaxation of septic restrictions. The proposed village district rezoning in "Max Development – LAWPC Lands Remain Protected" to convert 59 acres of AG and RR districts to GB and NB districts was also removed. This illustrates the projected increase in development from existing conditions ("Existing"), to buildout conditions under existing zoning ("Business as Usual"), to buildout conditions under existing zoning with relaxed septic system requirements ("Max Development – LAWPC Lands Remain Protected"), to buildout conditions under the 2022 proposed zoning ("2022 Ordinance Changes Baseline Buildout"). Values removed are shown in gray strikeout with those added shown in bold black font.

[2]There were 23 projected new buildings identified within the 300-foot buffer under the "Business as Usual" and "Max Development – LAWPC Lands Remain Protected" that the 2022 ordinance changes conservatively excluded due to the limitations of using the Table 4D soil profiles. These were removed from the two 2021 buildout scenarios.

[3]FBE's October 2021 study predicted an additional 174 buildings in Auburn if the septic restrictions are relaxed (390-216=174). This matches closely with the 176 additional buildings estimated in the 2010 CEI buildout with relaxed septic system requirements (Scenario 2). **Assuming further development in the AG district can occur, the 2022 ordinance changes directly reduced the total number of projected new buildings by 30 in comparison to the "Business as Usual" scenario** (216-186=30). The results show that the rezoning of RR to LDCR offsets the additional building lots allowed from removing the septic restrictions, but to a lesser degree when development in the AG district is considered.

Attachment B

FBE Figure 3-1 from *A Regulatory, Environmental, and Economic Analysis of Water Supply Protection in Auburn, Maine*, by FB Environmental Associates, October 2021

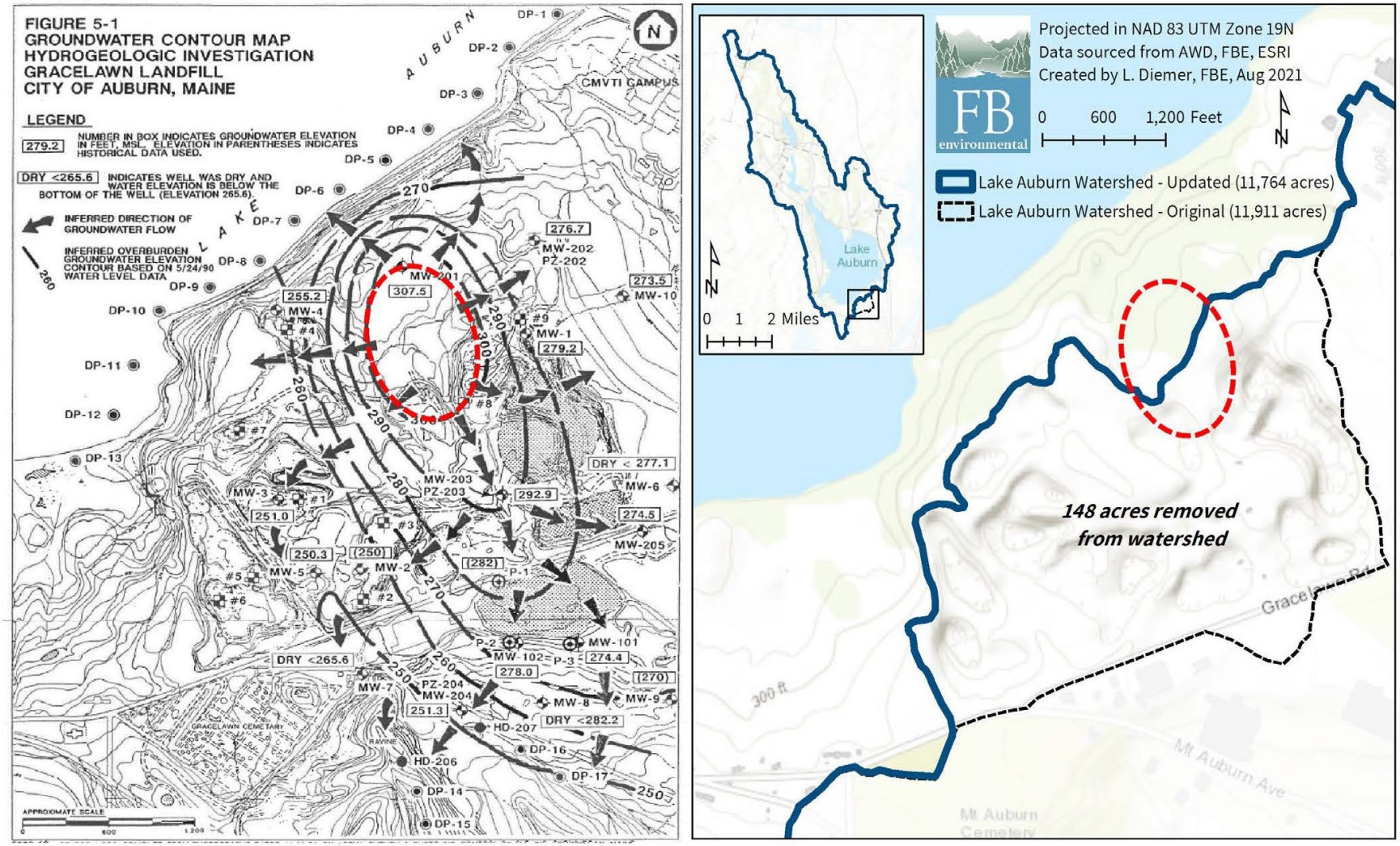

Figure 3-1. Map of groundwater contours developed by E.C. Jordan Co. (1990) (left) compared to map of updated watershed boundary (right). The dotted red circle is provided for ease of reference between the two maps.