School District No. 63 (Saanich)

Saanich Schools

BRIEFING NOTE

Great Places to Learn & Safe Places to Be

To: Board of Education

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Superintendent of Schools

Subject: **Wireless Networks (Wi-Fi)**

Date: December 14, 2010

This briefing note is provided as support for the board's consideration of draft changes to Policy 3130 – Use of Technology and Information Systems, specifically guiding principle 12 as it relates to installation of Wi-Fi systems in schools.

1) What is Wi-Fi?

Wireless Fidelity (Wi-Fi), is a means of wireless network communication that provides an alternative to wired local area networks. With Wi-Fi, signals are fed over high speed lines through modems to wireless access points which relay radio frequency (RF) signals to and from nearby computers. The devices located at those wireless access points are either consumer-available routers as can be found in most homes, or commercial grade routers that are found in larger businesses, colleges or schools. These commercial systems are managed by network administrators.

Any stationary or laptop computer in range of the access point and with a wireless network card can view the router and with the password or network key for that router can access the internet. Wi-Fi has a truly ubiquitous presence in our lives. In fact, from almost any location one can see one or two wireless routers, or perhaps dozens.

2) Why Wi-Fi in our Schools?

Access to the internet has become a staple of education for access to on-line resources, communications via email and social media, creation and use of websites, full audio and video communications for meetings or classes, access to web-based applications and storage, and much more. Students of all ages can benefit to some extent from access to the internet, and as students move through the grades into middle and secondary school, access to the internet is a necessity for learning.

Given the widely varied locations and types of access that students need to the internet, wired access through a local area network (LAN) can often be difficult or even impossible.

Students and staff, particularly at the secondary level, need access literally all over a school and a wired infrastructure that allows for this increasingly routine school-wide demand is prohibitive both logistically and from a cost point of view. This notion, combined with the fact that students and staff are now carrying laptops of minute size and immense capacity, points to the need for wireless access to the internet, a cheap and viable alternative to LANs.

It should also be noted that wireless access to the internet is of increasing importance for personalized learning, special education and aboriginal education. These three areas, and others, rely on students being able to access online resources in ways and at times that benefit their learning, often on laptops which need access at various places within the classroom. It is not desirable to have these students attached to outside walls to obtain their internet access rather than being part of the class.

One of the central questions in regard to Wi-Fi is the extent to which it is needed at each level (elementary, middle and secondary). It is clear that there is significant need at neighbourhood secondary schools, ILC and SIDES, as evidenced by the fact that the schools have installed ad hoc networks to provide for pervasive wireless coverage. As will be noted in section 5, we have made plans to replace the ad hoc networks with commercial, managed Wi-Fi systems. We are also convinced that there is some degree of need at the elementary and middle levels in order to support laptop access to the internet, but it will be important to discuss the type and location of need at both levels.

It should be noted that in the District Technology Plan 2009-11 adopted by the board in 2008 there is only passing reference to Wi-Fi as part of Section 1.6 – Other Initiatives: *As the network will enable efficiencies it will also enable other technologies such as video conferencing, voice over IP, IP video, computer to computer instruction via laptops, enhanced wireless networking and the centralization of many curricular and operational resources.*

3) Expressions of Concern

Over the past few years, including in Saanich over the past few months, people have been expressing concerns about the safety of Wi-Fi in schools. These concerns appear to be grounded in legitimate concerns for the health of our children, with concerns about Wi-Fi safety have been the subject of a number of media stories. Most have focused on personal anecdotes and to a lesser extent scientific research, with many of the concerns about wireless networks are based on parent reports of what they perceive to be adverse health effects of Wi-Fi on their children. Interestingly, the case against Wi-Fi is frequently not accompanied by a call for curtailment of the use of other RF transmission devices such as cell phones, cordless phones, televisions, microwaves ovens and FM radios, even though those have stronger RF outputs. That said, the concerns do provide an important counterpoint to the assumption that Wi-Fi is harmless and therefore should be installed in schools.

4) The Scientific Research

For this briefing note we have reviewed and taken extracts from a number of research summaries from prominent and reliable sources. Many of the findings are generated from meta-analyses of hundreds of other peer reviewed and published studies:

i) Provincial Health Officer Dr. Perry Kendall: *There is no conclusive evidence of adverse effects on health at exposure levels below the current Canadian guidelines (with Wi-Fi being far below) and there is no reason why schools and other facilities should not use Wi-Fi equipment. If despite the lack of evidence of any adverse health effects and the fact that Wi-Fi exposure constitutes only a small fraction of total RF exposure school boards will wish to consider measures for reducing exposure, inexpensive (unproven) measures may include: limiting Wi-Fi use to certain times or locations; turning off Wi-Fi when not in use, disconnecting Wi-Fi in rooms that do not use computers, and ensuring user manuals are read and recommendations are followed.*

ii) World Health Organization: *There is no scientific evidence that the weak RF signals from base stations and wireless network devices cause adverse health effects. Research is still being promoted by WHO to determine whether there are any health consequences from the higher RF exposure from mobile phones.*

iii) Health Canada: *Based on scientific evidence, Health Canada has determined that exposure to low-level radiofrequency, such as that from Wi-Fi equipment, is not dangerous to the public. RF energy levels are required to meet Health Canada's safety guidelines (Safety Code 6). The limits specified in the guidelines are based on an ongoing review of thousands of published peer reviewed scientific studies. Levels of RF energy emitted from Wi-Fi equipment are typically well below these safety limits. As long as exposure is below these established limits, there is no convincing scientific evidence that this equipment is dangerous to school children.*

iv) Ontario Agency for Health Protection and Promotion: *Wi-Fi exposure is not only well within the documented limits, but are only a small fraction (less than 1%) of what is received during typical use of cellphones. For this reason, much of the research on possible effects of RF energy has been focused on exposures from cellphones rather than the lower exposure associated with RF uses such as Wi-Fi. RF exposures to the public, including school children, from Wi-Fi are far lower than occur with cellphone use and to date there is no plausible evidence that would indicate current public exposure to Wi-Fi are causing adverse health effects. (Various subjective symptoms were suggested to be triggered by exposure to RF fields, however the limited number of studies conducted to date found no evidence of association).*

v) IT Director Gregg Ferrie: *There is no scientific evidence that low power wireless communications devices pose any health risk. Standards have been widely adopted and products must comply in ways that provide for substantial margins of safety*

including of children. There is no doubt that ubiquitous access provides a depth of freedom for students and staff. To date, wireless networks have been deployed on an ad hoc basis. It would be expedient to create a district wireless implementation plan which would conform to PLNet policies and ensure that any potential safety and security risks are minimized.

vi) Radiation Protection Services, BC Centre for Disease Control: *I have made Wi-Fi measurements at a school using recently calibrated equipment. During the first few measurements the wireless signals were too low for the minimum measurement of the instrument, so the instrument was replaced by a more sensitive one. Power densities were at the lowest end of my measurement equipment. The length of time of the fields was very short and the transmissions had long off times. Computers transmit their information very quickly; the Wi-Fi aces point and a laptop client card do not continuously communicate. I would conclude that all of the levels are very low. Even if I assumed a worst possible case in which the highest power density level was continuous for a six minute period, and I compare that to Safety Code 6, the exposure was still 50 times below the allowable exposure level for members of the general public*. (Randy Moss, Head, Non-Ionizing Radiation and Non-Medical X-Ray Program, Radiation Protection Services, BC Centre for Disease Control)

vii) Building Biologist Katharina Gustavs: Ms. Gustavs wrote a final paper for her Environmental and Occupational Health Certificate Program at UVic (2008) that said in part the following. *This paper starts out with the background levels of non-ionizing radiation in nature, documents what actual exposure levels across various frequency bands are found in offices today, and looks at technically achievable options of how to minimize emissions levels of common office equipment (p. 8). As ambient levels of EMF and RF radiation continue to increase, the number of persons who attribute their health symptoms to low-level EMF and RF radiation exposure in the workplace or at home is also on the rise (p. 10). It is very difficult to measure the health impact from an office environment and establish causal links between individual environmental factors, such as EMF/RF levels, IAQ, illumination, thermal comfort, and noise (p. 12). It would seem prudent to err on the side of caution as long as long-term negative consequences from ubiquitous low-level electromagnetic exposure cannot be ruled out. This is especially relevant in places where we spend considerable amounts of time, such as computer workstations (p. 15). Health Canada has issued exposure limits for radiofrequency electromagnetic fields since 1991 . . . that protect from acute, short-term effects only (p. 18).*

It is important to note that item vii, the report from Ms. Gustavs, provides a counterpoint to the research reports and summaries that precede it. The work of Ms. Gustavs has been brought to our attention by members of the District Green team and is a welcome addition to our knowledge base in regard to Wi-Fi.

It is also worth noting that the World Health Organization suggested the following: *Some people perceive risks from RF exposure as likely and even possibly severe. Several reasons for public fear include media announcements of new and unconfirmed scientific studies,*

leading to uncertainty and a perception of unknown hazards. Other factors include a feeling of lack of control or input to the process of determining the location of new base stations. Experience shows that effective communication and involvement of stakeholders at appropriate stages of the decision process before installing RF sources can enhance confidence and acceptability.

5) Status of Wi-Fi in Saanich

Ad hoc wireless installations have been in place in Saanich schools for a number of years, and all are have been analyzed for provision of managed wireless systems.

- Claremont has twelve access points for 75% coverage
- Parkland has twelve access points for 100% coverage
- Stelly's has three access points for 25% coverage
- Royal Oak has two access points for 20% coverage
- Bayside has no access points
- North Saanich has two access points with limited coverage
- Brentwood has one access point that may or may not be active
- Lochside has one access point that may oar may not be active

After discussions with administrators and technology lead teachers about wiring upgrades it has become apparent to our IT department that we must make provisions for wireless access points in all of our schools, although the extent of coverage is yet to be determined for middle and elementary schools. We have had Navigata map schools for maximum coverage with the minimum number of access points. For example, we can reduce the RF radiation at Claremont by 50% by installing six routers in place of the twelve that have been installed by the school. We are preparing to install commercial systems in the secondary schools in the spring of 2011. Bayside and the board office and physical plant can also be done on the same timeframe.

6) Locus of Discussions and Decisions

a) Green Team: The district green team has been formed to "encourage all district employees to act as environmental stewards, actively seek and recommend environmentally sensitive procedures, equipment and materials," and support the work of school based sustainability committees. One of the concerns raised within this team has been the issue of radio frequency transmissions, with a number of team members being particularly concerned about the RF transmissions associated with Wi-Fi. We have discussed these concerns within executive and believe that this matter is best addressed in one venue and have determined that this is a health and safety issue. We have therefore requested that the Green Team direct any information that they may have over to the District Health and Safety Committee.

b) District Health and Safety Committee: After a brief lapse we have re-instituted the District Health and Safety Committee with representation from schools, the district, the STA and CUPE 441. This committee, chaired by our Health and Safety Officer Kathryn

Farr, will review the research and consider other perspectives or concerns brought forward, including from the Green Team, and prepare recommendations for Executive to bring to the Board in early 2011, both directly and through the Policy Committee.

c) Board of Education and Senior Staff: The Executive, supported by Gregg Ferrie and with full information coming from the Health and Safety Committee, and as appropriate the Green Team, will coordinate the processes, communication and decision flow as it relates to Wi-Fi. I will play an active role in that as superintendent. As trustees will see, draft changes to Policy 3130 include the following language in Guiding Principle 12:

> *Wireless access is viewed by the board as being an essential element for access to teaching, learning and assistive electronic resources as described in the district technology plan. Wireless computer access will be meet the safety standards established by Health Canada and the World Health Organization, with those standards reviewed from time to time by the District Health and Safety Committee. Commercial-grade managed wireless access points will be provided in adult work spaces including the school board office, physical plant, education centre, school staff rooms and staff work areas, and in student environments according to the following:*
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> - *Secondary schools including the Individual Learning Centre and SIDES: 100%*
> - *Middle and Elementary schools: Libraries and 50% school-wide coverage (or more as determined by the school)*

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