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4.1 INTRODUCTION

The original master plan for Lake Lure included thoughtful consideration of the utility infrastructure. The utility systems, which include water, sewer and electricity, have served the town for many years. Recently, service demands, new regulations, and specific water and sewer system issues have forced the town toward major utility improvements. Significant engineering efforts, new facility implementation and existing facilities remediation have been accomplished in recent years, however, further work remains to be accomplished. Resident and non-resident population growth will continue to increase demand on the town's utility systems.

Input received during interviews and meetings indicated a high level of sensitivity to environmental protection and stewardship with respect to land use decisions, and this sensitivity should be reflected in utility infrastructure goals and planning. Utility infrastructure planning should be responsive to the physical and visual concerns of the town's residents while addressing state and federal regulations.

Details of the water and sewer systems are pertinent to understanding the town's utility status and are partially covered in separate studies and reports. This section builds upon information previously reported in studies such as the 201 Facilities Plan by McGill and Associates (2005), the Isothermal Planning and Development Commission 1997 Report, and the Water and Sewer Regionalization Assessment in 2003-2004 also prepared by McGill.

4.2 Inventory and Existing Conditions

The town is responsible for a number of utility services including water supply and distribution, wastewater collection and treatment, and hydroelectricity. Each of the existing utilities is critical to maintain the quality of life and accommodate potential growth. Generally, the current state of the Lake Lure's utility infrastructure is as follows:

Water

The Town of Lake Lure currently owns and operates a water supply storage and distribution system. The system partially serves the area within the town limits as well as areas outside the town as shown on Figure # 2, Infrastructure Map

The town is served by five deep wells as follows:

<u>Well</u>	<u>Yield</u>
Vess	66,240 GPD
Powers	75,000 GPD
Price	34,560 GPD
Island Creek 1	7,200 GPD
Island Creek 2	8,640 GPD

The town's water system is also interconnected with the Village of Chimney Rock water system. A master water meter has been installed connecting lines to Chimney Rock's water system for resources sharing between both communities. The town must pay the village for water supply over 10,000 GPD. Present Chimney Rock water supply capacity based on a maximum 12-hour-per-day pumping schedule:

Chimney Rock Well #1	43,200 GPD
Chimney Rock Well #2	15,840 GPD
Chimney Rock Well #3	17,280 GPD

Present Lake Lure water storage capacity is as follows:

System-wide service

	Gallons	Overflow (feet)
Washburn Reservoir	80,000	1,380.0
Chimney Rock Reservoir	100,000 *	1,233.0
Island Creek Tank	200,000	1,380.0

** This number is equal to the allotted capacity in the 250,000 gallon tank per an Interlocal Agreement.*

Localized service

	Gallons	Overflow (feet)
Chalet Club Reservoir	20,000	1,525.0
Highlands Reservoir	67,117	1,645.0

A developer is presently installing water wells and a storage reservoir in the Boys Camp Road area. Two wells have been

drilled so far with a combined yield of 32 GPM. The developer is committed to providing a minimum 41 GPM. The proposed reservoir is 127,000 gallons with overflow at 1,562 feet. The proposed tank has yet to be approved. Additional space will be provided at the site for the town to construct a future tank, potentially 125,000 gallons with the same overflow elevation.

The exact number of water connections is unknown (customer base noted in the Regionalization Assessment was 324). As shown in Figure #5, which displays the areas where water lines are located in the town, Lake Lure's existing water system does not serve all of its residents. Those who are not served by the system are served by individual wells. Additionally, the Rumbling Bald Resort area within the town is served by the Carolina Water Service (CWS) system, a private utility.

The Regionalization Assessment identified the need for water system capital improvements for Lake Lure. When the study assessment was completed, the projected costs tallied in excess of \$3 million (this amount was exclusive of the newly completed elevated storage tank project). The list of improvements underscored the need for an upgrade of the current water distribution system. Since the assessment was completed, some of the capital improvement recommendations have been implemented. Although the town has added water supply and storage capacity with the Island Creek wells and elevated tank, system improvement needs remain.

The shape and size of Lake Lure creates hydraulic remoteness. In order to serve the remaining areas within the town limits that are not already served by other parties, numerous water system extensions will be required. Distance from the existing storage tanks and topography will also necessitate additional storage reservoir(s) and booster station(s). Additional water supply well(s) may also be needed to serve these areas due primarily to distance from the existing wells to the future customers / tanks and system leaks.

Lake Lure continues to experience development inside and adjacent to its corporate limits with associated requests for

water services. In response to such requests, the town has acted on a case-by-case basis. Currently, the town has not adopted a service/extension policy.

Wastewater

Wastewater Collection System and Treatment Plant:

Based on the 2001 Facilities Plan by McGill the existing Lake Lure sewer system serves 777 residential customers from the Town of Lake Lure and the Village of Chimney Rock and 121 commercial customers. As shown in Figure #5, which displays the areas where wastewater lines are located in the town, Lake Lure's existing wastewater system does not serve the entire jurisdictional area.

As a result of the significant infiltration into the town's collection system as documented in the 201 Facilities Plan, flows into the town's wastewater treatment plant have at times reached or exceeded the plant's permitted capacity (0.995 MGD). During these periods the town has been unable to respond immediately to specific requests from proposed new development and, in fact, the town has recently imposed a moratorium on new connections. The historical efforts at dealing with the excessive infiltration, primarily due to the major sewer collection lines being situated within the lake, have been to conduct remedial repairs in an attempt to seal off leaks. Thus, the more recent approach to the town's plant capacity issue has been a cyclical (generally on an annual basis) occurrence of repair/reduction in infiltration during draw down of the lake, followed by a rise in plant flows from either new connections or infiltration. The McGill 2005 Study recommended that the town conduct a comprehensive Infiltration/Inflow (I/I) Study, and implement necessary repairs. This study began in 2006. Completion of TV inspections of the major sewer lines, exclusive of the main trunk sewer down the center of the lake, has provided direction for continuation of these investigations. While there is optimism that the continued efforts at remediation of the I/I problem will allow the systematic growth and development of the town, there is a degree of uncertainty associated with this program.

The town has implemented recommendations from the 201 Facilities Plan to construct upgrades to the waste treatment plant which would address NPDES permit violations. It is

anticipated that these upgrades will be completed by the third quarter of 2007. However, these upgrades do not include expansion of plant capacity. If the I/I remediation program is unsuccessful in reducing infiltration to a degree that provides sufficient excess capacity for the projected future growth of the town, other alternatives will need to be evaluated. The 2025 projected wastewater flow from the town as indicated in the 201 Facilities Plan is 1,060,000 GPD. As noted previously, flows to the plant have been as high as 0.999 MGD according to the 201 Facilities Plan. A significant portion of the I/I must be removed from the system if sufficient capacity in the existing plant is to be available for the anticipated growth. While an aggressive I/I remediation program has the potential to remove a significant quantity of the excessive infiltration, it may not be possible to achieve removal to the extent necessary to avoid a plant expansion so long as the collection sewer under the lake continues to be utilized. It must be emphasized, as the 201 Facilities Plan notes, “At the indicated rate of increase, the capacity of the existing wastewater treatment plant will be exceeded within the planning period of this document unless I/I into the existing collection system can be significantly reduced.”

As the town pursues the I/I remediation, careful monitoring of its success will establish the extent to which planning and/or engineering of additional alternative collection system strategies or plant expansion should be contemplated. Current preference by the town’s consultants is to avoid a plant expansion if possible. In any event, allocation of resources to this effort is paramount in the town’s long-range utility infrastructure capital improvements planning.

Septic system failures, predominantly over peak summer weekends, have occurred. In recognition of this problem, as well as in addressing the infiltration problem and the view of the potential negative impacts to the lake from existing septic systems, the 201 Facilities Plan proposed a series of 15 new collection system projects that would install new gravity sewers and allow for town residents currently using septic systems to connect to the town’s wastewater collection system.

Per another recommendation from the 201 Facilities Plan, the town has developed and adopted new design and construction standards for water and sewer facilities.

Implementation of these standards involves the following: detailed plan review; education of developers, builders and contractors about the town's requirements; coordination to control certificate of occupancy until the utility systems are complete in accordance with the town's standards; continuous inspection of the utility construction; and documentation in the form of as-builts and certifications to consistently maintain accurate records of the town's system. The rate of growth and corresponding demands on town staff may dictate the need for additional resources to fully implement these recommendations, either in the form of additional staff or consultant services. The adopted standards should be readily available to the development and engineering community.

The 2005 McGill study further recommends that a more definitive policy be adopted relative to new connections or requests for service (i.e. capacity). One key element of this policy is the commitment of capacity be made only with a corresponding expiration date for the commitment. Currently, the town requires that any new development that receives a sewer capacity commitment immediately begin payment of monthly sewer service charges in order to have reserved capacity. The adoption of the 201 Facilities Plan recommendation if deemed appropriate by the town would need to be reconciled with the current policy of collecting service charges prior to customer occupancy.

Privately-owned Carolina Water System (CWS) serves portions of Lake Lure east of Snug Harbor in the vicinity of Memorial Highway. CWS serves the Lake Lure Golf & Beach Resort, Apple Valley and Shumont Estates under contract with the Fairfield Mountains Property Owners Association.

Hydroelectric Power

Lake Lure owns the hydroelectric dam at the lower end of the lake. According to Duke Energy, the hydroelectric facility consists of two vertical shaft powerhouse Francis-type hydroelectric turbines and generators with a capacity of 3,400 kilowatts. According to the National Inventory of Dams, the dam is approximately 480 feet in length and has a structural height of 124 feet. The dam generates power that is sold to Duke Energy, and funds are paid to the Town of Lake Lure for its use. The revenues from operation of the dam have traditionally supplemented the hydroelectricity fund. Lake Lure recently

signed another contract with Duke Energy, agreeing to continue selling power to Duke Energy for the next five years. According to the town's Web site, the dam was constructed in 1927. Given the age of the dam, roughly 80 years old, it carries a potential financial burden as it requires yearly maintenance and inspection. The town has recently contracted with a firm to conduct a full inspection of the dam and its condition in response to concerns raised by NCDENR. For more information see the *Government and Administration* section.

4.3 Summary of Issues and Opportunities

- Some areas within the town that should be served are not provided water and/or sewer service.
- Currently, there is an insufficient water supply to accommodate future populations. Future population growth will require additional well capacity or other sources of water supply.
- The existing water distribution system (line size and network) is not capable of providing fire protection flow and/or pressure to many homes within Lake Lure.
- The sewer system has excessive infiltration, which reduces capacity needed to serve existing and future development.
- The waste treatment plant capacity will be inadequate to serve existing and future development unless the Infiltration/Inflow remediation program is very successful or alternative collection system strategies are implemented.
- There are periodic and/or temporary delays in sewer service for new development as evidenced by the correct moratorium on new connections.
- The 201 Facilities Plan indicated that some homes with on-site septic systems have experienced problems and are potential sources of contamination for the lake. This problem is exacerbated as the septic systems continue to age.
- The town lacks a long-range infrastructure plan (LRIP) that would create a schedule for improvements and prioritize needs.
- There is a need to further establish funding methods to finance future capital improvements, particularly those recommended in a future LRIP.
- There is a potential need for support staff (i.e. an engineer) to aid the town manager with the oversight of

current and future projects, procedures, policies, and maintenance.

4.4 Goals, Objectives and Policies

UI Goal 1: Adequate service provision in developed areas or areas that will develop in the near future

Objective:

UI-1-1: Provide service to developed areas needing service and areas for which development is planned.

Policy UI -1-1.1:

Improve capacity and allocation of it to meet current and future demands for water/sewer service.

(1) Conduct a water supply analysis and groundwater reconnaissance studies. *The results should establish anticipated groundwater supply capacity. Tie these demands to timing of projected growth to allow the development and integration of additional supplies on a timely basis to avoid water shortages. This study would factor in any additional supply contributed from private development projects now underway.*

(2) Identify specific areas that should be included in the water distribution system. *A hydraulic model of the existing Town and ultimate service area should be developed to identify correct line sizes and other system components to provide a desired level of fire protection for the town. This study would identify existing undersized lines.*

(3) Continue and complete the study to evaluate the current condition of the infiltration/inflow problem as outlined in the 201 Facilities Plan.

(4) Require that each allocation of sewer capacity or each approved sewage connection has an expiration date. This expiration policy should apply to all new commercial, institutional, industrial and multi-unit residential development. *If the development that has*

received the sewage capacity has not been constructed by a specified deadline, then it forgoes the balance of its allocation. Therefore, the town can reallocate the unused sewage capacity to another development.

- (5) Negotiate a long-term agreement with Carolina Water System, including a policy basis for wastewater treatment charges.

UI Goal 2: Utility systems are improved and expanded in concert with the Comprehensive Plan

Objective:

UI-2-1: Conduct long-range planning for utilities that acknowledges the development patterns envisioned and documented in the comprehensive plan.

Policy UI -2-1.1:

Develop a long-range infrastructure plan (LRIP) that supports the comprehensive plan.

- (1) Calculate anticipated growth and infrastructure demands.
- (2) Build upon previous body of engineering work, expanding and updating it.
- (3) Establish budgets and a prioritization of water/sewer projects that respond to the anticipated growth and priorities in the comprehensive plan. *Set forth a schedule that details future projects (3-, 5-, and 10-year projects) for water/sewer facilities, lines, connections, etc.*

UI Goal 3: Uniformity in water distribution and wastewater collection systems

Objective:

UI-3-1: Ensure all components of each system are extended, designed, and constructed in the same manner for consistency in service provision and efficient maintenance.

Policy UI-3-1.1:

Define the utility provision and extension terms for existing development.

(1) Adopt a new policy for the existing septic systems to require connection to the town's sewer system as installed and create a program to assist property owners financially as necessary. *The 201 Facilities Plan identifies 15 areas that should receive priority for service due to higher densities in close proximity to the lake with potential for failing septic systems.*

(2) When evidence exists that a given septic system is failing or has a history of failures, require the owner of that septic system to connect to the town's system.

Policy UI-3-1.2:

Define the utility provision and extension terms for new development.

(1) Require all new development to provide water and sewer facilities. *These shall be at no cost to the town.*

(2) Adopt a policy that will standardize the process for utility system extensions. *Future connections to the town's water and sewer system should have a uniform approach for the connection process.*

(3) Eliminate "negotiation" process for utilities extension. *Develop a systematic application process and standard fees for every development. Regiment the fee structure.*

UI Goal 4: Adequate funding for utility infrastructure improvements

Objective:

UI – 4-1: Ensure the availability of funding of short- and long-term utility infrastructure improvements.

Policy UI-4-1.1:

Update the Capital Improvements Program (CIP) to address immediate utility service issues and anticipate/estimate future expenditures.

- (1) Set forth and establish budgets for immediate needs projects and 3-, 5-, and 10-year planning horizon projects.

Policy UI-4-1.2:

Establish funding specifically for the CIP and its necessary actions/improvements.

- (1) Conduct a study to assess revenue projections from current utility customers commensurate with future CIP needs. *An analysis of fees and/or charges shall be conducted to determine reasonable amounts for services from plan review, inspection and connection fees to capacity charges. These fees and charges should be evaluated on the basis of both equity and cost of the provision of a specific service, as well as projected costs for replacement of utilized capacity.*

- (2) Seek alternative funding sources.

- Appeal to the NC Clean Water Management Trust Fund to obtain funds for future projects with important water quality benefits.
- Assess the opportunity to finance future projects with tax increment financing (TIFs), or self-financing bonds, as they are called in NC. *This approach requires unique circumstance(s) and evidence that without public investment in infrastructure, the development project as proposed would not be possible. Experienced legal advice is recommended, but could potentially represent an alternate funding source.*
- Explore possibility of an Adequate Public Facilities Ordinance (APFO) to offset costs associated with new development. *This would be part a an*

overall study of the potential benefits and impacts of an APFO. Depending on the range of services that the new development has an impact on (defined in the APFO), some or all of the revenue generated may be applied to improving/extending water and sewer systems.

UI Goal 5: Improved management of operations

Objective:

UI-5-1: Provide additional staff to support existing staff with utility infrastructure development and maintenance.

Policy UI-5-1.1:

Create a position for and hire support staff (or consultant) to implement and monitor Lake Lure's standards, policies, and procedures. *Define and create a position that assumes (should include but not be limited to) the following duties: developments, infrastructure, and improvements, plan review and approval, inspections, review of as-builts, etc. He or she shall also serve as liaison among between Lake Lure and entities such as Duke Energy, North Carolina Utilities Corporation, developers, and homeowners.*