

BRINGING FOREST HEIGHTS INTO THE 21ST CENTURY

A Proposal for computer & Internet Service at the
Forest Heights Municipal Building

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DRAFT



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CONTENTS

Introduction	1
What is the Internet	1
Equipment needed for internet access	1
Local Area Network (LAN) for the Municipal Building	2
Internet Security	3
Forest Heights Website	6

Introduction: The Forest Heights Municipal Building serves multiple purposes including office space for staff, a place for Town meetings and a center for citizens to gather. The building, however, has never been equipped with internet access. Internet access would improve staff productivity for better service to the community, enhance communications between the Town and citizens, provide opportunities for citizens without computers to access the internet.

What is the Internet: The internet is a worldwide link of computers in which the resources of all these computers are generally available to anyone having access to the internet. Access to the internet is obtained through an Internet Service Provider (ISP). There are many ISP's that offer a variety of services and prices.

Equipment needed for internet access: The simplest internet access is over a local telephone link to a nearby ISP access point. The computer uses a modem to convert the digital signals of the computer to analog transmission over the telephone line. When the analog signals reach the ISP's server, they are converted back to digital signals for transmission over the internet.

Currently, the telephone lines leading into the Clerk's office and the Mayor's office are on an internal digital telephone system are unsuitable for connections to the modems in the computers in those offices. The digital phone system was installed by the Police Department and ensures privacy on extension lines. To provide internet access to these computers via a telephone line will require installing an extension line from the telephone line entrance near the maintenance room door to the computers. The Police Office has a stand-alone computer with a modem and is able to access the internet over a separate analog telephone line.

Modem connections over an analog telephone line are relatively slow, the fastest connection possible is 56,000 bits per second, or 56K baud. The modem in the Mayor's office is 28K baud and the modem in the Clerk's office is 14K baud. These modem speeds are suitable for basic web browsing and sending and receiving e-mail. However, higher modem speeds are desirable when downloading or uploading files from and to other computers on the internet.

Many other technologies are available for higher speed connections to the internet. The two that would be suitable for the Municipal Building in the near future are Digital Subscriber Line (DSL) and Cable Internet. DSL connections are provided by superimposing a digital signal over the analog signal of a normal telephone line. The DSL modem filters out the analog signal so that there is a direct digital connection between the computer and the internet server.

Connection speeds are typically at least four times to over a hundred times faster than a 56K baud analog modem. Providers of DSL connections typically charge higher rates as a function of the connection speed requested by the customer.

A variation of DSL is Asynchronous DSL or ADSL. This variation lowers to the customer by splitting the bandwidth such that download speeds are faster than upload speeds. This feature is an advantage for most customers because the typical residential and commercial user of internet services downloads much greater amounts of data than is uploaded to the server. Consequently the use of bandwidth is more efficient and cost effective.

Cable internet connections are signals that are transmitted over cable television cables. Speeds are typically higher than DSL connections, although the bandwidth is shared by other customers on the cable system. A user may experience differences in connection speeds depending on time of day as other users log onto the system. The slowest times are usually in the evening as residential users arrive home from work. Office use of cable internet connection at the Municipal Building would likely be using the service during times when speeds are fastest.

Both DSL and Cable Internet connections require specialized modems and a network device in or attached to the computer. Rather than attaching a separate DSL or Cable modem to each computer when several computers at the same location require access to the internet, it is usually more economical to connect the computers together in a local network or LAN. In this configuration only one of the computers has direct access to the internet, and the other computers access the internet through the single computer with that connection. Computers with Windows 98 and later versions have the capability for this type of internet access. (See also discussions on installing a LAN in the Municipal Building.)

Local Area Network (LAN) for the Municipal Building: As the Town of Forest Heights adds additional computers to the Municipal Building equipment inventory, connecting these computers in a LAN should be considered. The benefits of a LAN include increased productivity in the preparation of correspondence, documents and data bases used by the Town and making more efficient use of other peripherals attached to the computers.

To construct a LAN, a network adaptor card must be installed in each computer¹, and then a network cable is used to connect each of the network cards together. There are two different types of cables that are in common use: thin coax using BNC connectors and multi-strand telephone type wire using RJ-45 connectors.

The advantage of the thin coax is that it is simpler and more economical, but it is slower than connecting the LAN using multi-strand cables. The RJ-45 terminated cables require the addition of an ethernet hub. All computers and LAN based peripherals on the LAN plug into the hub, which controls communications among these devices. Hubs typically are designed to handle 4, 6, 8, 16 or 24 connections, but can be stacked to handle multiples of these connections. An eight or sixteen port hub should handle Municipal Building for the foreseeable future.

As noted above, an advantage of a LAN is that more efficient use of peripheral resources can be obtained. Printers are the most common peripheral device, and currently, each computer in the Municipal Building is connected to a single ink-jet printer. An alternative would be to acquire a single laser printer which would have superior output quality and connect it to each of the computers via the LAN. Laser printers typically have a higher acquisition cost than an ink-jet

¹A new technology called Universal Serial Bus (USB) permits connection of an external network adaptor through the USB port on the computer. USB technology requires an upgraded version of Windows 95 or later Windows operating system.

printer, but are faster and their long run operating cost can be lower, given the high cost of replacement ink cartridges.²

Another computer peripheral device which is currently not available at the Municipal Building is a scanner. These devices convert hard copy to digital images which can be stored in the computer. Digital storage of these images can greatly reduce the amount of paper needed to be files in the Clerk's office and facilitate retrieval of the archived documents when needed for decision making and public information purposes. The images can be printed on the computer's printer, rather than making Xerox copies.

An issue that needs to be addressed in the development of a Municipal Building LAN is whether the computer(s) in the Police Department should be connected to it. Security of police matters is vital and deference should be given to the Police Department in securing its computers. There are however, some options which could be exercised that may allow limited use of the LAN by the Police Department without compromising security. For example, before a computer that is physically connected to the LAN by cables can access other LAN resources, file and printer sharing must be activated in its Windows operating system. If only printer sharing is activated, the computer will be able print on a LAN printer, but others can not access files on that computers. Additional steps can be taken to password protect files and folders on the secure computer and install firewalls. (See also the discussion on internet security).

Internet Security: One of the unfortunate developments associated with computers and the internet is the proliferation of computer viruses³ that can damage data stored on the computer and otherwise disrupt its use. The fact that businesses and individuals continue to invest and depend on computers and the internet despite these invasions is testament to the importance of these systems to modern commerce and government functions.

This paper will address several aspects of computer and internet security associated with virus and other electronic attacks on computers and provide options for dealing with them.

Computer viruses, written by errant programmers have been around long before the internet became operational. Consequently, reputable companies have responded by developing "anti-virus" software. This software can be run in the background on Windows computers and provide continuous checking of files being used, including those on floppy disks, for viruses or virus-like activity. When a virus is detected, the software will stop the computer from further processing activity and ask the user what he or she would like to do about eliminating the virus. The anti-virus software can also be set to do periodic sweeps of all files on the computer's hard drive to ensure that viruses are not present.

²Another printer technologies include daisy wheel and dot matrix printers, but those technologies are considered obsolete and are rarely found today in office settings. The printers are noisy and may require noise suppressing boxes to meet environmental standards.

³The term "viruses" is used here to describe a number of different attacks on computers that are not all technically defined as viruses. These include e-mail "worms," Trojan Horses and denial of service attacks on internet servers.

An important task in maintaining a virus-free computer is to periodically (about every two weeks) update the virus “signatures” used by the software to detect viruses. These signatures are available from the software manufacturer. Manufacturers differ with respect to policies on providing signature updates, but generally they will provide free updates for about a year after their software is installed, and provide updates after that period at a nominal charge. Because unscrupulous computer programmers continue to write new damaging viruses it is vital to maintain the signature updates.

The most practical way to obtain the latest virus signatures is by downloading them over the internet. It must be kept in mind that viruses can enter the computer by means other than the internet—they can be found on floppy disks or CD’s, including program software that is installed on a computer. The only way to be sure that the computer is protected from viruses is to install anti-virus software and keep the signatures updated.⁴

Another common threat to computers is hackers coming in over the internet or LAN. The target of these attacks is usually to copy confidential files or obtain other information that they would not otherwise have access or rights to the information. Hackers can also use their illegal entry into a computer to destroy or corrupt data on the computer. These attacks differ from a virus attack because they are manual intrusions rather than automated attacks triggered by hidden code.

There are several countermeasures available to deal with computer hackers. The first is not to connect the computer to a LAN or the internet, or if it is connected, to limit the connection for brief periods so that hackers would not have time to electronically enter the computer and do any damage or steal data. Not connecting to the internet at all would be extreme, for example, because a computer’s anti-virus signatures could not be easily updated. Connecting briefly over an internet connection that uses a dynamically assigned IP address would reduce the possibility of a hacker getting in to under one in a million.

Hackers can also be stopped by use of software and hardware “firewalls” which insulate the computer from outside attacks. While not perfect, these firewalls make it difficult for an outside intruder to penetrate the computer, and they also watch for illegitimate software code inside the computer that attempts to access other computers on the internet. These codes are called Trojan Horses, because after being slipped into the computer, they then try to open the computer for an attack from the outside.

Finally, steps need to be taken with computers that have access to the internet that are used by children. To some extent, software and choice of ISP can provide protection that children will not obtain material legally limited to adults, and that children are not subject to e-mail solicitations and chat rooms that are inappropriate for their age.

⁴The author had the experience of receiving a copy of a directive signed by President Clinton that was contained in a floppy disk file. The floppy disk was provided by a member of the White House staff. Upon inserting the floppy disk in a protected computer, the anti-virus software immediately detected a boot sector virus. The White House was notified and the virus was subsequently removed by the software.

America On Line, for example, has age graduated filters that can be used to restrict children's access to adult-oriented websites and restrict content and attachments for e-mail sent and received by children. It is important to keep in mind however, that children are quick learner's of computers and the internet and that some adult supervision of their use of computers is advisable.

Despite potential hazards to children on the internet, the internet can be an important supplement to a child's learning experience. The risks and benefits should be carefully weighed by adults controlling their use of technology.

Forest Heights Website: Creation and maintenance of web sites has been a major tool by which government agencies can communicate and provide information to the citizens that they serve. In Prince George's County, the municipalities of _____ have set up web sites and provide information for citizens and others wishing to do business in their community. In addition to information about the municipal government, a website can provide links to other websites of interest to the community. For example, a municipal website can provide links to churches, shopping, recreation, tourist attractions, restaurants, accommodations and other nearby attractions of interest to the community. It also can provide links to other levels of the government, including Federal, State and county websites.

Information on a Town of Forest Heights website could include notices of meetings and other news items usually published in the Town Newsletter, Town documents such as the Town Charter and ordinances, recreation activities, information on trash pickup and other Town services, and contact information for the Mayor, Town Council and Town Manager.

A website could be maintained on a Town computer, but a more efficient manner would be to use an ISP or other commercial website service to set up the website. The website could be updated periodically from the Municipal Building over the internet. The staff person designated to make the updates is called the webmaster. The cost of maintaining a website should be economical and less costly than publishing the monthly newsletter. In fact much of the contents prepared for the Forest Heights News would already be in electronic form and easily uploaded to the website.

Forest Heights Internet Café: An opportunity exists for expanding internet services at the Municipal Building to provide additional services for citizens of Forest Heights. The model for this service is the internet service provided by the Oxon Hill Library and other libraries in the county and around the country. Under this model, the Town would set up one or more cubicles, (perhaps in Room 2) in which computers connected to the internet would be installed. These computers would be made available to citizens who would like to access the internet or otherwise have a need to use a computer. The computer would be attached to a printer so that users could print reports. Also, the computers would have a floppy disk drive so that users could download files and take them home with them. An additional peripheral would be a CD-R or

CD-RW drive. These drives are capable of writing on CD's (approximately 600MB⁵), which overcomes the 1.4MB limitation of 3 ½ inch floppy drives.

Write-once CD's (CD-R) can be purchased in bulk for under \$0.50 per disk and CD's that can be written and erased multiple times are in the \$1.00 to \$2.00 per disk price range. Installing a writable CD drive on any one of a networked set of computers means that all computers can access the drive and take advantage of the devices large storage capacity. For example, in addition to using a scanner to electronically archive documents to hard drive in the Clerk's office, copying these document files to a CD means that an entire file cabinet can be reduced to a few CD's that can be stored for safety keeping in the Town vault or moved offsite to a safe place. In case of a fire that otherwise destroys the Town's records, these records could easily be restored and recreated from the images or OCR⁶ files stored on the CD's.

Partnering

Sources

Contract for Tech support

Mentoring and volunteer teachers for adults and children

⁵MB stands for megabyte or 1 million bytes of data. A byte is equivalent to one character of data, e.g., a letter of the alphabet. Bytes are composed of 8 binary units, either 0's or 1's. Another unit that has become common is the GB or gigabyte. A GB is equivalent to 1,000 MB or 1 billion bytes of data. Modern PC computer hard drives are commonly sold with 2GB to 50GB capacities, although larger drives are available.

⁶OCR stands for Optical Character Recognition. It is a software technology that automatically converts text contained in graphic images to character-based files. In addition to greatly reducing the size of the files, character based files can be copied, pasted and edited when creating new documents, thereby improving productivity. Character-based files can also be searched for key-words when trying to locate files containing information on specific subjects.