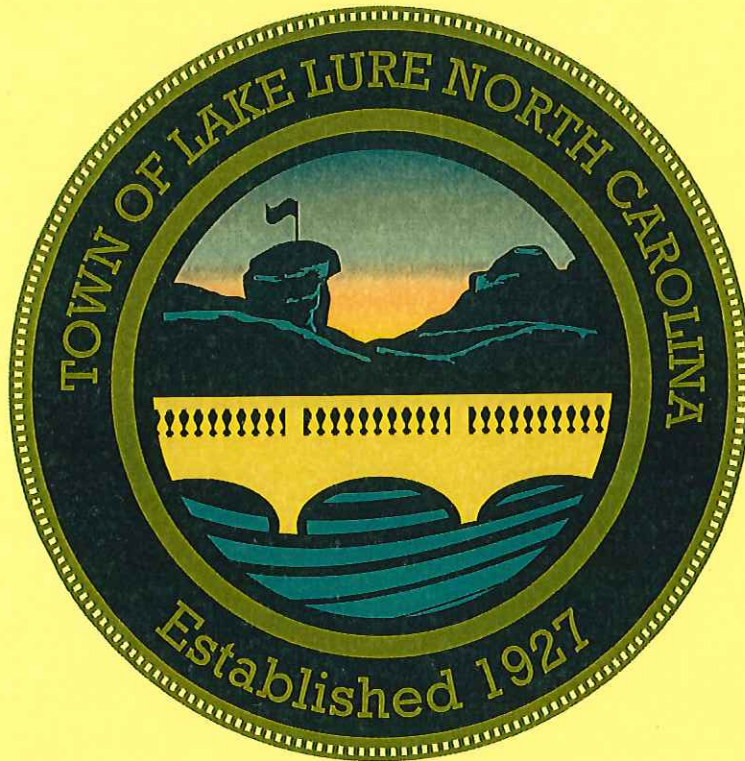


LAKE LURE TOWN COUNCIL REGULAR MEETING PACKET

Tuesday, November 4, 2014



Mayor Bob Keith

Commissioner John Moore

Commissioner Mary Ann Silvey

Commissioner Diane Barrett

Commissioner Bob Cameron



REGULAR MEETING OF THE LAKE LURE TOWN COUNCIL

November 4, 2014

7:00 p.m.

Lake Lure Municipal Center

AGENDA

1. Call to Order Mayor
Bob Keith
2. Invocation (*Please rise and remain standing*)
3. Pledge of Allegiance
4. Approve the Agenda
5. Public Forum: *The public is invited to speak on any non-agenda and/or consent agenda topics. Comments should be limited to less than five minutes.*
6. Staff Reports
7. Council Liaison Reports & Comments
8. Consent Agenda:
 - a. Approve Minutes of the October 14, 2014 Regular Meeting
 - b. Approve a Budget Amendment Concerning Dam Phase I & II of the Electric Project
9. Unfinished Business
 - a. Consider Approval of an IT Support Contract and Authorize the Town Manager to Execute the Contract on Behalf of the Town
 - b. Consider Approval of Allocation of the Dredging Budget
 - c. Discuss and Consider Approval of Staff Compensation Recommendations
10. New Business:
 - a. Boy's Camp Road Assessment and Road Improvement Discussion
11. Adjournment

Agenda Item: 8a

Agenda Item: 8b

Andi Calvert

From: Lake Lure Town Manager [townmgr@townoflakelure.com]
Sent: Tuesday, October 28, 2014 8:28 AM
To: 'Sam Karr'; 'Andi Calvert '
Cc: 'Donnie McCraw'; Bob Cameron; Bob Cameron (town); Bob Keith; 'Bob Keith (town)'; Diane Barrett; Diane Barrett (town); 'John W. Moore'; John W. Moore (town); Mary Ann Dotson; Mary Ann Silvey (town)
Subject: Phase 2 electrical project at Dam
Attachments: Emory Revised Schematic 10-22-2014.pdf; Emory Revised Proposal 10-22-2014.pdf

Attached is a proposal for \$64,910 of electrical improvements at the dam, an important project that Bob Cameron has been shepherding. This is Phase 2 of a project that is already underway—Phase 1 was a replacement power line from the hydro plant to the sewer lift station (over the new driveway recently installed).

Sam, can you please prepare a budget amendment for this work to be considered by Town Council next week. It's to be paid out of the Hydro fund.

PROJECT OBJECTIVE: improve backup power service at dam to reduce risks to the Town during Duke power outages. We currently have a backup generator in the hydro plant that provides backup power to the hydro plant, floodgates, intake gate and sewer lift station. Each of these services is mission critical, particularly during a storm event. Although this existing generator is functional and under an annual maintenance contract, it is aging and there is always a risk that it won't work at the very time that we need it if we lose power during a storm. This project adds a second and third backup capability, eliminating the single point of failure.

This electrical work will:

- install a backup generator at the Lake Operations Office to provide power to:
 - o Dam floodgates
 - o Dam intake gate
 - o Hydro plant
 - o Sewer lift station
 - o Lake Operations office (manned during storms/emergencies)
- install necessary panels, breakers, switches and cabling
- install quick-disconnect facility at the sewer lift station to accept portable (towed) generator the town owns

Thanks –

Chris Braund

Town Manager

2948 Memorial Highway

Lake Lure, NC 28746

Office: 828.625.9983, Ext. 101

Web: townoflakelure.com



10/28/2014



From: Harlow Brown [mailto:harlow@brownpa.net]
Sent: Monday, October 27, 2014 2:56 PM
To: 'Lake Lure Town Manager'; 'lakelureelectric'
Cc: 'Wayne Ouellette'; 'Robert Smith'; Donnie McCraw
Subject: Revised electrical proposal

<<...>> <<...>>

Chris – Bob

Attached is Emory's revised proposal. It moved from \$63,840 to \$64,910; a \$1,700 increase. This is understandable from the items we added to Phase I, such as a second external generator hook-up and other items.

If this is Ok with you Bob, I recommend it goes on next Council agenda for approval.

In order for Emory to start, they have to provide the County Inspections Department a drawing sealed by a Professional Engineer. I advised Wayne that if they up-date the drawing, I would seal and sign it so he can obtain his permit. The revised drawing is attached. I trust you have no issue with this?? Advise accordingly.

Have a good day.

Harlow

Harlow L. Brown, PE

Brown Consultants PA

30 Ben Lippen School Road

Asheville, NC 28806

office 828-350-7683

cell 828-545-7779



Emory Electric
PO Box 3315
Asheville, NC 28802

Phone: 828-658-8300
Fax: 828-658-0708

SCOPE OF WORK

PROJECT NAME: City of Lake Lure
PROJECT ADDRESS: 197 Buffalo Shoals Road
PROJECT CITY: City of Lake Lure
PROJECT BID DATE: 10/22/2014

CONTRACTOR:
ATTEN: Harlow Brown
TEL: 828-350-7683
Architect: Brown Consultants PA

DESCRIPTION		Included	Excluded	COMMENTS
1	PLANS & SPECS			
	Preliminary Drawing	X		Provided with Scope
	Design Build	X		
2	FEE'S			
	Electrical Permit	X		
	Power Company Fee's		X	
	Electrical Bonding Fee		X	
	Electrical Engineering Fee's		X	
3	DOCUMENTS			
	Submittals	X		
	Sample & Brochures	X		
	Maintenance & Operation Manuals	X		
	As-Built Drawings	X		
	Equipment Guarantees & Warranties	X		
	Type Written Panel Directory	X		
	Material Safety & Data Sheets		X	Upon Request
4	PHASE 2			
	Provide and install (1) 70KW 120/240V 3 PH Weather Enclosure Cummins Gen-set LP Gas	X		As Noted on Design Drawings
	Provide Concrete Pad	X		As Noted on Design Drawings
	Provide Proper Ground	X		As Noted on Design Drawings
	Provide and install Controls to 200 amp 1 Phase Transfer Switch	X		As Noted on Design Drawings

Provide and install Power for Block Heaters to Both Gen-sets	X	As Noted on Design Drawings
Provide and install Power for Chargers to Both Gen-sets	X	As Noted on Design Drawings
Provide and install New 125 amp 240V 3 Phase Nema 4X Panel with Breakers for Gate & Intake Motors With Breakers for Each Motor	X	As Noted on Design Drawings
Provide and install (1) 60amp 240V 3 Phase Double Throw Switch for flood gates Nema 4X	X	As Noted on Design Drawings
Provide and install (1) 60amp 240V 3 Phase Double Throw Switch for Intake Nema 4X	X	As Noted on Design Drawings
Provide Relocation of Conduits and Conductors to Accomplish proper hookups	X	As Noted on Design Drawings
Test Gen-set with existing system to assure proper phase rotation	X	As Noted on Design Drawings
Provide Gas Hookups for 70 KW	X	NOTE ALLOWANCE FOR 60KW IS \$800.00
Labeling	X	
Test Gen-set with existing system to assure proper phase rotation	X	
2" Rigid Conduit with (4) # 3/0 # (1) #4 Ground from the Lift Station Building up the edge roadway on the bank.	X	
Install (1) 24" Sono Tube and Pour with concrete and steel a Pedestal for the Pin and Shelf Receptacle for the Portable Generator. Located at the top of the roadway.	X	
Located in the Turbine Room Remove existing Rusted out control cabinet Remove spliced Conductors and replace conductors in existing conduit. Replace the Control cabinet with a new wire way for a pull though box.	X	

5 MISCELLANEOUS		
Base on 7.0 % sales tax	X	
Garbage & Debris Removal	X	
Painting Stenciling & Tagging	X	

PROPOSAL	\$	64,910.00
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THANK YOU !

Wayne D. Ouellette

Wayne D. Ouellette

PH -828-658-8300 X316

FAX -828-658-0868

CELL - 828-775-0881



Finance Director
MEMORANDUM

To: Town Manager, Mayor & Town Council
From: Sam A. Karr, Finance Director
Subject: Budget Amendment-Electric Project-Dam Phase I & II
Date: October 28, 2014

The town would like to improve critical emergency backup power to the Hydro-electric plant during power loss. The electric work, including installing a new back up power generator; which will operate floodgates, intakes, sewer lift stations and to provide emergency power at the Lake Operations office; which will be designated as a manned location during storms and emergencies; must be budgeted.

The approximate cost, including engineering, of the project is about \$80,000. As you all know, we had a surplus of over \$266,000 in the Hydro-electric Fund last fiscal year. We recommend a motion **transferring \$80,000 from Hydro-electric Fund fund balance (Fund equity) to the Hydro-electric Capital Outlay dept (#590).**

If you have any questions, please feel free contact me at your convenience.

XC: Thadd Hodge, Accountant

Agenda Item: 9a



Office of the Town Manager

TO: Mayor and Commissioners
Department Heads

FROM: Chris Braund

DATE: October 30, 2014

RE: IT Support Services Contract

Recently, we evaluated four potential vendors to provide computer and network support services for the Town. An earlier memo outlines the issues and our rationale for changing vendors. From these, we selected Advanced Data & Network Solutions and requested a more detailed inventory and cost proposal. That proposal is summarized below. The staff is very much ready for the change. In fact, earlier this week we lost nearly an entire day of email (in or out) and the town's website was offline. Productivity was severely impacted.

CURRENT PC ENVIRONMENT: Each work station in our environment (desktop or laptop) has its own operating system and software for email, Office applications and specialty applications (e.g., finance, police, fire, GIS). User data may be stored on the network or on the local machine. As a result, we have a wide range of application versions and any data stored locally on a machine is at risk of loss if the machine is damaged or infected. There is significant expense in upgrading software and hardware as needed, and we typically defer this expense for too long.

NEW ENVIRONMENT: Instead of accessing locally-stored programs and data, each user will log into their account via the internet and they will see their customized desktop, delivered from "the cloud" and accessible from any machine. They can work from their office desktop. From a laptop. From their personal machine at home. From a PC in a hotel business center. All their data will be stored in the data center (cloud) and backed up nightly. All users will be standardized to the most current versions of Microsoft Office 2013. Outlook will be the standard for Email, but improved with Microsoft Exchange, which adds features like shared calendaring and meeting scheduling. At a glance, you'll be able to see when any of your team members have availability in their schedule and you can send them a meeting invitation. Should any laptop or computer fail, no data will be lost. That person can just log into any other machine and can continue working. We'll have spares on hand.

48	<u>PC's supported (laptops & desktops)</u>	\$54 each per month (\$39 + \$15 for MS-Office suite)
		\$2,592 monthly
		\$31,104 annually
		\$18,144 REMAINING 7 MONTHS OF YEAR

- Monitoring, maintenance and support
- Weekly maintenance & patch management
- Monthly onsite maintenance
- 8am to 6pm remote support. Onsite support if needed.
- Anti-spam Email gateway
- Anti-virus software & subscriptions, monitoring and updating
- Cloud-based PC: log in to your personalized desktop from any machine

- Nightly data backups, disaster recovery / business continuity services

4	<u>Servers supported at Advanced Data</u>	\$649/each per month \$2,596 monthly \$31,152 annually \$18,172 REMAINING 7 MONTHS OF YEAR
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1. File Server / Domain Controller / GIS Server
2. Remote Desktop Server (to deliver everyone's desktop via the web)
3. Microsoft Exchange Server (email and calendaring)
4. Southern Software / Police Pak Server

- 24x7 system monitoring and support
- Weekly maintenance & patch management
- Monthly onsite maintenance
- Firewall administration
- Anti-virus software & subscriptions, monitoring and updating
- Nightly data backups, onsite & offsite
- Disaster recovery / business continuity services
- Virtual server / hosting services provided – we will migrate our applications over time to virtual servers in the ADNS call center
- Yearly network audit & diagramming
- Yearly service audit and cost evaluation
- Monthly IT review meeting
- Yearly IT business planning meeting
- Network management
- Router/switching/firewall management
- Anti-spam Email gateway

Total Annual Support Fees	\$62,256 \$36,316 - REMAINING 7 MONTHS OF YEAR
One-Time Setup Fee	\$5,683
TOTAL NEEDED IN REMAINING FY 2014/15:	\$41,999
Remaining in Budget:	
IT Support Services	\$24,000
Hardware Replacements	<u>\$15,000</u>
	\$39,000

HARDWARE UPGRADES: at this point, no workstations require a mandatory upgrade. But we have identified the oldest and slowest machines that will soon need replacement. When needed, we will replace them with inexpensive, thin-client PC's that simply access the internet and the user's desktop in the cloud. We will have the option of purchasing the hardware outright or leasing them for a higher monthly support fee.

SERVER VIRTUALIZATION AND CONSOLIDATION: we currently have four servers supported at town hall. ADNS plans to migrate and consolidate these into their data center, reducing the ongoing costs of

maintenance and replacement. This will be done on an application-by-application basis, working closely with users and the software vendors.

I am requesting Town Council's authorization to sign the support contract with ADNS and to proceed with the transition from our current support provider. We'll find a way to cover the remaining \$2,000 needed by the end of the year, or we'll request the use of Contingency funds if needed.

Thank you –

Chris



Advanced Data & Network Solutions
60 Ravenscroft Dr
Asheville, NC 28801

QUOTE

Date	Quote #
10/22/14	ASHQ3574

Town of Lake Lure
Chris Braund
2948 Memorial Hwy Lake
Lake Lure, NC 28746
United States

Phone: (828) 625-9983
Fax:

Phone: 828-285-8882

Email: gerald@adnsolutions.com

Fax: 828-281-2772

Valid For	Term	Rep	P.O. Number
15 Days		Gerald	

Ln #	Description	Qty	Unit Price	Ext. Price
1	Flat Fee IT for Servers - Premium + Hardware	4	\$649.00	\$2,596.00

Complete IT Support:
8am-6pm Unlimited Support. After-hours Support by On-call Technician. Best-effort Spare Device Swap for Servers.



Monitoring and Maintenance:
System audit/asset management. 24/7 system monitoring. Customer portal case management. Patch Management. Weekly maintenance tasks. Monthly onsite maintenance.

Virtual Server Provided / Hosting Services:
Dual-Core Intel Xeon 5600 Processor, 4GB RAM, 300GB Hard Drive. Backup and disaster recovery services (30-day retention). Free upgrades for life (Upgrades usually occur every 3 years). Resources are pooled so RAM, CPU and hard drive space can be allocated to another virtual machine if desired.

Managed Security:
Local Firewall administration. Anti-virus subscription/software included. Antivirus Monitoring & Updating. Nightly Server Hard Drive Cloning (to onsite backup appliance). Offsite Backup of Server Data - 25 GB per server (pooled allocation). Disaster Recovery Services. Onsite Network Backup Appliance Provided.

Administrative Services:
Yearly Network Audit and diagramming. Yearly Service Provider audit and cost evaluation. Monthly IT review meeting. Annual IT Business Plan Meeting.

Network Management:
Uptime Monitoring/Alerting. ISP Management. Router/Firewall Management. Switching Management. VPN Management. Anti-Spam Email Gateway. Best-effort Spare Device Swap.

Servers hosted and managed by Advanced Data:

1. File Server/Domain Controller/GIS Server
2. Remote Desktop Server
3. Exchange Server
4. Souther Software/Police Pak Server

Ln #	Description	Qty	Unit Price	Ext. Price
2	Flat Fee IT for PC - Premium  Monitoring and Maintenance: System audit/asset management Customer portal case management Patch Management Weekly maintenance tasks Monthly onsite maintenance Support: 8am-6pm Remote Support 8am-6pm Onsite Support Managed Security: Local Firewall administration Antivirus Monitoring & Updating Anti-virus subscription/software	48	\$39.00	\$1,872.00
3	Hosted Microsoft Office 2013 and Exchange 2013- Add-On per/user - Word - Excel - PowerPoint - Outlook - OneNote - Publisher - Exchange	48	\$15.00	\$720.00
4	Network Management: Uptime Monitoring/Alerting. ISP Management. Router/Firewall Management. Switching Management. VPN Management. Best-effort Spare Device Swap. Anti-Spam / Anti-Virus Email Gateway.	5	\$99.00	\$495.00
SubTotal				\$5,683.00
Sales Tax				\$0.00
Shipping				\$0.00
Total				\$5,683.00

PRICES SUBJECT TO CHANGE - PRICES FOR INDIVIDUAL ITEMS ARE CONTINGENT UPON THE TOTAL PURCHASE OF ALL OTHER ITEMS - ALL DELIVERY, TRAINING OR CONSULTING SERVICES TO BE BILLED AT PUBLISHED RATES FOR EACH ACTIVITY INVOLVED - GENERALLY ALL HARDWARE COMPUTER COMPONENTS PROPOSED ABOVE ARE COVERED BY A LIMITED ONE YEAR WARRANTY, COVERING PARTS AND LABOR ON A DEPOT BASIS - WE SPECIFICALLY DISCLAIMS ANY AND ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OR WITH REGARD TO ANY LICENSED PRODUCTS. WE SHALL NOT BE LIABLE FOR ANY LOSS OF PROFITS, BUSINESS, GOODWILL, DATA, INTERRUPTION OF BUSINESS, NOR FOR INCIDENTAL OR CONSEQUENTIAL MERCHANTABILITY OR FITNESS OF PURPOSE, DAMAGES RELATED TO THIS AGREEMENT. MINIMUM 15% RESTOCKING FEE WITH ORIGINAL PACKAGING. STATE AND LOCAL SALES TAXES MAY BE APPLIED DEPENDING ON SHIP TO ADDRESS OR FINANCING TERMS.

By signing below you agree to the terms of Advanced Data & Network Solutions and agree to pay the full amount as shown. Applicable sales tax will be added on all qualifying products. A 100% deposit for all hardware items and 50% deposit of the labor amount is required before any product is ordered or any service is scheduled.

10/22/14

ASHQ3574

Accepted for Advanced Data & Network Solutions, Inc. by:

Date of Agreement

Quote #

Town of Lake Lure

Gerald Eldridge

Customer

Account Representative

Customer Signature

Account Representative Signature

Date

Print Name

Title

Corporate Approval Signature

Date



Advanced Data & Network Solutions
60 Ravenscroft Dr
Asheville, NC 28801

QUOTE

Date	Quote #
10/22/14	AAAQ2691-0

Town of Lake Lure
Chris Braund
2948 Memorial Hwy Lake
Lake Lure, NC 28746
United States

Phone: (828) 625-9983
Fax:

Phone: 828-285-8882

Email: gerald@adnsolutions.com

Fax: 828-281-2772

Valid For	Term	Rep	P.O. Number
15 Days		mattv	

Ln #	Description	Qty	Unit Price	Ext. Price
1	One Time Set-Up for new Flat Fee IT Customer - Set-Up/Manage Passwords on all network devices and servers - Install Remote Monitoring Agent on all servers and workstations - Set-Up Backup and Disaster Recovery Services - Create Detailed Inventory of all systems under the Managed Service Contract - Audit Firewall and secure the network from outside - Set-Up Alerting for Critical Systems on the Servers	1	\$5,683.00	\$5,683.00



SubTotal	\$5,683.00
Sales Tax	\$0.00
Shipping	\$0.00
Total	\$5,683.00

PRICES SUBJECT TO CHANGE - PRICES FOR INDIVIDUAL ITEMS ARE CONTINGENT UPON THE TOTAL PURCHASE OF ALL OTHER ITEMS - ALL DELIVERY, TRAINING OR CONSULTING SERVICES TO BE BILLED AT PUBLISHED RATES FOR EACH ACTIVITY INVOLVED - GENERALLY ALL HARDWARE COMPUTER COMPONENTS PROPOSED ABOVE ARE COVERED BY A LIMITED ONE YEAR WARRANTY, COVERING PARTS AND LABOR ON A DEPOT BASIS - WE SPECIFICALLY DISCLAIMS ANY AND ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OR WITH REGARD TO ANY LICENSED PRODUCTS. WE SHALL NOT BE LIABLE FOR ANY LOSS OF PROFITS, BUSINESS, GOODWILL, DATA, INTERRUPTION OF BUSINESS, NOR FOR INCIDENTAL OR CONSEQUENTIAL MERCHANTABILITY OR FITNESS OF PURPOSE, DAMAGES RELATED TO THIS AGREEMENT. MINIMUM 15% RESTOCKING FEE WITH ORIGINAL PACKAGING. STATE AND LOCAL SALES TAXES MAY BE APPLIED DEPENDING ON SHIP TO ADDRESS OR FINANCING TERMS.

By signing below you agree to the terms of Advanced Data & Network Solutions and agree to pay the full amount as shown. Applicable sales tax will be added on all qualifying products. A 100% deposit for all hardware items and 50% deposit of the labor amount is required before any product is ordered or any service is scheduled.

10/22/14

AAAQ2691-0

Accepted for Advanced Data & Network Solutions, Inc. by:

Date of Agreement

Quote #

Town of Lake Lure

Matt Vitelli

Customer

Account Representative

Customer Signature

Account Representative Signature

Date

Print Name

Title

Corporate Approval Signature

Date

Agenda Item: 9b

Andi Calvert

From: Lake Lure Town Manager [townmgr@townoflakelure.com]
Sent: Thursday, October 23, 2014 11:46 AM
To: 'Sam Karr'; 'Thadd Hodge'
Cc: 'Andi Calvert '
Subject: FW: Dredging Budget Allocation

FYI:

From: Bob Keith [mailto:mayor@townoflakelure.com]
Sent: Thursday, October 23, 2014 10:35 AM
To: 'Andi Calvert '
Cc: 'Bob Cameron'; 'Lake Lure Town Manager'; 'Mary Ann Silvey'; LOA@townoflakelure.com
Subject: Dredging Budget Allocation

Andi,
The Dredging Sub-Committee has recommended to Council that the \$400,000 budget for 2015 be allocated as follows:

Main Channel	\$300,000
Rumbling Bald	\$70,000
Grey Logs	\$10,000
Reserve	\$20,000

This recommendation needs to be on the November Town Council agenda for approval.
Thanks,
Bob

10/28/2014

Agenda Item: 9c



Office of the Town Manager

TO: Mayor and Commissioners

FROM: Chris Braund

DATE: October 14, 2014

RE: Staff Compensation Recommendations

At our last council workshop, we discussed my recommendations that we utilize a portion of the 2013-2014 budget surplus to pay bonuses in recognition of the entire team's dedication to financial discipline, revenue collection and quality work. We yielded over \$204,000 in surplus, which automatically went into the fund balance at year end. In addition, we discussed performing an in-house salary study to evaluate our pay scales and current salary in all positions against other municipalities of similar size and/or nearby.

Anita gathered salary data from cooperating towns and she was fortunate to be provided the results of salary studies (at no cost to us) being conducted in some other towns. This was thanks to her excellent relationship with a consultant in the field, David Hill, and prior work we've done with him. The salary study (in the attached packet) identifies the comparable pay scales and current salaries and compares Lake Lure's to the peer group average. The analysis asks these questions of each role:

- 1) How does Lake Lure's pay scale (minimum to maximum) compare with average of the group? We aim to be near the average. Too low and our salaries are not competitive. Too high and we may be overpaying for the market.
- 2) Is the salary we're paying for this role appropriate for our pay scale? People should earn more on the pay scale if they have advanced degrees, special certifications, years of experience and knowledge in the job, or if they are in a role that is highly competitive and they are likely to be recruited away. One benchmark evaluation is the midpoint of the salary range: a capable employee should reach the midpoint of the pay scale at about the midpoint of their career in this role (subject to all of other factors mentioned here).

Challenges and Weaknesses Found

- A. Most of our job pay scales are appropriate and competitive with other peer municipalities. We recommended slight upward adjustments to the pay scales of just 7 roles.
- B. However, the salaries we are paying are at the low end of our own stated pay scales. This is not unexpected as we haven't done regular salary increases (beyond COLA) in the past 6 years. We've disconnected good job performance from regular salary increases. We used to increase salaries regularly based on employee performance evaluations. There was not a lot of employee satisfaction or support for this system because it was so subjective.

- C. Our average tenure is 9 years on the job, so we should expect salaries to be in the middle third of our ranges. To bring everyone to the midpoint of our salary range would add 10% to our payroll costs (\$138,276) – that's not feasible all at once.
- D. We no longer have a mechanism for people to increase their base salary...other than through cost of living adjustments, a promotion or leaving for a higher paying job. Thus, it doesn't really matter what the upper end of your pay scale is...you tend to get stuck in one place along it.

As a result of the analysis, we are recommending salary adjustments to 14 employees whose salaries are significantly below where they should be...either in comparison to their peer group or relative to Lake Lure's pay scale and their experience. These adjustments would bring these 14 salaries more in line with the marketplace and with their peers among in Lake Lure with similar job responsibilities and experience levels. Note that it won't bring them fully in line, but it's what we can afford and it's a start. The analysis indicates that all the other salaries are at an appropriately competitive level.

In summary, the compensation recommendations consist of three separate components:

- 1) A budget performance bonus of \$1,000 for each employee on staff last year. The total cost of this program, including required payroll taxes and retirement contributions, is **\$37,875**. This bonus would be offered whenever a budget surplus will allow.
- 2) A longevity bonus of \$100 per year of service with the Town of Lake Lure. The bonuses would range from \$100 to \$2,700 and the total cost of the program will be **\$38,750**. This bonus would replace the customary Christmas bonus (\$100 per person) and be offered whenever a budget surplus will allow. This bonus recognizes loyalty and long-term service and the accumulated knowledge that comes with long service.

Employees will be responsible for their own withholding taxes on any bonus checks.

- 3) The 14 salary adjustments will add **\$34,600** to payroll, an increase of 2.4%

To fund all three of these programs will require a transfer from fund balance of \$111,225. This is compared to the \$204,125 in surplus last year that increased the fund balance.

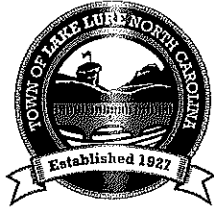
Now that we've emerged from the recession in much stronger shape and have been re-building our general fund balance, we are playing catch-up in our investments in hard assets (water, sewer, roads, dam) and in critical needs like dredging. However, our employees are the most important and productive assets we have and we also need to be mindful of investing in them.

The attached packet outlines the salary study, the current pay and experience levels for every employee and the recommended bonus or salary adjustment for each employee.

Thank you,

Chris

Agenda Item: 10a



Office of the Town Manager

TO: Mayor and Commissioners
FROM: Chris Braund
DATE: October 29, 2014
RE: Road Repairs

Attached is an assessment report of conditions on Boys Camp Road, prepared by J.M. Teague Traffic Engineering. It contains information and recommended road improvements, but also some overall commentary on the Town's funding approach for road maintenance. Note that much of the work needed on the road was identified in a similar report from fourteen years ago (2000).

Working from the assessment report, here are the activities that Chuck Ammacher (street maintenance supervisor) has already completed on or near Boys Camp Road using Powell Bill funds in this year's budget:

1. 22 reflectors added to the guard rails
2. 4 reflective delineators added to the bridge and cleaning of the road surface
3. Seven 25 mph speed limit signs replaced with high reflective
4. Two 25 mph speed limit signs added. Total cost of signs and reflectors about \$3,000
5. Truck warning sign moved closer to the intersection to give trucks a turn around location at flowering bridge parking lot
6. Shields Tree Service trimmed branches along both sides of road 15 feet high from Sugarbush Point and ending 100 ft past Garden Lane. Total cost \$8500. Maintenance department (5 man crew) chipped brush for 2 hours to finish project.
7. Culvert pipe installation on North Shore drive. 60 feet long by 24 inches in diameter. Cost of pipe \$1500
8. Patching of the road where culvert pipe was replaced. \$1,372
9. Paving on Cut Away rd. Total cost \$7,810.
10. Stop sign replaced at intersection of Boys Camp and Memorial Hwy.

The total so far comes to around \$22,000. This is out of the \$69,000 in street maintenance budget for the year.

Including Boys Camp Road, there are three priority areas needing attention on Ridge Road and Snug Harbor Circle. The other two are where the land has slid or subsided along a roadway, threatening the stability of the road and creating a hazard.

I am recommending that we utilize our infrastructure capital improvements reserve fund to address the immediate needs on Ridge Road and Snug Harbor Circle and to begin the major items on Boys Camp Road. These priorities are itemized on the next page.

Recommended Improvements – ESTIMATED COSTS

Boys Camp Road – Priority 1

From J.M. Teague estimates

Item

1.	Striping with Paint	\$5,000
5.	Full depth patching in distressed areas	\$60,000 (middle of range)
6.	Crack sealing ¼" cracks	\$15,000 (middle of range)
7.	Chip Seal or Mat & Seal	\$70,000
12.	Guardrail installation	\$25,000 (middle of range)
14.	Install recommended signs	<u>\$2,000</u>
		\$177,000

Ridge Road – Priority 1

From Harrison Paving Proposal

1.	Slide repair with riprap, steel pipe & grating	\$30,000
2.	Wedge asphalt plus 1.5" overlay	\$13,500
3.	Asphalt curbing	\$1,800
4.	Install catch basin, connect to existing culvert	<u>\$2,200</u>
		\$47,500

Snug Harbor Circle – Priority 1

From Harrison Paving Proposal

1.	Slide repair with riprap, steel pipe & grating	\$28,000
2.	Wedge asphalt plus 1.5" overlay	\$11,000
3.	Asphalt curbing	\$1,500
4.	Install rip rap in opposite ditch	\$3,000
5.	Repair slope behind ditch	\$3,300
6.	Install catch basin, connect to existing culvert	<u>\$2,200</u>
		\$49,000

TOTAL OF PRIORITY 1 ITEMS	\$273,500
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Boys Camp Road – Priority 2

7.	1.5" Asphalt Overlay	\$220,000
11.	Reshaping and replacement of ditches	\$40,000 (middle of range)
2.	Striping with high reflectivity markings	<u>\$25,000</u>
		\$285,000

Recommended Improvements – FUNDING STRATEGY

Beginning in 2013, we enacted a 3 cent tax dedicated to a fund for capital improvements. That fund now has \$352,060, which includes the contribution for 2014/15 and the payment for the water system improvements on Washburn Road & Asa Gray. We add about \$250,000 each year to it. \$275,000. If council agrees, then we will obtain multiple bids for the work and bring back contracts to council for a budget amendment appropriating these funds.

In a future year, we can evaluate the right time to address the Priority 2 items (along with any other priority needs that may emerge).

BOY'S CAMP ROAD ASSESSMENT

Lake Lure, North Carolina



Prepared For:

Chris Braund
Lake Lure Town Manager
2948 Memorial Highway
Lake Lure, NC 28746

Prepared By:

J.M. Teague Engineering, PLLC
525 North Main Street
Waynesville, North Carolina 28786

October 2014

JMTE Project 0335

PROJECT BACKGROUND AND UNDERSTANDING:

Boy's Camp Road (BCR) is a paved two lane road approximately two miles long with an overall winding alignment. BCR was once a state-owned and maintained road until the town of Lake Lure took responsibility of the road sometime before the late 1980's. This switch of ownership occurred before any of the existing town key staff were in place.

Some features along the road include: six speed humps located at strategic locations, a bridge, and several culverts. The roadway contains several sections of grade, some of which is moderately steep. However, occasional steep grades are expected in the region, and although they may not technically meet industry standard recommendations, they certainly meet most driver expectations. A preliminary field review revealed several safety, maintenance, and operational improvement needs such as shoulder condition, drainage, signing, pavement markings, guardrail, and pavement cracking. The Town of Lake Lure has recognized these needs and has asked JMTE to prepare a road assessment that identifies, prioritizes, and makes reasonable recommendations for the repair, removal, or the rehabilitation of these needs.

In December 2000, McGill Associates completed a similar study along BCR. In the 2000 report McGill recommended: improved signing, roadside vegetation trimming / reduction, shoulder widening, guardrail installation, improved pavement markings, the addition of pavement markers, pavement repairs (both surface and full depth), roadway widening, curve realignment, drainage and ditch improvements, and slope reduction.

Many of the current recommendations are the same as or similar to the 2000 report. It appears as if the most critical guardrail needs, some signing improvements, and some roadside vegetation trimming have been handled to some degree. However, deficiencies such as pavement condition, roadway width, drainage, pavement markings, ditch improvements, and shoulder widening, have not been addressed.

PARAMETERS AND METHODOLOGY

In order to begin the analysis and provide current baseline data, Boys Camp Road was divided into segments roughly 0.1 mi long. The beginning of each 0.1 mile segment was designated as a base station. It should be noted that normal stationing techniques were not used in order to provide a maintenance tool that could be used effectively by all users, not those just familiar with surveying methodologies. These 0.1 mile segments can be easily duplicated with a standard vehicle odometer and will provide easy reference points for Town maintenance crews. Please note that although stations are listed as a plus distance from a nearby base station, they are approximate and may not reflect the exact location of a particular hazard or feature. Most hazards or roadway features described within this report will be obvious to an observer, especially one with road maintenance responsibilities.

Although each section will be of some value when locating specific deficiencies, they were not analyzed as standalone sections. Instead, the entire road was analyzed based on the roadway's safety, sustainability, and operational attributes. Stations begin at the intersection of US 74A and ascend by traveling northeast on BCR.

ANALYSIS AND RECOMMENDATIONS

ROADWAY WIDTH

Roadway width plays a critical role in driver behavior. As roads become narrow, drivers tend to hug the centerline and occasionally cross the centerline, especially in curves or when roadside obstructions are present. The roadway width of BCR is arguably the most significant deficiency along the entire road. The first 300 foot section of BCR was recently improved and upgraded to NCDOT minimum standards as part of the US 74A bridge replacement project over the Hickory Nut Prong of Lake Lure. The roadway width in this segment is between 25 and 28 feet wide. The rest of BCR becomes narrow and is generally between 16 and 18 feet wide. According to the North Carolina Department of Transportation's Subdivision Roads Minimum Construction Standards (Roads Manual), in order for a mountainous road with unpaved shoulders to be considered of adequate width it must be 18 feet wide. NCDOT's preferred minimum width for public roadways is 20 feet. It

should be noted however, that roads widened excessively will usually result in higher vehicle speeds. The field observation indicated that most drivers along BCR were generally obeying the posted 25 mph, likely a result of the narrowness of the road. The following pictures show various images of the narrowness of BCR.



RECOMMENDATIONS

BCR needs to be widened to 18 feet minimum and preferably to 20 feet. However, due to right of way constraint, adjacent structures (primarily privately owned rock walls), and construction / grading costs, it may not be feasible for the Town to undertake such a daunting task without ample due diligence and community discussions. It is recommended that the Town at least “test the waters” to better establish the feasibility. Many times, if presented in the proper way, local property owners will donate small portions of right of way to a road owner if it means that their road will become

safer, more attractive, and their property values will increase. This method is commonly used by the NCDOT when attempting to upgrade rural roads with no recorded right of way.

SIGNING

BCR contains numerous warning and regulatory signs. Most of the warning signs are related to speed humps and are addressed under the "TRAFFIC CALMING" section discussed below. Signs relating to the posted speed limit are discussed in the "SPEED LIMIT" section discussed below.

BCR contains several sections where there is a significant drop off or "hole" into a culvert. Some of these sections need delineation and are described below in the "GUARDRAIL AND DELINEATORS" section.

The narrow bridge is properly signed with advance warning signs and properly oriented bridge end delineators. These warning signs, along with several others, are somewhat faded and coated with tree sap and road grime. The Manual on Uniform Traffic Control Device guidance regarding "NARROW BRIDGE" signs is given below.

The field review indicated a few other signing needs as outlined below.

Section 2C.20 NARROW BRIDGE Sign (W5-2)

Guidance:

- 01 A NARROW BRIDGE (W5-2) sign (see Figure 2C-5) should be used in advance of any bridge or culvert having a two-way roadway clearance width of 16 to 18 feet, or any bridge or culvert having a roadway clearance less than the width of the approach travel lanes.
- 02 Additional emphasis should be provided by the use of object markers, delineators, and/or pavement markings.

Option:

- 03 A NARROW BRIDGE sign may be used in advance of a bridge or culvert on which the approach shoulders are narrowed or eliminated.

"CHEVRON" warning signs are properly placed at several curves along BCR. Other than improved maintenance and tree sap removal that is coating the sign, no changes are needed at this time through these already signed curves.

At approximately station 14 + 475 a "WINDING ROAD LEFT" sign is properly located but is too low and needs cleaning or replacing. Several other signs along BCR were noted as too low. The following pictures show various images of a few of the signs in need of cleaning or replacing.

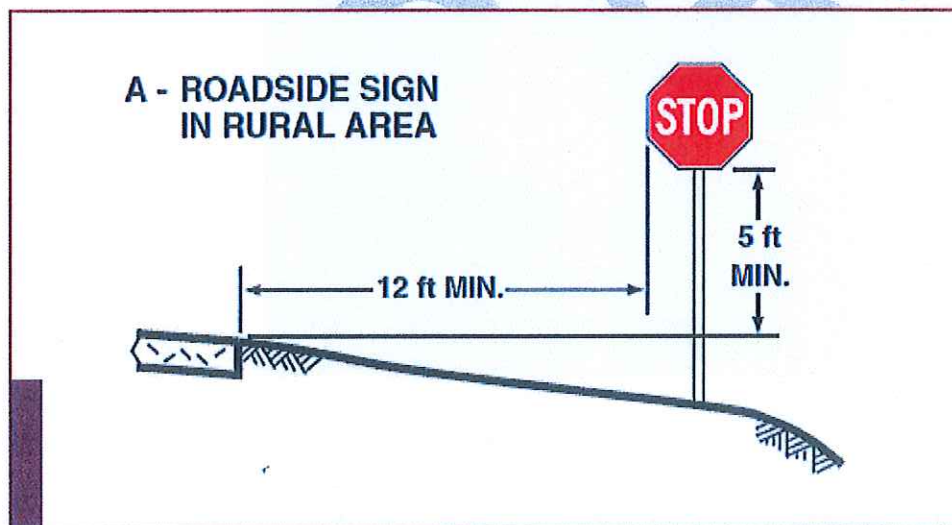
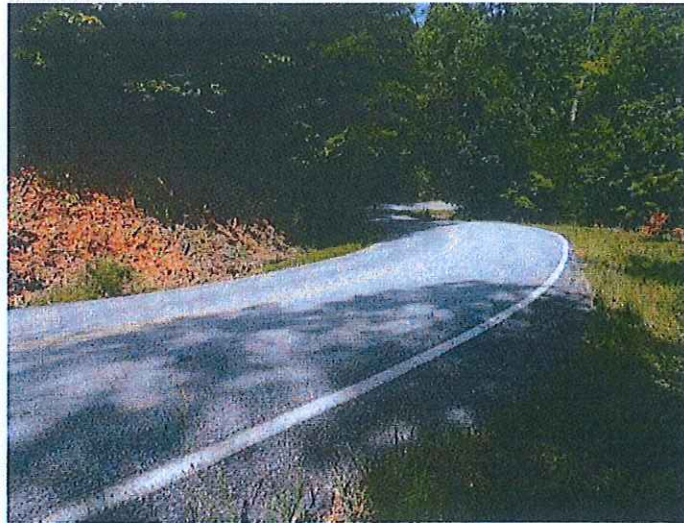


RECOMMENDATIONS

It is recommended that each all warning signs be cleaned or replaced at regular intervals to ensure proper reflectivity. It is also recommended that the Town conduct regular night time reflectivity reviews to determine which signs need replacing.

According to the Manual on Uniform Traffic Control Devices (MUTCD), the bottom of the sign face on rural roadways need to be around 5 feet above the pavement surface and around 12 feet from the edge of pavement. It is also understood that in mountainous areas, it may not be feasible due to right of way or geographical constraints to meet these requirements. However, every effort should be made to adhere to the vertical and horizontal distance rule as outlined in the MUTCD.

Additionally, "CHEVRONS" are recommended on the down grade approach for the reverse curves found at station 16 + 410 and 17 + 50. Approximately 4 "CHEVRONS" are needed for each curve – as shown below.



PAVEMENT MARKINGS AND MARKERS

Another significant deficiency on BCR is the pavement markings. Except for the first 300 feet closest to US 74A, the pavement markings along BCR are in poor condition. Both the edgeline and centerline are mostly faded, non-existent, or substandard width (3 inch stripe verses 4 inch stripe). It appears

that except for a few full width patch areas, the pavement markings have aged consistently and were likely installed as one project along the entire road. Except for the first 300 feet closest to US 74A, BCR does not contain raised reflective pavement markers. Regular paint has a life expectancy of 2 years and long lasting high reflective material is 10 years. The following pictures show images of the poor pavement markings along BCR.



RECOMMENDATIONS

It is recommended that the entire BCR be restriped with a centerline and edgeline in accordance with the MUTCD. Long lasting Thermoplastic or Polyuria type material should be used to enhance nighttime reflectivity. The scheduling of the restriping should coincide with any resurfacing, patching, or crack repair activity to ensure an adequate lifespan of the markings.

Due to the low traffic volumes and the resulting cost / benefit ratio, raised pavement markers should be considered as optional and a supplemental treatment only if funds allow.

SHOULDERS AND DRAINAGE

"A Policy on Geometric Design of Highways and Streets" by the American Association of State Highway and Transportation Officials (AASHTO) defines a roadway shoulder as an extension of the roadway travel lane. The shoulder purpose is to provide adequate drainage and serve as a refuge area for errant or stranded drivers. Typically a shoulder is the same slope as the travel lane for at least 6 feet and then gets gradually steeper as the distance from the edge of pavement increases. Because of the narrow shoulders and adjacent embankments along much of BCR, the available area for ditch improvement is limited. There are some areas where ditches are virtually non-existent. This is often due to adjacent structures or private property features that encroach within the usual ditch area of the road. Where ditches exist, they are generally shallow. However, because of the grades along BCR, they should be sufficient and capable to drain BCR from most rain events. Where feasible, ditches should be maintained the extent possible along BCR and constructed in some areas where they are non-existent.

The shoulder immediately adjacent to the edge of pavement along the entire length of BCR is rarely the same slope as the travel lane. The field review revealed either high shoulders or low shoulders, both of which will keep water on the roadway or allow for a natural "wash out" area to form creating an ever increasing shoulder drop off and potential pavement raveling area.

There are also clear zone hazards scattered along BCR. These hazards create obstacles for drivers and include established rock walls, utility poles, and embankments. Typically hazards within 6 feet of a travel lane will cause drivers to drift closer to the center of a roadway, thus reducing the effective width on an already narrow road.

Some particularly hazardous areas to note include:

Between stations 6 and 7 on the north side there is a rock wall falling into road

Between stations 4 and 8 along the south side there are several rock walls within 2 feet of roadway

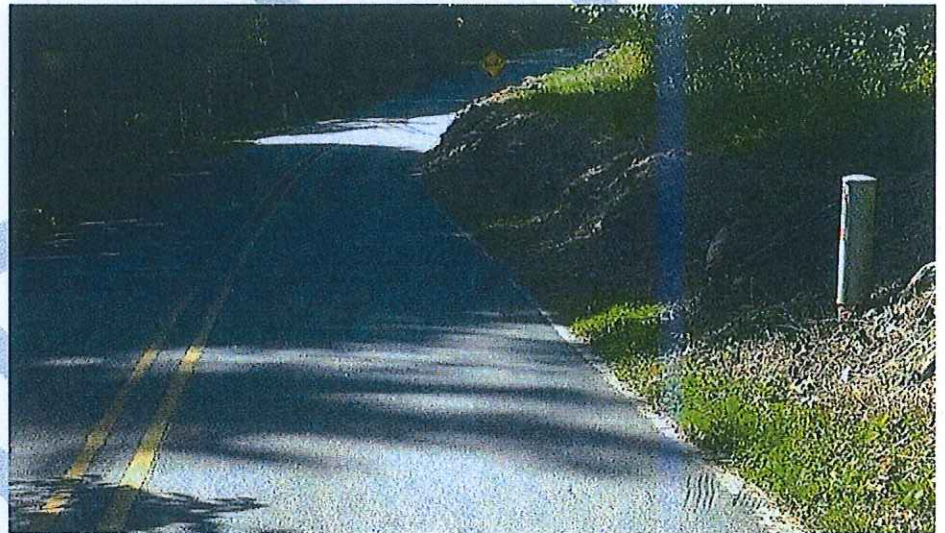
Between station 5 and 6 on the north side there is a steep embankment that slopes down to the edge of pavement

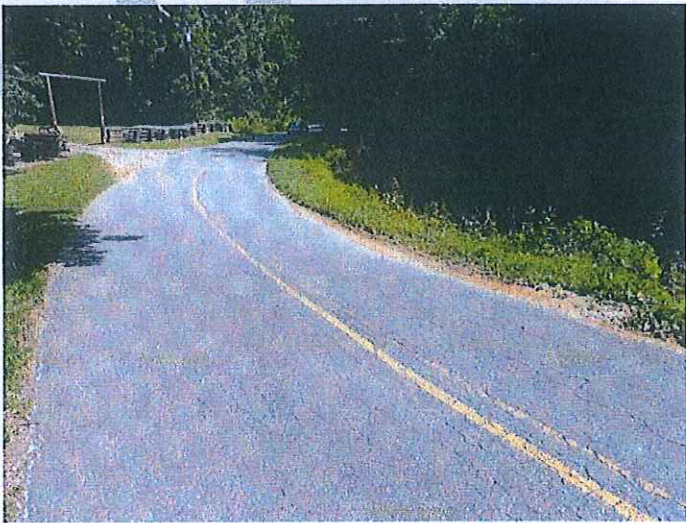
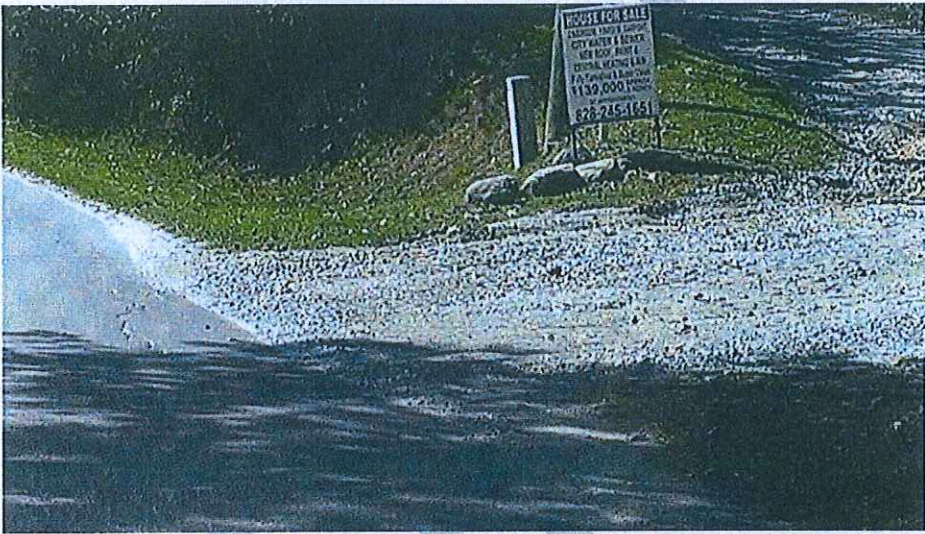
Near station 10 + 300 on the south side there is a section of greater than 6" shoulder drop off

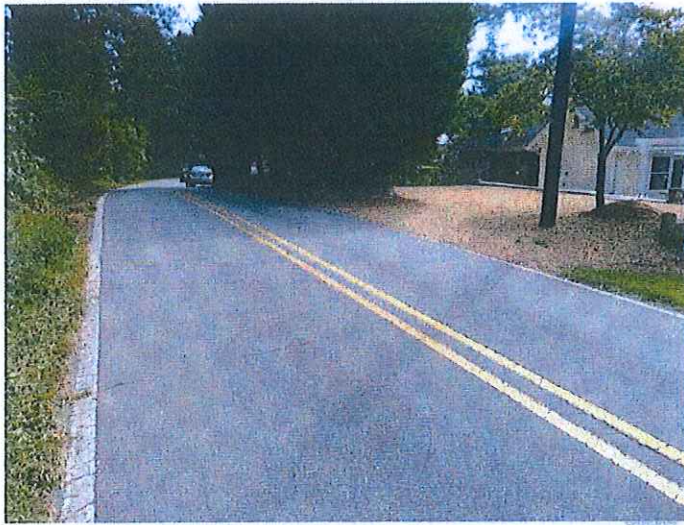
At the intersection of Sea Wish Way gravel was washed into the roadway creating as much as an 18 inch overflow into the travel lane.

The following pictures depict some of the shoulder conditions along BCR including the Sea Wish Way gravel, high shoulders, and clear zone hazards.









RECOMMENDATIONS

It is recommended that shoulder grading take place to create a roadway shoulder that basically serves as a roadway extension with the same slope. The ditches should be reshaped where possible, to create at a minimum, shallow swales to carry water along the edge of the roadway to the numerous streams and live water areas that cross the road. These streams primarily utilize corrugated metal pipe (CMP). The field investigation revealed CMP conditions to be adequate in most areas. It is recommended that the Town develop a yearly maintenance review on the CMP to ensure they are blockage free and that they remain in adequate condition. These live water and storm water pipes can be inspected by the same video method many municipalities inspect their storm water systems. A couple of low or sunken areas were noticed along BCR. However, these areas can be addressed with proper resurfacing techniques.

The intersection of Sea Wish Way needs to be addressed to minimize gravel accumulating onto BCR. One option is to pave a small apron on Sea Wish way and create a water break just beyond the newly paved area, forcing water to leave Sea Wish Way several feet before BCR. Once the gravel issue is addressed, the paved curb across from Sea Wish Way can be removed, creating an area for a proper shoulder to be installed.

It should be noted that an apparent spring is draining onto the road near station 13. This constant water source may cause hazardous driving conditions issue during freezing weather.

SIGHT DISTANCE

There are primarily 2 types of sight distance that road owners should be familiar with. Stopping sight distance (SSD) is the sight distance needed for drivers traveling along a road to effectively stop for a roadway hazard such as an animal, pedestrian, or entering vehicle. Intersection sight distance (ISD) is the sight distance needed for a driver entering a roadway to effectively make a left turn into the nearest travel lane. ISD is basically SSD plus the time needed for the entering vehicle to make their intended maneuver. AASHTO recommends a stopping sight distance of 155 feet for rural roads posted 25 mph and intersection sight distance of 280 feet for rural roads posted at 25 mph.

The observed sight distance along BCR generally fell within the AASHTO range. In the few areas where SSD or ISD were marginal, it was primarily a result of vegetation growth. A particular area of excessive vegetation growth was near station 5 on the north side.

RECOMMENDATIONS

It is recommended that the vegetation be monitored at regular intervals throughout the growing season to ensure continued compliance with AASHTO.

GUARDRAIL AND DELINEATORS

Guardrail is a "value" safety tool that can be used where there are adjacent roadway hazards such as structures, water hazards, or drop offs. Its purpose is to redirect errant vehicles into the roadway instead of into the hazard it is intended to protect. It is sometimes called a "value" tool since the value of having guardrail should always be weighed against the value of NOT having it. Guardrail

does not prevent vehicle crashes, it just transfers vehicle crashes into the guardrail instead of the hazard the guardrail is intended to protect. Because guardrail is very costly, its use is usually limited and the benefit / cost ratio is usually low. With that said, guardrail should be used sparingly

Delineators can aid drivers in identifying areas of drop offs or at specific hazards such as utility poles or bridge ends. It is important to understand the proper orientation of delineators. OM3-L is placed when traffic is expected to travel to the right of the hazard and OM3-R is placed when traffic is expected to travel to the left of the hazard. The black stripes point downward toward the direction of desired vehicle movement.



Several areas were identified as needing guardrail or delineators.

The following pictures depict several areas along BCR in need of guardrail or delineators.





RECOMMENDATIONS

Delineators

Field observation identified several areas along BCR that needed delineators on all approaches.

Station 2 + 380 – 2 needed on each approach – live stream crossing

Station 6 + 239 – 2 needed on each approach – live stream crossing

Station 13 + 450 – 1 needed on uphill approach only – drop off

Station 15 + 10 thru 40 – 4 needed in series to cover drop off on south side

Station 16 + 240 – 1 needed on south side at drop off

Station 17 + 50 – 2 needed on south side at drop off

Guardrail

Station 10 + 490 thru 11 + 414 – Existing guardrail needs reflectors and proper end treatments

Station 8 + 315 – less than 100 foot guardrail section needed for south side drop off

Station 12 + 000 – less than 50 foot guardrail section needed for south side drop off into stream

Station 11 + 355 – less than 50 foot guardrail section needed for north side drop off into stream

Station 15 + 172 – 200 foot guardrail section needed for south side drop off (marginal warrant)

PAVEMENT CONDITION

Overall the pavement along BCR is in fair to poor condition. It appears that patching has occurred in several areas and one section, between station 13 and 14 has a short section that has completely resurfaced in recent years. Evidence of transverse cracking, alligator cracking, rutting, raveling, oxidation, and blocking are evident throughout most of the roadway. Some of the more prevalent distressed sections are identified as follows:

Station 2 + 250 – low spot in roadway – standing water

Station 2 + 50 – distress failure

Station 3 – distress failure

Station 4 + 83 – distress failure

Station 3 + 21 – block cracking

Station 3 + 75 – edge ravel

Station 4 to 7 + 447 – moderate alligator, severe blocking, and moderate shoulder distress

Station 7 + 447 to 8 plus – severe alligator cracking

Station 4 + 473 – distress failure

Station 7 + 150 – severe potholes

Station 8 + 50 – concrete spillage on road

Station 8 + 200 – severe pavement oxidation

Station 9 + 433 – deep rutting

Station 11 + 198 – shoulder distress

Station 12 + 138 – distress failure

Station 15 + 300 – distress failure

Station 5 + 142 thru 310 – distress failure

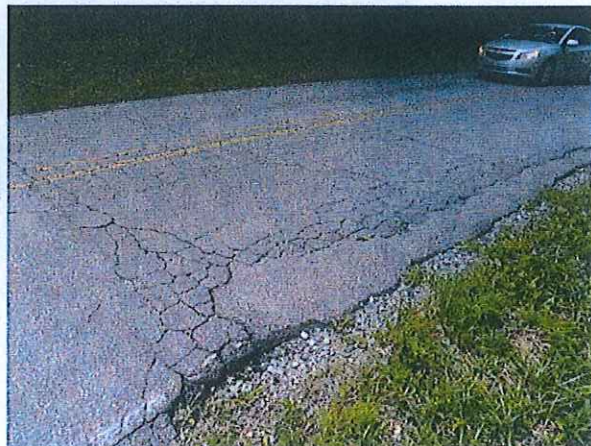
Station 19 + 291 – 100 foot section distress failure

Station 19 + 438 – distress failure

Station 20 + 98 – distress failure

Station 20 + 298 – distress failure

The following pictures show some of the numerous places along BCR where pavement patching or sealing is necessary, prior to resurfacing.











RECOMMENDATIONS

Due to the widespread cracking and numerous patching, it is recommended that the entire length of BCR be resurfaced through a series of treatments. An exception to this is the newly paved section between stations 13 + 38 thru 14 - 353.

The areas listed above as distress failure should be fully excavated and patched. Then the potholes should be patched with usual asphalt patching material. All cracks (block, alligator, and transverse) larger than ¼ inch should be sealed. Once these areas are repaired and secured, it is recommended that BCR receive a chip seal or mat & seal treatment over the entire roadway, not including the newly paved section near station 13 + 38 thru 14 - 353. At that time, regular paint striping should be used to replace the pavement markings. Within 2 years of the chip seal, it is recommended that BCR receive a plant mix overlay over the entire roadway. After the plant mix overlay, it is recommended that a high quality pavement marking material such as polyuria or thermoplastic be used.

It should be noted that a chip seal or mat & seal treatment consists of gravel rolled directly into a protective coating of tar. This creates a rough surface – often with loose gravel during the onset – and can be un-popular with some drivers, bicyclists, and pedestrians. The loose gravel gradually disappears over time to create a relative smooth riding surface. These methods are less costly than traditional plant mix asphalt and will often last up to 5 years without additional treatments.

TRAFFIC CALMING

BCR contains six speed humps that appear to be designed for about 25 mph. Each of these speed humps are in generally good condition structurally. Pavement markings on the speed humps are generally adequate. Many of the speed humps contain "at the point" "BUMP" signs with a few containing advance "BUMP" signs. Because the difference in speed hump design speed and the posted speed limit is small, supplemental advisory speed signs are not needed. Some of the warning signs are coated with tree sap and appear slightly faded.

It should be noted that these traffic calming features are technically "speed humps" and not "speed bumps". Because these differences in engineering terminology are not well known by the public, signing terms are often interchangeable.

Speed bumps are not usually engineered and require extreme slowing to traverse. They can also create an abrupt lurching action as drivers cross them and often pose as a threat to bicyclist and pedestrians. They are often found in privately owned parking lots. Speed humps are engineered traffic calming devices that can be designed for different comfortable driving speeds. They are most often found along public roadways. The speed humps seem to be adequately and appropriately spaced along BCR. Below is some relevant information regarding speed humps and associated signing.

Section 2C.29 SPEED HUMP Sign (W17-1)

Guidance:

01 *The SPEED HUMP (W17-1) sign (see Figure 2C-6) should be used to give warning of a vertical deflection in the roadway that is designed to limit the speed of traffic.*

02 *If used, the SPEED HUMP sign should be supplemented by an Advisory Speed plaque (see Section 2C.08).*

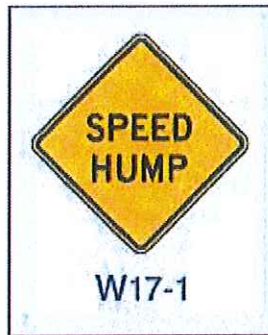
Option:

03 *If a series of speed humps exists in close proximity, an Advisory Speed plaque may be eliminated on all but the first SPEED HUMP sign in the series.*

04 *The legend SPEED BUMP may be used instead of the legend SPEED HUMP on the W17-1 sign.*

Support:

05 *Speed humps generally provide more gradual vertical deflection than speed bumps. Speed bumps limit the speed of traffic more severely than speed humps. Other forms of speed humps include speed tables and raised intersections. However, these differences in engineering terminology are not well known by the public, so for signing purposes these terms are interchangeable.*

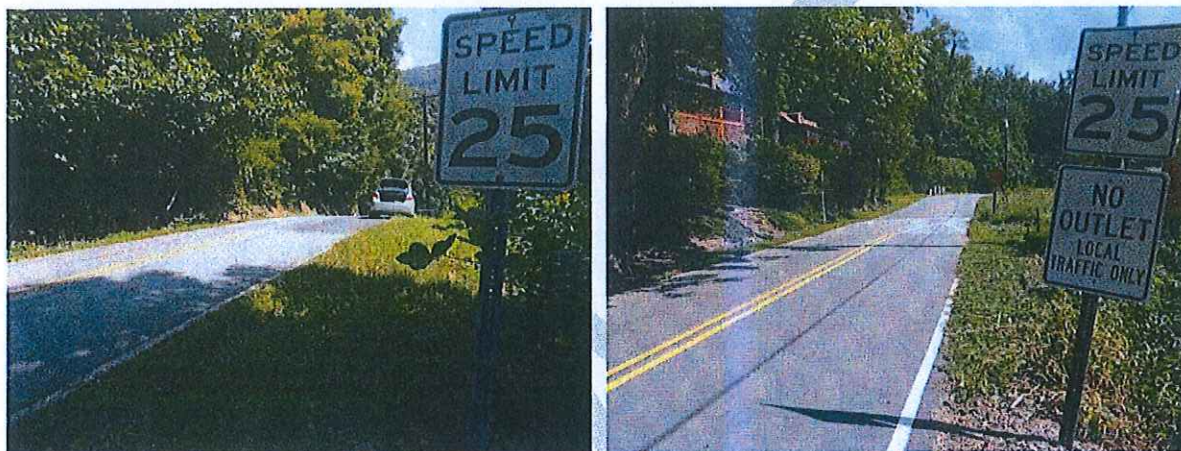


RECOMMENDATIONS

It is recommended that each speed hump contain an "at the point" SPEED HUMP warning sign as well as an advance SPEED HUMP warning sign on each approach. The estimated costs for these sign modifications and additions is However, through the duties of normal sign replacement, the Town should consider modifying the existing sign message to read "Speed Hump". It is also recommended that the Town clean the existing warning signs and conduct regular night time reflectivity reviews to determine which signs need replacing.

SPEED LIMITS

BCR is posted at 25 mph. This is an appropriate speed limit. Signing spacing varies and signs are sometimes placed just prior to a roadway or hazard. The recommended spacing, based on industry research, is for a driver to come into contact with two speed limit sign approximately every one minutes. This corresponds to a spacing of 1100 feet for 25 mph (*Chart 1*



RECOMMENDATIONS

It is recommended that the "SPEED LIMIT 25" regulatory signs be re-positioned per the spacing outlined in (*Chart 1*). Judgment need to be exercised in sign spacing to avoid the issues discussed earlier and to accommodate for maintenance issues, especially in privately landscaped areas. Chart 1 should only be used as a guide. Speed limit signs should never be placed just before a speed hump, sharp roadway curve, or other area that requires additional vehicle maneuvering. For more effective maintenance operations, speed limit signs can be place at property lines, in front of utility poles, or in front of vegetation areas. This will minimize damage caused by mowing and roadside maintenance operations.

This spacing ensures that drivers see two speed limit signs about minute.

Posted Speed Limit	Recommended Spacing
20 mph	900 ft
25 mph	1100 ft
30 mph	1300 ft
35 mph	1500 ft
40 mph	1800 ft
45 mph	2000 ft
50 mph	2200 ft
55 mph	2400 ft

Chart 1

PRIORITIZATION OF ACTIVITY

Pavement rehabilitation will be one of the most costly items to consider. In order to avoid further pavement failure and associated costs, it is recommended that the repair work outlined in the Pavement Condition section be accomplished quickly and the road sealed with one of the two methods indicated (chip seal or mat & seal). The seal could feasibly last several additional years to allow for the accumulation of funds for a full plant mix overlay. If funds are still not available after several years, an additional seal treatment can be performed on BCR to further prolong the needed overlay.

Another priority is the restriping of BCR. Depending on the choice of pavement options, this striping may be either paint or long lasting material. Regardless, better striping needs to occur quickly.

Some of the shoulder repair should be considered a low cost and high priority treatment. Much of the high and low shoulder areas can be easily remedied by running a motor grader blade along the shoulder / pavement edge to essentially "knock off" the high edge and "fill in" the low edge. More substantial shoulder repairs and expansion can be accomplished as funds allow and possibly be incorporated into a road widening project.

Speed limit, delineator, and warning sign cleaning / re-positioning should be considered a moderate priority with respect to their impact to drivers. However, due to the low cost associated with this recommended action, consideration should be given to accomplishing this task quickly.

Conversely, the widening of BCR should be considered a priority with respect to its impact to drivers. However, due to the high cost associated with this recommended action, it is likely not feasible for the Town to undertake such an arduous task quickly. The Town should however explore ways to negotiate right of way and private property issues and gradually reclaim a 20 foot roadway through small steps. Until substantial contiguous sections are established as 20 foot roadway sections, the striping should remain at 18 feet in order to reduce the hazard of driver having to negotiate varying lane widths. The extra acquired pavement width can be treated as a paved shoulder until the time to restripe as a 20 foot roadway.

The removal of roadside hazards, especially the rock wall that is falling into the roadway, should be considered a high priority with respect to its impact to drivers. However, due to the complications associated with these hazards belonging to private property owners it is likely not feasible for the Town to accomplish this task quickly. The field review noted a lengthy section of BCR near the western end that contained numerous branches in the ditch line. Some of these branches were rather large and were spilling into the roadway. This debris need to be removed.

The reshaping of ditches should be considered a moderate priority and be accomplished as resources allow.

Although the narrow bridge seems in adequate shape, it is recommended that the sub structure and super structure of the bridge be reviewed at least every 5 years to ensure its functionality. This review needs to be performed by a civil engineer certified in bridge inspections.

ESTIMATED COSTS

The following represents estimated costs for the various recommendations. These costs are approximate and will vary widely based on asphalt pricing, time of year, right of way availability, and local labor rates.

	Item	Low Cost	High Cost
1.	Striping with paint	\$5,000	
2.	Striping with high reflectivity markings		\$25,000
3.	Sign cleaning / re-positioning	Town Staff	Town Staff
4.	Elimination of high / low shoulder	Town Staff	Town Staff
5.	Full depth patching in distressed areas	\$55,000	\$75,000
6.	Crack sealing ¼ inch cracks	\$12,000	\$18,000
7.	Chip Seal or Mat & Seal with surface Patching	\$70,000	
8.	1 ½ inch Overlay with Hot Mix Asphalt		\$220,000
9.	Widen to 20 feet		unknown
10.	Removal of roadside hazards		unknown
11.	Reshaping and replacement of ditches	\$35,000	\$50,000
12.	Guardrail Installation	\$21,000	\$30,000
13.	Guardrail reflectors	Town Staff	Town Staff
14.	Install recommended signs (Town Staff Labor)	\$1,000	\$2,000
15.	Bridge Inspection <i>ALREADY DONE REGULARLY</i>	\$2,000 per inspection	\$3,000 per inspection
	TOTAL	\$201,000	\$423,000

+ unknown

CONSIDERATION OF TOWN BUDGET

The Town of Lake Lure currently maintains about 30 miles of roadway. Virtually all maintenance activities for these 30 miles rely on Powell Bill distributions received from NCDOT. This equates to around \$70,000 per year or about \$2,000 per road mile.

All municipalities across NC receive Powell Bill funds to assist with road maintenance. Powell Bill funds are designed to be a supplement to a municipality's road maintenance budget as most towns also use local tax revenue to complement their road needs. It is extremely rare and likely impossible for any local government to adequately maintain their roadway network using Powell Bill funds alone.

The substantial deterioration of Boys Camp Road and lack of a supplemented roadway budget will definitely pose a challenge to Lake Lure. In order to adequately fund the necessary improvements on BCR, as well as likely other critical needs on other roads, the Town should consider a cost-driven approach to establishing an annual roadway system maintenance budget rather than revenue driven approach using Powell Bill funds alone.

The Town should also consider a light axle weight limit for BCR or at the very least an impact fee. The field review revealed moderate truck traffic ranging from loaded tandem dump trucks to seven yard concrete trucks. Both these type of trucks are likely the culprit for some of the more severe pavement damage.

A large portion of Lake Lure's economy is driven by seasonal residents. This equates to a significant number of older adults, many of which naturally have diminishing driving skills. Not only is adequate roadway maintenance critical for asset management, it is crucial to driver safety and ultimately to the entire culture surrounding the Town of Lake Lure.



SNUG HARBOR

9-3-14

112



EROSION

SNUG HARBOR



Harrison Construction Company
APAC-Atlantic, Inc.
1188 Smoky Park Hwy.
Candler, NC. 28715

Proposal And Contract

Return Proposal to:
PO Box 6939 Asheville, NC 28816
Phone: (828)665-1180 Fax: (828)665-9345

To: Town of Lake Lure
Attention: Harlow Brown
Project: Snug Harbor Circle / Slide Repair
Date: 9/22/14 10:13 AM

We propose to furnish all labor, materials, equipment, and supervision required for the performance of the following described work in connection with construction of improvements for

Job Name: Snug Harbor Circle / Slide Repair

County: Rutherford

State: NC

Owner: Town of Lake Lure

In accordance with conditions listed below and in strict accordance with plans and specifications listed below.

We Include:

ITEM #	DESCRIPTION	EST. QTY	U/M	UNIT PRICE	AMOUNT
1	Snug Harbor Circle Slide Repair will include 12" layer of Class B Rip Rap within the failure area, supported by a 3' high heavy duty steel grating supported by 2" diameter steel pipe driven into the ground 3' on 4' centers.	1	LS	\$28,000.00	\$28,000.00
2	Level existing low area, approx. 45 SY area. Wedge various depths with S9.5B surface asphalt, approx. 116 SY area. Overlay with 1.5" S9.5B surface asphalt, approx. 145 SY area.	1	LS	\$11,000.00	\$11,000.00
3	Install Asphalt Handformed Curb. Approx. 100 LF	1	LS	\$1,500.00	\$1,500.00
4	Install Rip Rap in existing ditch on opposite side of road.	1	LS	\$3,000.00	\$3,000.00
5	Slope repair behind ditch.	1	LS	\$3,300.00	\$3,300.00
6	Install catch basin on opposite side of road in ditch, connect to existing culvert pipe.	1	LS	\$2,200.00	\$2,200.00
TOTAL BID					\$49,000.00

Note: We exclude warranty for design, we do warranty our workmanship and materials.
The above price is based on that the 2" diameter pipe can be driven in to dirt, not rock. If rock is encountered, it will be additional cost, if it is possible to drill the rock to install the pipe.

Notes: If bond is required add 1.5%.
No testing included.
All permits by others.
Not responsible for erosion control.
The above price excludes prime cost.
Paving operations not guaranteed from November 15th through April 1st.
Harrison Construction is not responsible for drainage problems in areas with less than 2% slope.
Harrison Construction is not responsible for subsurface conditions not ascertainable by visual inspection.
All inspections and approvals are the responsibility of the owner.
grading by others will be within +/- 0.1' of subgrade.

Above price to be adjusted in accordance with NCDOT's Special Provisions SP109A & SP109B regarding price adjustments for fuel and bituminous material (liquid asphalt cement) based on September 2014 Index of \$630.00

We Exclude Excavation; traffic control and flagging; barricades and signs; surveying or layout; pavement marking or marking layout; sealcoating; saw cutting; soil sterilization; utility adjustments and/or utility patching; curbing; wheel stops; primecoat; proof rolling; pavement milling; pre leveling; (unless specifically bid); gravel base; misc. patching (curblines, trenches, ramps); sweeping or pavement cleaning; colored, patterned or stamped asphalt; haul route or street use permits, plans or fees; as-built drawings; builders risk insurance; railroad insurance; bonds; participation in any apprenticeship and/or training programs; traffic control plans; cost of owner or general contractor required project specific safety training; cost of project-specific drug testing.

All proposals or contracts are contingent upon satisfactory financial arrangements.

Est. No:

Submitted By:

Armand Huppe, Estimator

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PROPOSAL-CONTRACT TERMS AND CONDITIONS

1. Please check all items listed under "we include" and "we exclude" as this is the basis of our bid.
2. Invoices shall be rendered monthly for all work performed under this agreement during any month; payment of such invoices is due and payable within thirty (30) days from date of invoice. Final and complete payment for all work performed under this agreement shall be made not later than thirty (30) days after date of final invoice for such work. Interest at the highest rate allowable under the laws of the state in which the work is done, or one and one-half (1 1/2) per month, whichever is less, shall be charged and paid on all unpaid balances from the due date to the date we receive payment. You agree to pay in full all cost and expenses incurred by APAC in collecting the amounts owed by you under the agreement, including any and all court cost and attorneys' fees. Payments received will be applied against open items on unpaid invoices in an order and sequence determined by APAC in its sole discretion. Any monies paid to you for our work shall be held in trust for our benefit. If payment is not received in sixty (60) days, we are authorized to take such steps as we deem necessary to protect our interests.
3. We shall not become obligated to perform the work called for under this Proposal and Contract until we check and approve your credit. This Proposal and Contract shall be null and void if your credit is not approved. If credit conditions become unsatisfactory at any time prior to our completion of the work hereunder, you will furnish adequate security upon our request.
4. This document is the full agreement between us, regardless of any prior proposals or communications. Any deviations from the specifications or modification of terms of this contract and any extra or incidental work, or reductions in work, shall be set forth in writing and signed by both parties prior to the making of such change. If a time is set for the performance of our work, and if, in our judgement, such change or other circumstances beyond our reasonable control will increase the time necessary for our performance, we will be granted a reasonable extension of time. Any increase or decrease in the contract price resulting from such change shall be included in such writing.
5. We will provide and pay for Worker's Compensation, General Liability and Property Damage Insurance. You agree to carry General Liability and Property Damage Insurance sufficient to protect yourself against any and all liabilities and claims arising from the performance of the work, including but not limited to claims arising under your agreement to indemnify and hold us harmless under this contract.
6. We shall be provided with suitable access to the work area. If our work is dependent upon or must be undertaken in conjunction with the work of others, such other work shall be so performed and completed as to permit us to perform our work hereunder in a normal uninterrupted single-shift operation.
7. Unless a time for the performance of our work is specified, we shall undertake it in the course of our normal operating schedule. We shall not be liable for any failure to undertake to complete, and may suspend the work for causes beyond our reasonable control, including but not limited to fire, flood or other casualty; the presence on or beneath the work site of utilities, facilities, substances, or objects, including but not limited to any substance that in our opinion is hazardous or toxic or the reporting, remediation, or clean-up of which is required by any law or regulation (together "substance conditions"); labor disputes or other disagreements; and accidents or other mishaps, whether affecting this work or other operations in which we are involved, directly or indirectly.
8. If for causes beyond our reasonable control we are delayed in completing our work for more than ninety (90) days beyond the originally scheduled completion date, we may cancel this agreement at any time thereafter on ten (10) days notice. In such event (1) we shall be relieved of any further obligation with respect to the balance of the work; and (1) we shall be entitled to receive final and complete payment for all work performed by us to the date of cancellation within fifteen (15) days thereafter.
9. We shall not be responsible for, and you agree to hold us harmless from any liability resulting from, damages to utilities or other facilities or objects buried beneath, or to sidewalks, driveways or other improvements located within, our work area or designated areas of access. It is further understood that we shall not be responsible for any damage to or deterioration of any of our work, whether completed or in process, resulting from any cause or causes beyond our control, including but not limited to failure of subgrade or failure if inadequacy of any labor or materials not furnished and installed by us, whether or not such failure or inadequacy was or could have been known at the time our work was undertaken. You agree that proper jurisdiction and venue for any lawsuit concerning this contract is in Buncombe County, North Carolina and you waive any right to jurisdiction and venue in any other place.
10. Should a surety bond be required by you or by us, the one requesting the bond from the other will pay the premium, unless otherwise agreed to.
11. We are not responsible for delays in transportation, by lock-outs, strikes, weather conditions, or any other causes beyond our control.
12. No overtime work is included in this proposal, and should we be required to work overtime, same will be basis of any extra charge.

Price Adjustment Clause - Liquid Asphalt Binder For Plant Mix

Based on the NCDOT's Liquid Asphalt Price Adjustment clause, when at the time work is performed, the current NCDOT Index price for Liquid Asphalt Binder varies upward by more than 5% from the index price at the date the quote was written, we reserve the right to make a cost adjustment to payments due APAC-Atlantic, Inc. for the work performed at that time according to the following formula:

$(\text{Current Index Price} - \text{Index Price at the Date the Quote was Written}) \times \% \text{ of Liquid in Mix} \times \text{Tons of Asphalt} = \text{Cost Adjustment}$

The price adjustment clause is to be made part of our contractual agreement.

If the foregoing meets with your acceptance, kindly sign and return to the address listed above. At such time as we receive the above we will execute this contract and return one copy to you for your information and files. This proposal is for acceptance within 30 days.

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We (I) _____ am an officer, owner or authorized representative of
(Name)

_____ I hereby accept the above proposal and conditions
(Company)

_____ (Date)

Sign: _____

Harrison Construction Company
APAC-Atlantic, Inc.

Sign: _____

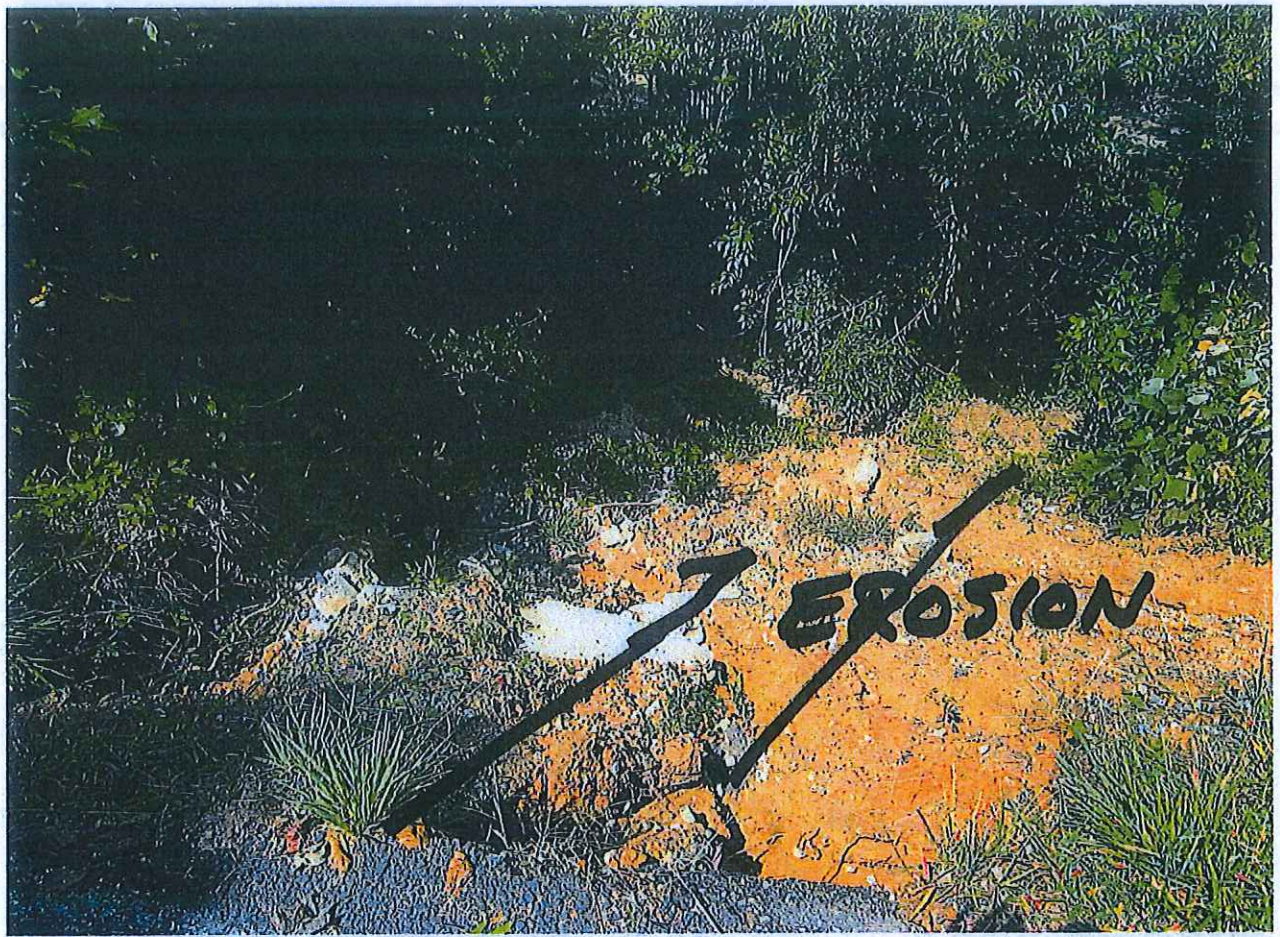
Title: _____

Date: _____

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RIDGE ROAD



ROAD



RIDGE



Harrison Construction Company

APAC-Atlantic, Inc.

1188 Smoky Park Hwy.

Candler, NC, 28715

Proposal And Contract

Return Proposal to:

PO Box 6939 Asheville, NC 28816

Phone: (828)665-1180 Fax: (828)665-9345

To: Town of Lake Lure
Attention: Harlow Brown
Project: Ridge Road / Slide Repair
Date: 9/22/14 10:16 AM

We propose to furnish all labor, materials, equipment, and supervision required for the performance of the following described work in connection with construction of improvements for

Job Name: Ridge Road / Slide Repair

County: Rutherfordton

State: NC

Owner: Town of Lake Lure

In accordance with conditions listed below and in strict accordance with plans and specifications listed below.

We Include:

ITEM #	DESCRIPTION	EST. QTY	U/M	UNIT PRICE	AMOUNT
1	<u>Ridge Road</u> Slide Repair will include 12" layer of Class B Rip Rap within the failure area, supported by a 3' high heavy duty steel grating supported by 2" diameter steel pipe driven into the ground 3' on 4' centers.	1	LS	\$30,000.00	\$30,000.00
2	Wedge various depths with S9.5B surface asphalt, approx 107 SY area. Overlay with 1.5" S9.5B surface asphalt, Approx. 200 SY area.	1	LS	\$13,500.00	\$13,500.00
3	Install Asphalt Handformed Curb. Approx. 120 LF.	1	LS	\$1,800.00	\$1,800.00
4	Install catch basin on opposite side of road in ditch, connect to existing culvert pipe.	1	LS	\$2,200.00	\$2,200.00
TOTAL BID					\$47,500.00

Note: We exclude warranty for design, we do warranty our workmanship and materials.
The above price is based on that the 2" diameter pipe can be driven in to dirt, not rock. If rock is encountered, it will be additional cost, if it is possible to drill the rock to install the pipe.

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All permits by others.
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We (I) _____ am an officer, owner or authorized representative of
(Name)

_____ I hereby accept the above proposal and conditions
(Company)

_____ (Date)

Sign: _____

Harrison Construction Company
APAC-Atlantic, Inc.

Sign: _____

Title: _____

Date: _____

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**BOYS CAMP ROAD
ENGINEERING EVALUATION**

Prepared for:

**THE TOWN OF LAKE LURE
RUTHERFORD COUNTY, NORTH CAROLINA**



Engineering • Planning • Finance
Post Office Box 2259
Asheville, North Carolina 28802

DECEMBER, 2000
00113

PRELIMINARY

JEFFREY R. BISHOP, P.E.

INTRODUCTION

Lake Lure is a small community in the Blue Ridge Mountains of North Carolina in Rutherford County. Due to the attractive scenery and pleasant lake front living, the area is growing. One area in particular is the northern side of Lake Lure. The only access to this side of the lake is along Boys Camp Road, which is a rural, two-lane road, built to minimal standards.

McGill Associates, P.A. was retained by the Town of Lake Lure to provide professional engineering services evaluating Boys Camp Road. The scope of services included the performance of a field evaluation and then recommendations are to be made for improvement and/or rehabilitation of the road. Preliminary construction estimates for the proposed improvements are to be provided also.

The area of study was defined as Boys Camp Road from U.S. Highway 74 to its public terminus at Cutaway Road. The project length is approximately 10,500 feet or 2 miles.

EXECUTIVE SUMMARY

While many recommendations were made for the improvement of Boys Camp Road, it is understood that all of the recommendations may not be financially practical at the present time. At a minimum, items A-D of the recommendations should be completed at this time. The estimated cost to install the appropriate signage for the 2 miles of roadway is approximately \$3000. The benefit that these signs would provide is very substantial.

The next item of improvement is the tree trimming. In many locations the trees along the roadway severely limit visibility and create hazardous situations for vehicles. The recommended tree trimming is estimated to cost approximately \$7500 and again would improve roadway safety.

Another of the strongly recommended repairs is shoulder improvements. There are two major aspects of shoulder improvements, the areas above existing culverts, and the section of roadway above steep embankments. The areas above existing culverts have little to no shoulder and are extremely hazardous because they leave no room for stalled vehicles or wide vehicles. No shoulder also leaves little room for error, meaning that if a vehicle gets a tire off the pavement, then a serious accident will most likely be the result. The required pipe extension and fill placement required to repair these areas is estimated to cost approximately \$28,000. In addition, the two areas requiring guardrail to protect steep embankments is estimated at \$5000.

The last of the initial recommendations for improvement is the installation of Raised Pavement Markers and new striping. These items have a estimated cost of \$11,000 and provide a significant improvement to a driver's ability to perceive the roadway.

Items A-D are emphasized not because they are the only important items, but because they are the most important items. The remaining recommendations should be completed for the overall safety and effectiveness of Boys Camp Road. For many of the remaining items, a more detailed survey and engineering design will need to be completed prior to construction. Cost estimates for all items have been included in Appendix 1 and correspond to the recommendations section of this report. All estimates have been completed assuming the work will be contracted to a private contractor, and not performed by the Town of Lake Lure. Any engineering design costs associated have not been included. Also, some of the recommended items may be redundant. For example, if the "S-curves" are graded and the roadway realigned, then the pavement widening for this area will not be required.

EXISTING CONDITIONS

Boys Camp Road is paved and generally in good condition. Portions of the road (totaling approximately 3900 feet) appear to have been resurfaced within the last one to five years and include 500 feet of new guardrail. Isolated areas are beginning to show signs of failure.

The road is fairly uniform in width, measuring between 16 feet and 18 feet. Shoulders are generally very narrow and provide few opportunities for stopped vehicles to get safely off of the roadway in case of emergency. The narrow shoulders also make it difficult for wide vehicles, such as commercial trucks, to travel Boys Camp Road. A few curves also have excessive superelevation, which promotes faster driving and creates hazardous driving conditions in winter weather.

In the area having guardrail the pavement width is 18 feet. As drivers tend to "shy away" from guardrail, the effective pavement width is reduced to approximately 15 feet. The potential for widening the road in this area is limited due to a large cut slope that is approximately 4 feet off of the edge-of-pavement.

Roadway drainage is provided by a combination of open ditches and culverts. Where ditches are provided they are generally shallow (less than 18" deep). The culverts observed were primarily corrugated metal pipe and are quite old. In several locations ditches are not provided due to cut slopes that extend nearly to the edge of pavement or privately maintained walls that extend to within a few feet of the pavement edge.

The road has several sharp curves, sometimes combined with vertical grade crests that make visibility poor. Three of the curves have cut banks on the inside edge of the curve greatly reducing visibility. Tree growth is another problem that contributes to poor visibility in a few locations.

Other than two 25 M.P.H. speed limit signs (one eastbound, one westbound) near U.S. 74, the only signs in the study area were road name signs.

Existing conditions for Boys Camp Road are shown in the attached drawings titled "Existing Roadway Conditions".

RECOMMENDATIONS

A. Signage

The overall safety of Boys Camp Road could be increased by the addition of adequate signage. The two types of signs that would be most effective are speed limit signs and various types of "Warning Signs" to alert drivers of potentially hazardous roadway situations. As this is a rural area without streetlights, the additional signage would alert drivers of the upcoming roadway conditions. Exact quantity and location of required signs should adhere to the Manual on Uniform Traffic Control Devices.

1. Speed limit signs: Additional signs posted along the road would remind drivers of the legal speed limit. Slower speeds will increase reaction time to hazardous situations, thus improving safety. Increased enforcement of the speed limit would also aid in slowing drivers.
2. Curve Sign/ Advisory Speed Plate: There is only one curve sign along Boys Camp Road, and it is in very poor condition. The placement of these signs would be particularly beneficial in the "blind" curve areas alerting drivers of a need to adjust their speed. Although pavement width could be improved in the curves, it is generally adequate for passenger vehicles traveling at a slower speed. Larger trucks could still have trouble with the sharpest curves.



3. Chevron Alignment Sign: "Chevrons" should be placed leading into the sharper curves or curves with a limited sight distance. These signs are effective at alerting drivers of the direction and severity of a curve.



4. Narrow Bridge: These signs would alert drivers of a need to adjust their speed for the potential of meeting another vehicle.



5. Limited Site Distance Sign: Following improvements, some areas may still have limited site distance. The safety in these areas could be improved by warning drivers of the situation.
6. No outlet / Local traffic only: Although tourist traffic is likely a small percentage of the overall traffic load, placement of local traffic only signs at U.S. 74 could reduce the number of drivers unfamiliar with the area traveling Boys Camp Road.

B. Tree Trimming

The trees along the road should be trimmed back within the right-of-way. While the canopy of trees is aesthetically appealing, in some cases it creates unsafe traffic conditions. Tree trimming would be of greatest benefit on the inside edge of curves. In particular, curves approximately located at stations 21+75, 60+00, and 86+50 (see attached drawings).

C. Shoulder Improvements

1. Increase shoulder width: The most critical areas in need of additional shoulder width are located at culvert crossings at approximately station 21+75, 49+00, 56+50, and 58+75. At station 21+75, the existing pipe will need to be extended and structural fill added to provide a shoulder for the roadway. At stations 49+00 and 58+75 extending the existing culverts and placing structural fill is recommended, however, installing guardrail above these embankments may be an option. Guardrail would protect vehicles from going down the dangerous embankments, but they do not provide a shoulder for wide vehicles or stalled vehicles. The embankment at station 56+50 is on the outer side of a curve and therefore should have the shoulder expanded and guardrail installed.
2. Guardrail: As previously mentioned, the safety of the curve at station 56+50 would be improved with the installation of guardrail. Guardrail is also recommended along a steep embankment at approximately station 74+25.
3. Erosion: Two areas will require the shoulder to be repaired because the pavement is being undermined. These two locations are located at approximately station 49+90 and 53+20.

D. Raised Pavement Markers and Striping

Along with the appropriate signage, Raised Pavement Markers (RPM) and new striping along the entire roadway would assist drivers in perceiving the layout of the roadway. RPM would also remind drivers when they have crossed the centerline of the road.

E. Pavement Repair

1. Surface Repairs: There are a few pavement areas showing distress and / or early signs of failure. These areas should be addressed as part of the towns ongoing maintenance program. In most areas, a simple overlay will be sufficient. Areas that require surface repairs are noted on the "Proposed Roadway Improvements" drawings. A particular area that needs to be addressed is located at approximately station 37+00. It appears as though multiple ready-mix concrete trucks have spilled concrete on the road surface due to the approximate 21% grade. The concrete needs to be removed and the pavement surface repaired as needed.
2. Full Depth Repairs: As with surface repairs, there are a few areas in which the pavement sub-base has begun to fail. These areas should be excavated full depth and properly reconstructed. The proposed repair locations are shown on the "Proposed Roadway Improvements" drawings.

F. Selective Pavement Widening

1. Curves: The curves located at stations 39+50, 75+50, 83+00, and 86+00 generally have excess shoulder area on the outside of the curve that would allow the road to be widened. The road's width of 17 to 18 feet is adequate in most cases. However, increasing this to 20 to 24 feet through these curves would make travel safer, especially for large trucks.
2. Guardrail Area: From approximately station 52+00 to 57+00 there is an existing guardrail. The dimension from the face-of-guardrail (F.O.G.) to the opposite edge-of-pavement (E.O.P.) is 18'. Since drivers leave a buffer between themselves and the guardrail, the effective width of the roadway is only 15 to 16 feet. Widening pavement by 2 feet could take place opposite of the guardrail and provide some additional driver comfort and safety. This, however, would reduce the available shoulder and ditch area. The limited available shoulder would then require the construction of curb and gutter and storm sewer to appropriately drain the affected area.

G. Grading / Realignment of Curves

1. Grading: In addition to the curve improvements recommended in section F above, it may be desirable to grade down the cut banks on the inside of affected curves. This would involve moving a substantial amount of earth and obtaining property or grading easements from the adjacent landowners. However, site distance and curve radii could both be improved. The curves that most need to be properly graded are at stations 39+50, 75+50, and 83+00. These "blind curves" would become much safer when the site distance is increased. Two additional curves that would benefit from properly grading the interior slope are at the approximate stations of 63+50 and 79+00. These two curves would also be safer if the site distance were increased.
2. Realignment: There are three curves that need to be realigned because they have excessively small radii. The curves are located at stations 77+50, 83+00, and 86+00. As mentioned above, the curve at station 83+00 will require the embankment on the inside of the curve to be graded, while the other two curves

will require structural fill placed on the inside of the curves. The drawing titled "Proposed Curve Alignments" shows the recommended changes and grading requirements.

H. Drainage and Erosion Control

1. Ditches: The area adjacent to the road available for ditch construction is limited. The existing ditches should be reshaped to the extent possible within the available right-of-way. The grades are generally steep enough so that a shallow ditch is capable of carrying storm water rather effectively. In addition to grading, the number of culverts should be increased to convey storm water under the road more frequently and therefore reduce the carrying capacity required in the roadway ditches.
2. Cut Slopes: There are two primary areas in which the existing embankment has eroded severely. These are from station 73+50 to 75+00 and from station 79+50 to 83+50. In order for an acceptable ground cover to be established, these areas will have to be graded to a reasonable slope and then seeded or planted.

I. Miscellaneous Improvements

1. Superelevation: The curves located at station 45+00, 77+50, 83+00, and 86+00 have superelevation values up to 14%. The superelevation should be decreased to a maximum of 6%. Repairing the superelevation involves demolishing the existing curve, grading the sub-base to the desired geometry and installing a new, full-depth section of roadway. Another option is to use asphalt paving and raise the lower side of the roadway until the desired superelevation is reached. The shoulder would have to be filled to match the new edge-of-pavement.
2. Vertical Alignment: At station 94+00 there is a vertical crest that creates a dangerously short site distance. To alleviate the "blind spot", the area needs to be cut approximately 4 to 5 feet at the highest point and transitioned into the existing roadway. A new section of full-depth pavement would then be required. An optional fix for the situation is to install "Limited Site Distance" signs and warn drivers of the situation. Another area that the vertical alignments needs altered is from station 35+50 to 38+00. The grade of the road in this area is +/- 21%. In order to decrease this slope, a section of roadway at the base of the hill will need to be demolished, approximately 5 feet of fill placed, and a new section of roadway constructed. This may also involve the grading of an incoming road in order to tie in to the new grade of Boys Camp Road.

