Two Northfax West Technical Analyses Provided by an Informed Expert

Dear Mayor, City Council, and Staff: July 10, 2020

I was surprised to learn in April about the NorthFax West development project from other County employees who were asked to provide comments regarding this project. Known to my colleagues as a long-time City resident, I dove in. Since then, I was asked by the Chair of the City's Environmental Sustainability Committee (ESC), the Audubon Naturalist Society (ANS), and Friends of Accotink Creek to assist with providing my professional expertise regarding technical issues related to stormwater, biological monitoring and analyses, stream restoration and mitigation. As such, I was asked to participate on a May 27, 2020 call with the Chair of the ESC, a developer and environmental consultant for the applicant. However, after being forwarded a copy of the June 2020 Multi-Parameter Stream Quality Assessment I wanted to bring your (and City Staff's) attention to inconsistencies with that report.

Here are the big takeaways:

- **Compared to County streams 2004-2018 (based upon the applicant's criteria - FBI) the A1 stream would rate in the 89th percentile (*TOP 11%*) of all streams sampled during that period within the County**
- **There is NO evidence presented in the report that A1 section is a "poor quality" stream segment, and certainly not a dead stream as the applicant has implied.**
- **There are numerous technical errors and/or omissions, non-normal ways of reporting criteria and or interpretations that do not follow sound ecological principles and give those with ecological expertise cause for concern.**

1) Macroinvertebrate sampling methods were NOT conducted using Fairfax County SWPD Standard Operating Protocols (as claimed).
    a. We use a 500 micron mesh "D" frame net, but the methodology for benthic collection is very different
    b. Their collection methodology was "riffle-only" – this could affect the lack of some common urban-tolerant predators (different methodology)
    c. The lab methodology is both similar and different - we preserve specimens and ID, but have a random approach to sub-sorting and taxa id (and stop at a certain # of organisms); while they identified …everything? It does not say but I'd assume so.
2) The summary table of water quality has misleading/erroneous analyses
    a. The conductivity is typically reported in microsiemens, not millisiemens, once converted the data seem typical; it's preferable to report Specific Conductance, which is standardizes fluctuations from temperature (shows a lack of reporting/understanding these types of data)
    b. Their analysis on Dissolved Oxygen (DO) omitted key information and is very misleading.
        i. DO is a function of temperature AND pressure. We calibrate our meters to the current air pressure present on a given day.
        ii. They referenced "optimal" DO as 9.45 to 9.65mg/L in their report was taken from an EPA table stating the maximum possible DO by temp. EPA's report did not suggest a "should be" or "optimal" value for flowing

steams. In fact, in any functioning biological system the expectation would be a lower (sometimes much) lower value.

iii. Further the EPA report indicates DO varies based upon size and depth of streams (which is very significant with such a small stream)

iv. DO changes based upon where one takes the measurement in a stream (riffles have higher DO than pools) – The EPA report acknowledges this as well.

v. DO changes throughout the day because of temp and photosynthetic activity

vi. Once again, this report shows a lack of attention to detail, lack of understanding or willingness to fully acknowledge ecological principles

3) Benthic Macro Results
   a. The report led with the HBI (an outdated measure of organic pollution/organic waste from agriculture/humans); As we transformed the landscape (1950s-present) from agriculture to resident using modern wastewater conveyance systems the HBI/FBI has becomes less important (but is really easy to calculate).
   b. The "good" segment of stream (A1) on the site has an FBI of 5.56 according to the Apex June 2020 report.
      i. All of Fairfax County's probabilistic monitoring program 524 sites (2004-2018) have an average FBI of 6.70 (ranging from a 2.9-10.0, lower scores being better). These sites (~40 sites/yr) are stratified by stream size and randomly selected each year to give an annual snapshot of the steam quality.
      ii. The Fairfax County reference streams for the same period had an average FBI of 4.18 (129 sampling events). These are all on Federal, protected land with minimal human impact (< 2% of the watershed land areas are covered by impervious surfaces & no agricultural impacts).
      iii. The segment proposed to be buried is 1.14 points BETTER than the average Fairfax County stream. That is quite a lot, in fact it puts it in the 89th percentile (Top 11%) for Fairfax County streams, for the FBI.
   c. Table 3. Has or suggests inaccuracies
      i. The two different FBI scores for two genera in the same family (should be same FBI score)
      ii. Identifying ONLY g. Hydropsyche and ONLY g. Chironomus in these families seems unusual in urban streams.
      iii. No information was given related to the methodology for the identification of the f. Chronomidae (requires head capsule prep/id), why most sampling programs stop at family level
      iv. The large number of organisms identified as Chironomus, is the driver of the low HBI score. Any misidentification on this one organism is driving the bulk of the score.
   d. The presence of Prosimulium, Serratella, and Neophylax (and to a lesser extent Baetis), suggest a better-than-average stream (Yes, the County's ~20 years of data indicate the presence of black fly Prosimulium helps us differentiate higher quality streams)
4) Aquatic vertebrate results

a. Their analysis has faulty assumptions on what it "should" be
    i. Fish diversity is highly correlated to drainage area, larger area = more fish species
    ii. Fairfax County does NOT conduct regular fish surveys on drainage areas of less than 300 acres (for this very reason)
    iii. Finding only blacknose dace in such a small drainage are stream (~150 acres) would be our *a priori* assumption
    iv. A 1975 report baseline report on the Accotink Watershed (by Parson, Brinkerhoff, Quade & Douglas) indicated that aquatic vertebrate sampling between Rts. 123 and Rt 50 (downstream, with a much larger drainage area) – ONLY had blacknose dace (moderate abundance), pumpkinseed sunfish (low abundance), and salamanders (high abundance).
    v. This, once again, shows a lack of understanding related to aquatic ecology or a deliberate attempt to conflate numerous issues.

5) Stressors – they missed a huge one. Chloride (from roadway salt), for which Accotink Creek now has a TMDL. It's unclear how they missed this issue, but the development intends to convert the landscape to more impervious surfaces needing winter de-icing treatments.

6) Geomorphology - I strongly disagree their embeddedness rating and wonder about the estimate of bankfull (height) and BEHI.

a. In Fairfax County we see embeddedness values that high very infrequently in small streams, and do not assess embeddedness in "runs". Immediately upstream of Orchard embeddedness was not 75%+, likely much less.
b. Bankfull is reported as a numeric value (yes), but typically reported as a standardized depth (not "height") and usually adjusted by stream width. Further, regional curve and other data required for stream comparisons requires this "height" to be standardized (Bankfull Area, Avg Width or Avg Depth at Bankfull standardized to drainage area). This highly unusual way of reporting these data in technical reports, leads me to believe they do not do this often.
c. The BEHI scores referenced, but not presented seemed off from previous studies and from what you can see downstream of Orchard Street.
d. All of these require property access for more detailed analysis.

Some may think I am being too critical, but I am really worried about the City Council basing any large environmental decisions on this stream assessment and subsequent report.

Mayor & City Council: July 10, 2020

I have made significant changes to a previous version of this email after additional research on the current rate(s) for phosphorus reductions and NOTB long-term requirements.

The Northfax West applicant proposes to conduct a restoration on over 2000 linear feet of stream in Van Dyck Park as a "commitment." The applicant proposes to restore the stream and create a Nutrient Offset Trading Bank, (NOTB) thereby using a City Park for a PRIVATE, PROFIT-MAKING VENTURE. This one component of the development plan, warrants the rejection of this plan of development. A NOTB is a type of mitigation bank to help future developments in the Accotink (or

neighboring) watersheds purchase nutrient reductions for site developments, in lieu of making the necessary changes to the development(s) to account for the required reductions. NOTBs were designed for wastewater facilities, agricultural BMPs (farmland conversions) and advanced stormwater technologies that reduce nutrients above the required amount. The "bank" can then sell the credits to others who cannot, or choose not to reduce their nutrient export. NOTBs are approved and administered by the VA-DEQ, which oversees the nitrogen and phosphorus removal (not sediment).

Approval of a development that includes this commitment as part of the plan of development would be fiscally irresponsible and short-sighted for the City, but **alone worth denying the NorthFax West proposal.**

1) Giving up rights to part of Van Dyck Park (and possibly portions of adjacent homeowners' lots) IN PERPETUITY: To create an NOTB the City would grant access and easement (use and maintenance of the Van Dyck stream restoration and buffer) forever. NOTBs sell off the nutrient credit in 1 time payments (for developers) then must maintain the nutrient reduction in perpetuity. DEQ acknowledges stream restorations are not typically used in this way (only 2-3 in the state), Essentially, this is a privatization of the City's stream network AND a financial benefit to the NOTB/applicant. The City would get no compensation from the stream restoration, except for the physical alteration of the stream. But would give up rights/control of a City Park forever.

2) Applicant's IRR: Stream restoration is BY FAR the most economical way to achieve phosphorus reductions. The applicant is clearly NOT including the earnings from the Van Dyck NOTB in their IRR calculation for the NorthFax West site. NOTBs are market driven entities, and typically have a very high return on investment (ROI) - particularly when the Bank/Banker is granted property access and doesn't need to purchase the land or a long-term conservation easement. This needs to be considered a profit-making activity by the applicant and should factor into the IRR. Please note the following estimates are based upon general design criteria for Fairfax County stream projects and the market rate for Phosphorus credits in the Virginia Nutrient Bank service area (Shenandoah Valley). Since land value is significantly more in urban areas this is likely a gross underestimate of potential profits.

- A planning-level estimate Fairfax County uses is 1 pound of Phosphorus reduced for every $5000 of stream restoration.
- If the Van Dyck restoration costs $2,000,000 they could reduce Phosphorus (alone) by ~400lbs.
- The going rate for the purchase of 1 pound of Phosphorus from the Virginia Nutrient Bank (Shenandoah Valley) is: $25,000-$35,000 per POUND.
- **A conservative estimate is: 400lbsP X $25,000/P = $10 Million minus $2million (for stream design/construction) = $8,000,000 profit to the applicant from the use of City parkland in perpetuity.**
- This $8M should be factored into the developer's IRR (since it's part of the commitment for the plan of development)
- This doesn't take into account Nitrogen reductions and their sale

3) City gives up rights to use the stream for regulatory requirements: Fairfax City will also lose the opportunity to use this stream restoration as a Capital Improvement Project for MS4 program goals in support of the Chesapeake Bay TMDL. That means the City will not get to use the nitrogen, phosphorus, and sediment reductions from this stream restoration in support of City goals, mandated by the Commonwealth and the EPA. This site has been identified on the City's watershed management plan for nutrient reduction credits, and while I understand the City is ahead of it's 2020 goals for nitrogen, phosphorus, and sediment. We are still far from achieving our goals. This project (with an NOTB or stream bank) would remove this stream segment from ever being used for the City's benefit to meet the Bay TMDL. Additionally, new guidance is being implemented on how to calculate, monitor and report Ches Bay TMDL nutrient reductions. This WILL alter City needs to restore streams or implement other nutrient reducing measures moving forward.

If anything the Van Dyck Park restoration should be required as part of the City's MS4 goals, provided wholly by the developer with oversight from City staff. That way the City gets the financial benefit from the restoration.

In short, allowing the plan and commitments to move forward as proposed is fiscally irresponsible and incredibly short-sighted. **Don't be the City Council that "gave away Van Dyck Park" for a private, profit-making, endeavor!**

A small sample of my qualifications: Currently an Ecologist for Fairfax County's, Stream Monitoring Section, Watershed Assessment Branch, Stormwater Planning Division. My team oversees the physical, chemical, and biological monitoring of Fairfax County streams in support of the County's MS4 permit, among other items. Additionally, we participate in the review and assessment of stream restoration and stormwater infrastructure projects County-wide, and have presented monitoring results at numerous regional, national, and international conferences. Prior to this I was employed as an environmental consultant in which I conducted stream/wetland/RPA delineations, perennial flow determinations, habitat assessment, permitting, designed and implemented stream restorations, and helped create a wetland/stream mitigation bank.