

# KILMARNOCK TECHNOLOGY CENTER

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KILMARNOCK, VIRGINIA

## PRELIMINARY ENGINEERING REPORT

APRIL 13, 2015

PREPARED BY:



**TIMMONS GROUP**

YOUR VISION ACHIEVED THROUGH OURS.

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## Introduction

The Town of Kilmarnock, Virginia seeks to expand its existing technology park to provide opportunities for new businesses to grow and prosper while providing employment and business opportunities for the citizens of the Town. To begin the process of the park's expansion, the Town provided an opportunity for stakeholders and Town staff to discuss the needs and goals of the expansion in an open public forum. Timmons Group was then tasked with exploring potential layouts for the park expansion on the Town owned property, including providing conceptual bubble diagrams for an active prospect that would require a 25 acre site. Following that task, Timmons Group was tasked with performing preliminary design for 2 potential layouts for the site as well as preliminary engineering calculations and cost opinions in accordance with the contract between the Town and Timmons Group executed on January 12, 2015.

## Public Meeting

A public meeting was held on January 13, 2015 at the Town of Kilmarnock Council Chambers which was attended by members of Town Council, numerous surrounding property owners, Town and County staff and other interested citizens. After giving a background as to the purpose of the meeting by Marshall Sebra, Tim Davey of Timmons Group led a discussion to find out what ideas, thoughts and input the attendees had to help guide the technology park expansion process in mutually beneficial terms.

Discussion topics included:

- Branding
  - Tourism
  - Commercial hub
  - Economic development
  - Community College/Training
  - Medical/Bon Secours relationship
- Negatives
  - Poor economic cycle
  - Signage
  - Balance curb appeal versus expense
- Internet Availability
  - Necessary to have broadband capability
  - May be years from coming
- Engineering
  - Stormwater – Regional solutions desirable where possible
  - Trails – potential means of connecting the Town and different uses
  - Topography – challenges of steep slopes
  - Water pressure is strong

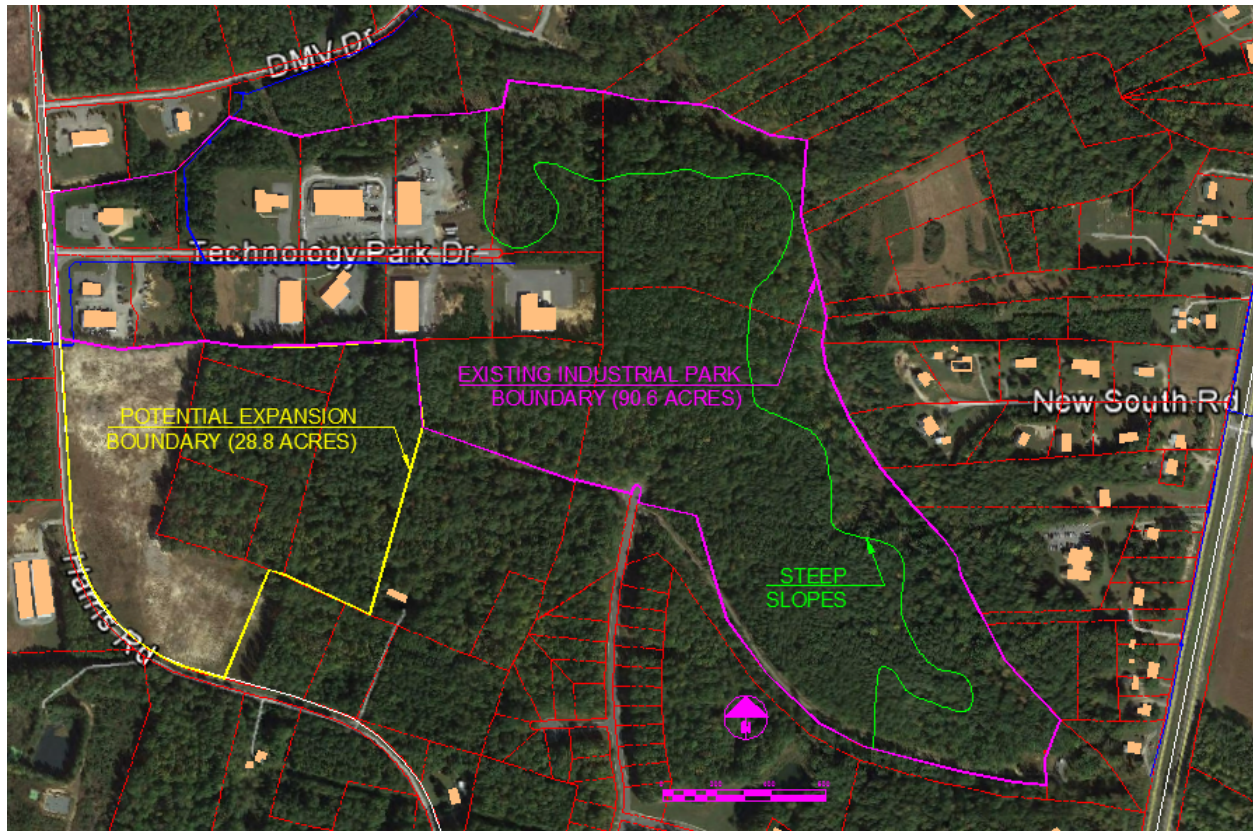
For additional information on the public meeting see the meeting minutes included in **Appendix A**.

## Property Due Diligence

The existing technology park is approximately 90.6 acres subdivided into 11 parcels with road and utility frontage on Technology Park Drive, of which 10 are developed and in use. The remaining parcel is very limited due to existing steep slopes and wetland restrictions. These 11 parcels constitute 36.25 acres, each varying in size somewhat, but generally approximately 2.5 acres each. The park is located approximately 1.5 miles south of downtown Kilmarnock and approximately 4 miles north of the towns of Irvington and White Stone. Photographs of the existing Technology Park development and partial plans of relevant construction documents are included in **Appendix B**.

The land available for expansion of the park that is currently owned by the Town of Kilmarnock consists of 54.3 acres inclusive of approximately 18 acres of steep sloped areas dropping from elevations in the 80s to elevations in the 20s over a length of about 250 feet and wetlands that are generally undevelopable. This land is currently wooded. Wetlands and 100' Resource Protection Area buffer exist on the east side of the site. The buffer is generally aligned with steep slopes which are generally undevelopable. According to the United States Department of Agriculture Natural Resource Conservation Service Web Soil Survey, the majority of the soils in the park expansion area are classified as Kempsville fine sandy loam, gently sloping and Sassafras fine sandy loam, gently sloping. These soils are classified as hydrologic soils type 'A' and 'B' which are well draining soils, which make stormwater management features more effective than poorer draining soils. Geotechnical investigations will be necessary prior to development of roads or sites to determine specific soil types and structural capacities.

Adjacent to the park to the south are five parcels totaling approximately 28.8 acres that may be planned to complement the Town's expansion. One key site includes approximately 1,550 linear feet of frontage on Harris Road. Of this area, approximately 12.5 acres are cleared and the remaining 16.3 acres are wooded. No wetlands appear to existing on these properties according to the U.S. Fish and Wildlife Service National Wetlands Inventory, but that would have to be confirmed with a wetlands delineation study. According to the United States Department of Agriculture Natural Resource Conservation Service Web Soil Survey, the majority of the soils in the park expansion area are classified as Kempsville fine sandy loam, gently sloping and Sassafras fine sandy loam, gently sloping. These soils are classified as hydrologic soils type 'A' and 'B' which are well draining soils, which make stormwater management features more effective than poorer draining soils. Geotechnical investigations will be necessary prior to development of roads or sites to determine specific soil types and structural capacities.

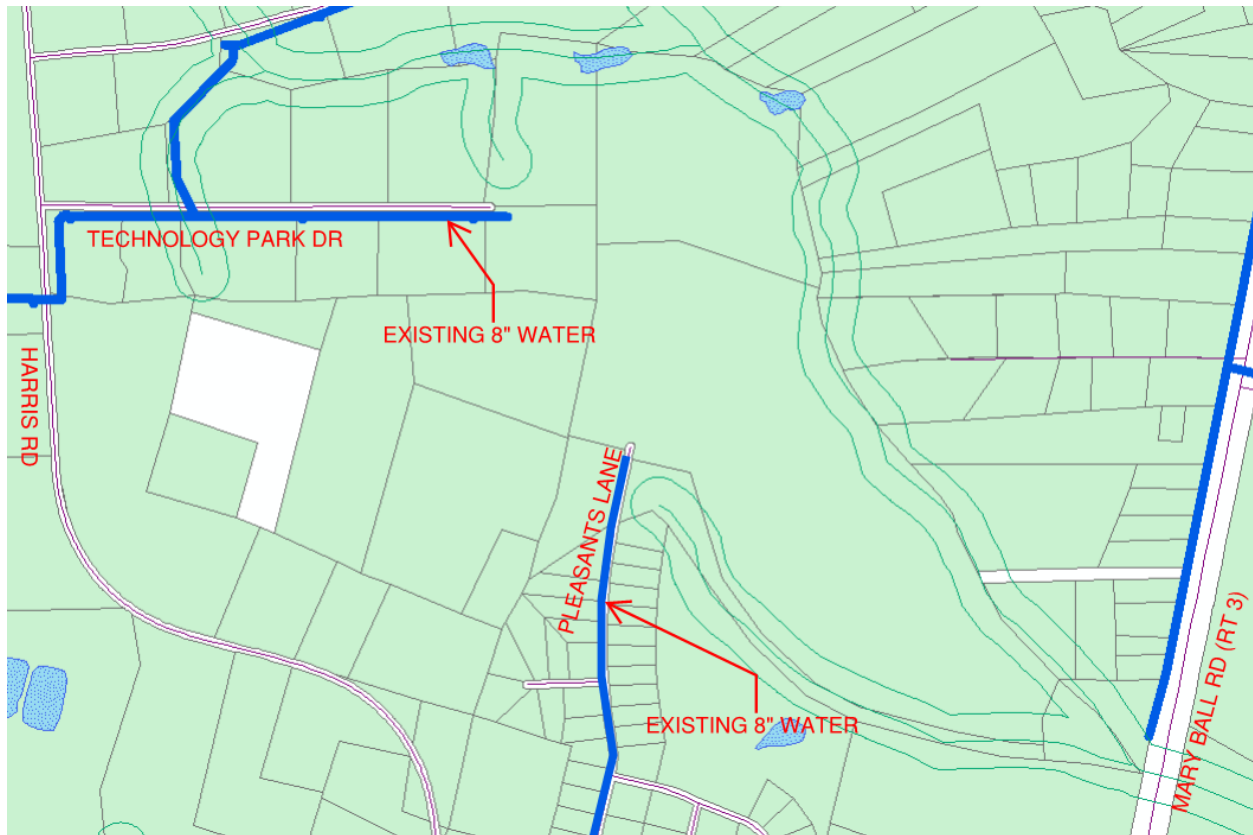


**Figure 1 - Existing Technology Park Layout Park Infrastructure**

The existing technology park is served by the Town of Kilmarnock with water and sanitary sewer.

## Water

An eight inch water main exists on the south side of Technology Park Drive that provides water for domestic and fire protection uses. It is assumed that this line can be extended to serve the expansion of the park while providing adequate flow and pressure. There is also an 8" waterline in Pleasants Lane to the south of the Town owned land. It appears that the right of way necessary to access both of these lines already exists, so no easements will be required to connect to either. Based on conversation with town staff, it is understood that the ultimate goal is to connect the water main in the park with the existing water main in Route 3 for pressure and redundancy benefits. Fire hydrant testing should be performed during the design phase of any future infrastructure to confirm static and residual pressures available to the sites and determine if any additional onsite or offsite upgrades are necessary to the water system. The existing water line locations are shown in the diagram below as a thick, blue line.



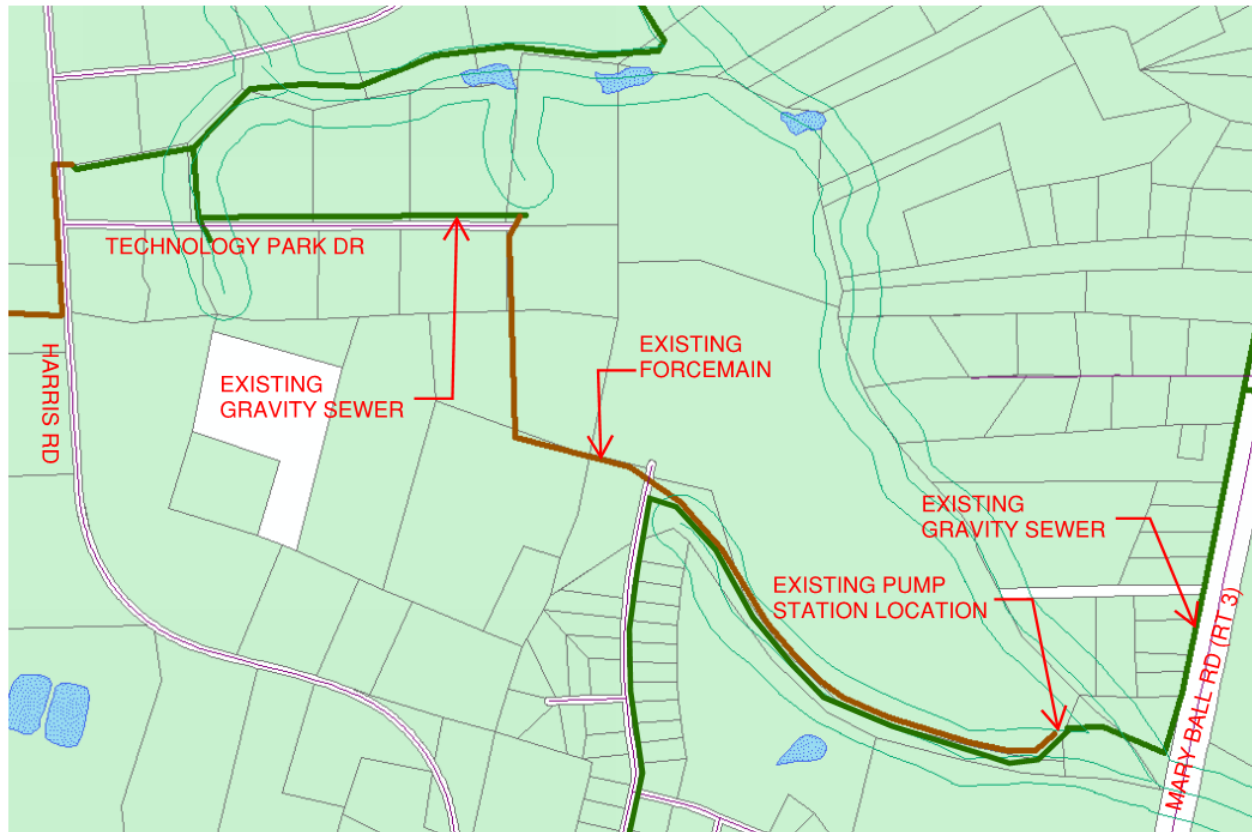
**Figure 2 - Water Infrastructure**

## Sanitary Sewer

Sanitary sewer service is currently provided to the existing technology park through an eight inch gravity sewer pipe system located on the north side of Technology Park Drive. According to the Town's GIS mapping information, this gravity sewer has a minimal depth at the east end of Technology Center Drive that would not allow for an extension of gravity sewer into the expansion of the park in its current configuration. We will verify this during the design of the first phase of the park infrastructure to determine the feasibility of serving any future lots using the current 8" gravity line.

A more feasible solution to servicing the entire park expansion is by discharging sanitary sewer to the existing gravity sewer that follows the access road east of Pleasants Lane along the southern property line of the Town owned site. Based on our conversations with the Town staff, the existing lift station located at the southeast corner of the park near Mary Ball Road has excess capacity. Because the cul-de-sac for Pleasants Lane and the gravity sewer adjacent to the cul-de-sac are located on town property, it does not appear that any additional easement will be necessary to connect to this sewer.

Based on our preliminary conversations, the duplex configuration pumps each have a capacity of 130 gpm with 133 residential units currently in the service area. Not all of these lots are currently built on. The existing planned flow equates to approximately 72 gpm, leaving about 58 gpm for further growth in the service area. Based on this information, it appears that the existing lift station has capacity to serve the first few lots of the park expansion before pump upgrades are required. We will need to confirm this during the design phase of the infrastructure.



**Figure 3 - Sanitary Sewer Infrastructure**

## Stormwater

The existing lots in the technology park drain by means of roadside ditch and driveway culverts. No stormwater detention or other water quality treatment is apparent within the park and many of the current sites appear to have been constructed before recently approved stormwater management guidelines.

Future development must responsibly treat stormwater management quality and quantity. Onsite measures will be employed in accordance with the regulations of the Town of Kilmarnock and the Virginia Stormwater Management Program (VSMP) regulations enforced by the Virginia Department of Environmental Quality. Stormwater design will need to be in compliance with the Virginia Runoff Reduction Method using methodologies approved in the Virginia Stormwater BMP Clearinghouse. The development of the site will employ stormwater management practices that mitigate the post development runoff due to an increase in impervious surface. Methods outlined in the Virginia Runoff Reduction Method will endeavor to limit the increase in surface runoff through the use of disconnected impervious surfaces, grassed swales and bioretention. The site has hydraulic soil types 'A' and 'B' for the majority of the site which will aid in the reduction of runoff by having an ability to absorb and infiltrate where pervious surface is constructed. Furthermore, the quantity of runoff will be mitigated by stormwater detention facilities to limit the peak discharge rates from the site. Overall stormwater modeling will be performed at the time of engineering design to ensure that the discharge from the site does not exceed the capacity of the receiving channels. No known or visible existing drainage deficiencies exist on the site.



Where possible, it is recommended that stormwater management infrastructure provide capacity to receive and treat flows from the individual sites to increase buildable acreage through efficient use of land and reduce development costs for new site development.

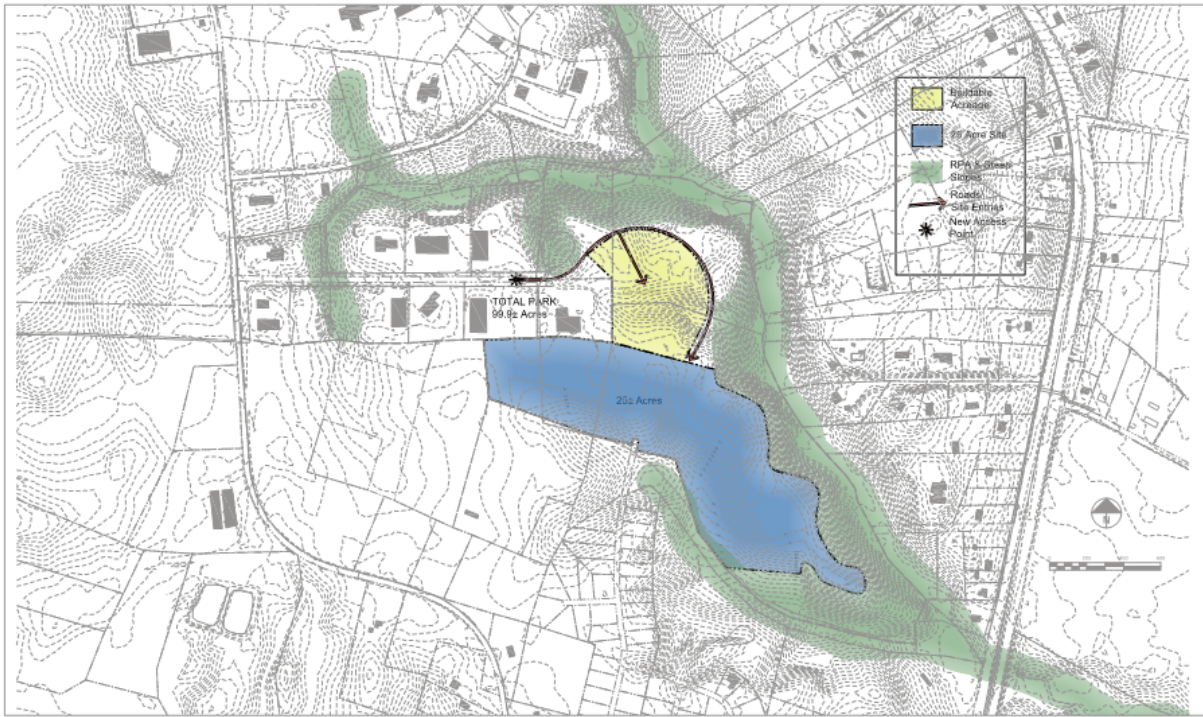
We believe the park expansion will be constructed with roadside ditch road cross sections much like the current park. However, because of the intent to help the sites comply with updated stormwater guidelines for quality and quantity, stormwater piping infrastructure may be necessary to carry flow to a regional facility. It is assumed that each planned parcel will have appropriately sized piping to connect stormwater discharge to. Additionally, the stormwater piping will be used as the receiving conveyance where practical for roadside ditch drainage to limit the width and depth of roadside ditches and reduce the number of driveway culverts.

## Bubble Diagrams

Immediately following the public meeting, a confidential economic development prospect contacted the Town. Their potential project would require a minimum of 25 acres and associated water, sewer, and road infrastructure. Preliminary layouts were created for the prospect including one in which an adjacent property was considered. These bubble diagrams indicated potential access points and roadway arrangements to complement the 25 acre prospect with smaller developable lots. Three concepts were developed for this prospect: two explored single cul-de-sac layouts extending to the easternmost developable land currently owned by the Town. The third layout included a looped road that connects back to Harris Road through property that is not currently owned by the Town.

### 25 Acre Option 1

This Bubble diagram shows a potential 25 acre parcel served by a cul-de-sac extended from the existing Technology Park Drive. Areas shown in green indicate locations that are undevelopable due to steep slopes or environmental limitations. Areas shown in yellow indicate potential developable land and the blue portion indicates the potential 25-acre parcel.



**KILMARNOCK TECHNOLOGY PARK**

OPTION 1: EXISTING PARK BOUNDARIES WITH 25 ACRE PARCEL



**Figure 4 – 25 Acre Option 1 Bubble Diagram**

## 25 Acre Option 2

Bubble diagram shows the 25-acre parcel as part of the expansion of the park and has a cul-de-sac serving the back of the existing park as an extension of Technology Park Drive. Access to the 25-acre parcel would be from Harris Road and would not necessarily connect to the existing park by internal roadways.

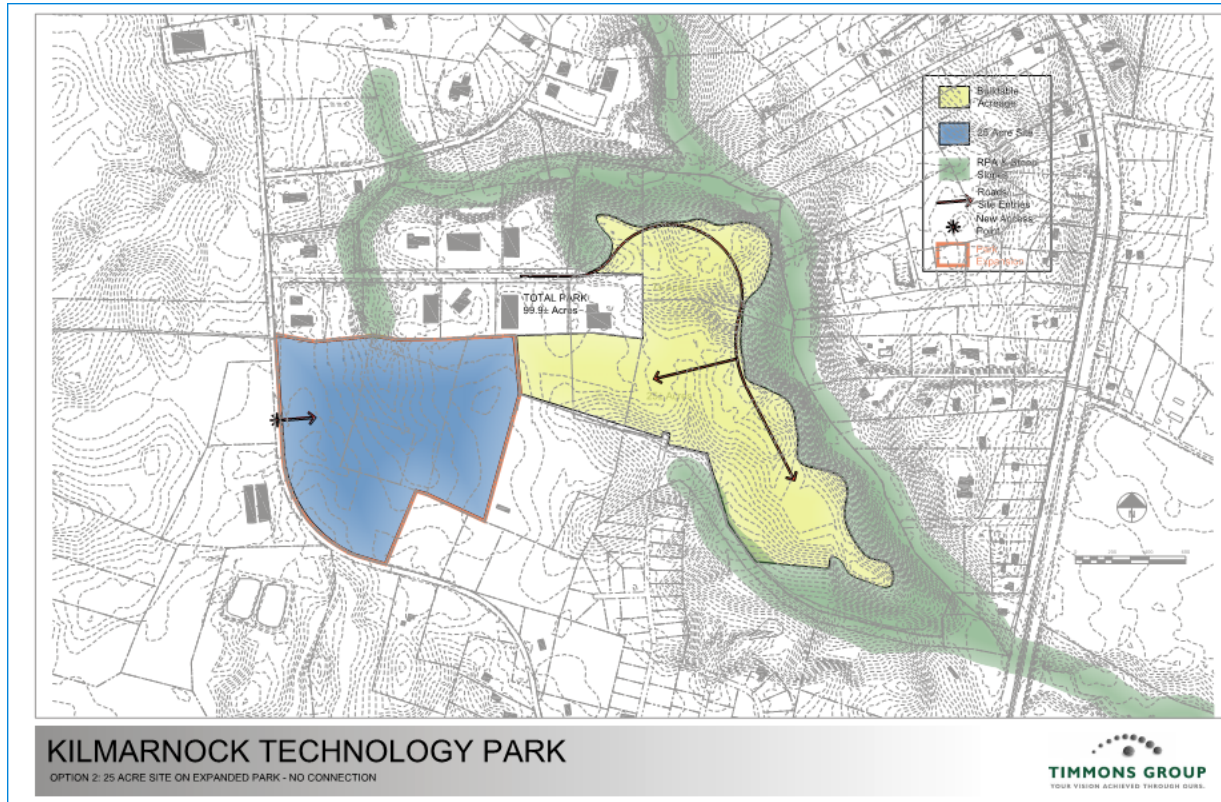
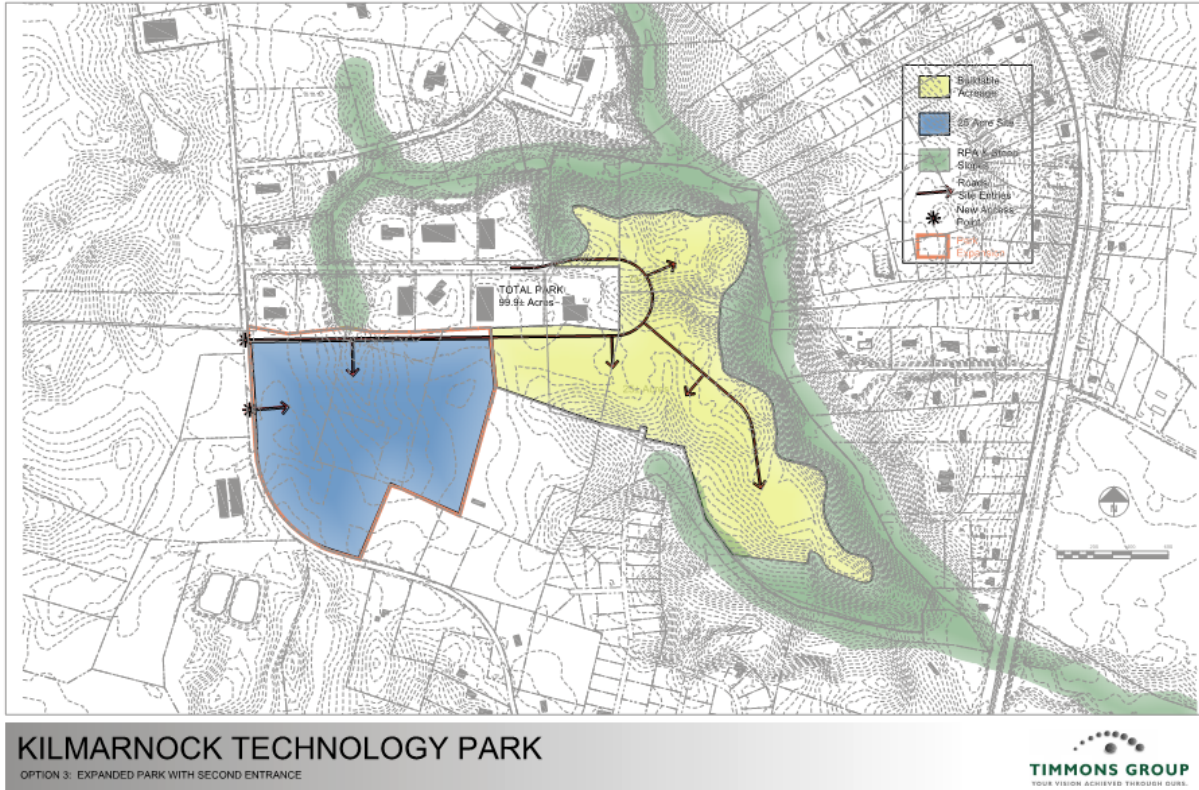


Figure 5 – 25 Acre Option 2 Bubble Diagram



## 25 Acre Option 3

Bubble diagram shows the potential loop road that ties the existing Technology Park Drive back to Harris Road to the south. This option was eliminated from consideration after discussions with Town staff.



**Figure 6 – 25 Acre Option 3 Bubble Diagram**

For additional details, the full size bubble diagrams are included in **Appendix C**.

## Preliminary Engineering Site Plan Layouts

Independent from the discussions with the confidential economic development prospect, conceptual preliminary layouts for the remaining acreage were developed using the SiteOps software outlined in our scope of services. SiteOps helps to quickly evaluate approximate configurations of parcels, pad sites, and roads that will balance the overall site from a grading perspective. The intent of this task was to be able to quantify the number of parcels, developable acreage, and general infrastructure configuration for use in developing preliminary construction budgets for each. We fully expect the further evaluate each of the two options summarized below as we enter the design phase of the project.

### Engineering Option 1

This concept utilizes a single cul-de-sac that hugs the west side of the property as development occurs into the site. The total length of roadway is approximately 2,150 linear feet and the layout yields nine buildable parcels and an area at the southern end of the development that could be used for a regional stormwater management feature. Because of the depth of the property immediately behind the existing development and in an attempt to make the shape of the lots practical for development, a flag lot was proposed that would have approximately 60' of road frontage but a buildable area set back from the road of approximately 360' by 360'. This lot is a total of 3.22 acres, but could potentially be combined with the property in front for a total area of 6.2 acres, or be used to accommodate a customer with expansion plans after locating in the park. The flag lot shown provides an opportunity to also consider partnering with the adjacent property shown in the bubble diagrams.

For a secondary access point in the park, a gated access can be connected to Pleasants Lane, seen as the dead end road near parcel 7. This access could be eliminated if another connection to the park was made possible through the expansion of the park back to Harris Road.

The approximate parcel areas for the newly conceived parcels are as follows:

Parcel 1	2.1 acres
Parcel 2	3.7 acres
Parcel 3	2.7 acres
Parcel 4	3.2 acres (flag lot)
Parcel 5	3.0 acres
Parcel 6	3.2 acres
Parcel 7	2.7 acres
Parcel 8	2.6 acres
Parcel 9	2.7 acres
<b>Total</b>	<b>25.9 acres</b>

For a full size print of the concept layout, see **Appendix D**.

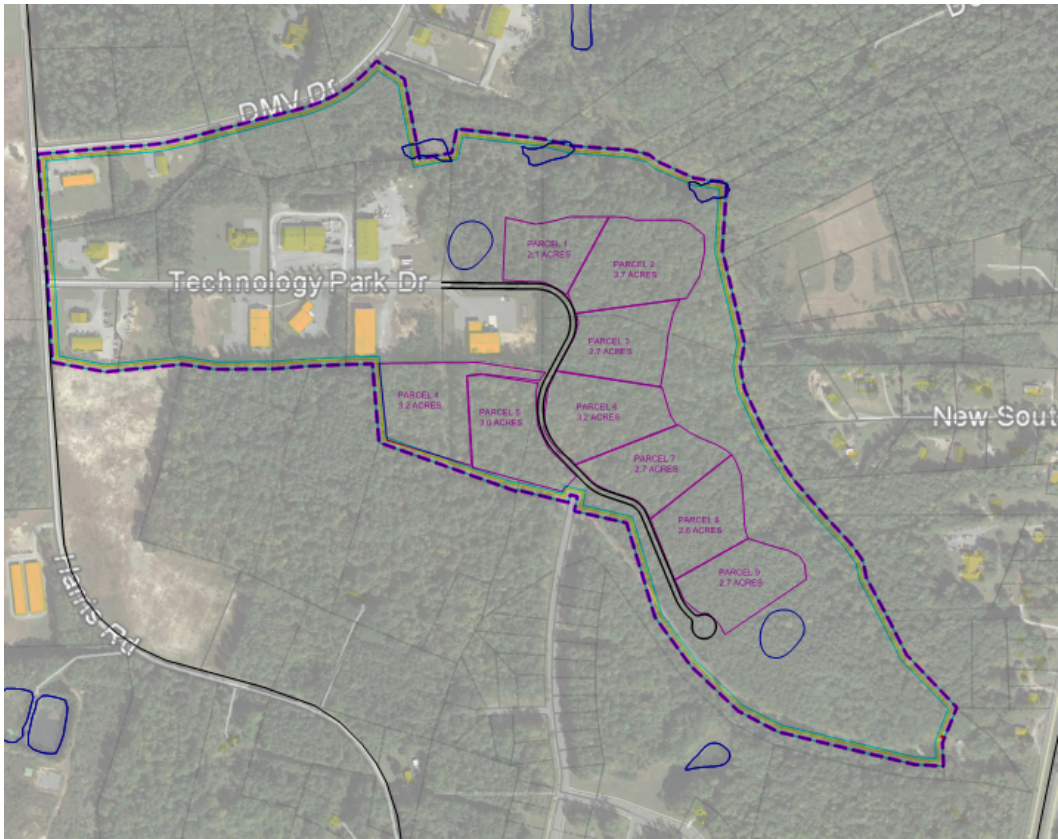


Figure 7 – Engineering Option 1 Concept Layout

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## Engineering Option 2

This concept extends the existing cul-de-sac to a logical terminus that would most likely determine the next phase line for the park. A second new road intersects the currently proposed extension and creates access for the east side of the property. The total length of roadway in this concept is approximately 2,400 linear feet. This layout, similarly to the previous layout, yields nine buildable parcels and an area at the southern end of the development that could be used for a regional stormwater management feature. Again, because of the depth of the property immediately behind the existing development and in an attempt to make the shape of the lots practical for development, a flag lot was developed that would have approximately 60' of road frontage but a buildable area set back from the road of approximately 330' by 350'. This lot is a total of 2.9 acres, but could potentially be combined with the property in front for a total area of 6.1 acres.

For a secondary access point in the park, a gated access can be connected to Pleasants Lane, seen as the dead end road near parcel 7. This access could be eliminated if another connection to the park was made possible through the expansion of the park back to Harris Road. This layout will need to be adjusted during the design phase to more appropriately align an emergency access with the current terminus of Pleasants Lane.

The approximate parcel areas for the newly conceived parcels are as follows:

Parcel 1	2.3 acres
Parcel 2	2.4 acres
Parcel 3	2.9 acres
Parcel 4	2.9 acres (flag lot)
Parcel 5	3.2 acres
Parcel 6	2.2 acres
Parcel 7	2.9 acres
Parcel 8	2.8 acres
Parcel 9	3.2 acres
<b>Total</b>	<b>24.5 acres</b>

For a full size print of the concept layout, see **Appendix D**.



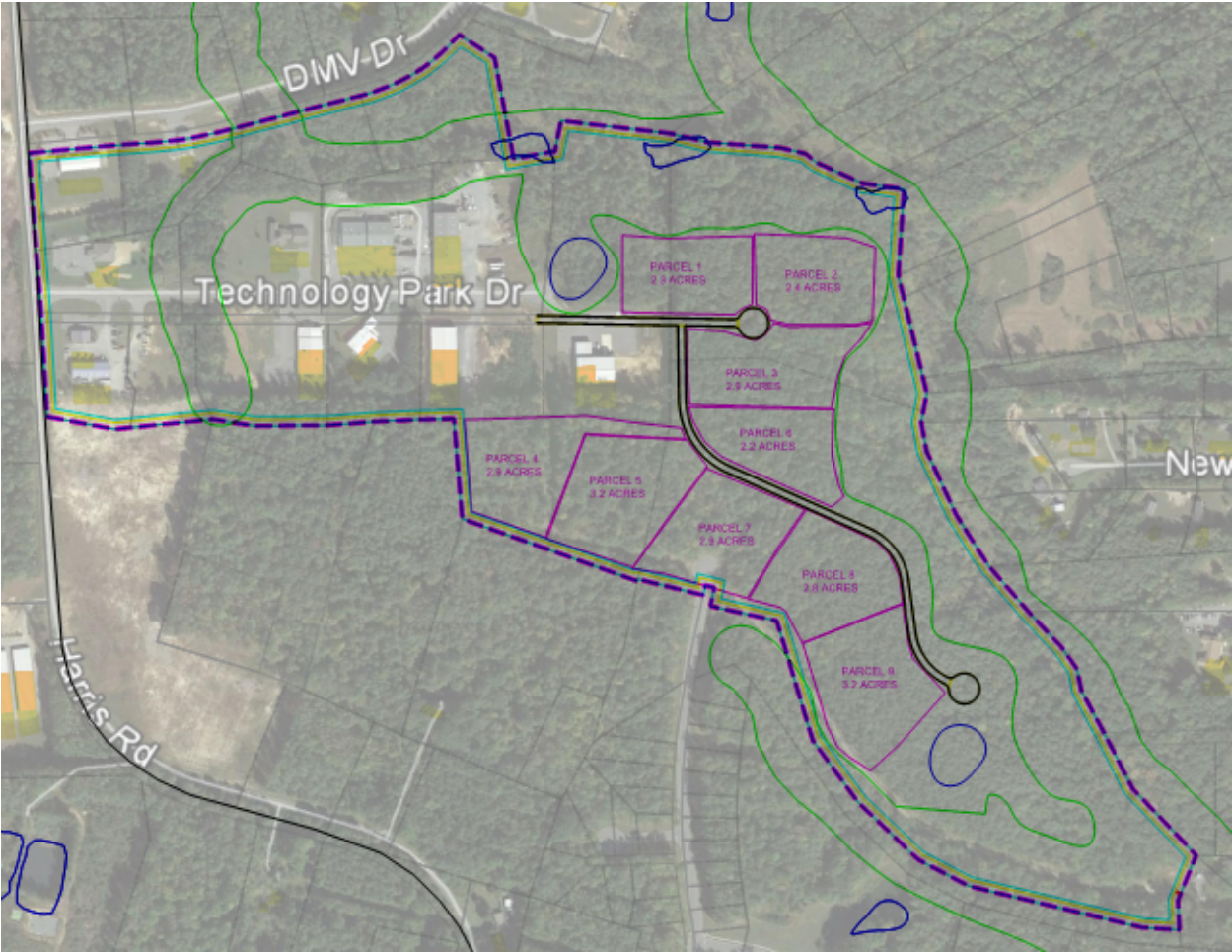


Figure 8 – Engineering Option 2 Concept Layout

## Preliminary Cost Opinions

Timmons Group has prepared preliminary cost opinions for each of the two engineering options summarized above. Approximate quantities were determined for earthwork and clearing limits based on the cut fill calculations performed by the SiteOps software. Quantities of water, sanitary sewer and stormwater were approximated based on the configurations of the roadways and consider only infrastructure in the public right-of-way, not on the individual lots. It is assumed that stormwater management features will be necessary on each parcel to meet the requirements described in the Stormwater Management section of this report. Regional stormwater BMPs, however, for stormwater quantity control are considered in the public infrastructure.

These cost opinions were developed to provide budgetary level costs for the public infrastructure and construction of pad ready sites. The Town may not choose to grade each of the pad sites, but this exercise provides some guidance that we will use in the design phase of the project. Site development costs for onsite parcel infrastructure (water, sewer, stormwater, paving, etc.) are not included in these calculations.

The following items are included in the cost opinions:

- Clearing
- Erosion control for pad and infrastructure construction
- Rough grading
- Pavement for streets
- Stormwater infrastructure for streets
- BMPs for stormwater quantity control for park expansion
- Water for domestic and fire protection
- Sanitary sewer

The following items were **not** included in the cost opinions:

- Engineering/Design
- Electrical/Communications/Natural Gas/Franchise Utilities
- Lighting
- Landscaping/Streetscaping
- Site improvements for individual parcels other than clearing and rough grading
- Driveways/Entrances
- Sidewalks/Walking Trails
- Curb and Gutter
- Site Signage
- Wetlands or other permitting costs and fees
- Costs of property acquisition/easements

Based on the two engineering concepts reviewed for preliminary layouts and cost opinions, it appears that full development of the pad sites and public infrastructure will cost approximately \$2 million. Engineering Option 1 provides 25.9 acres at an approximate cost of \$1.9 million yielding an approximate cost/acre of \$78,000 compared to Option 2 that provides 24.5 acres at an approximate cost of \$2.2 million with an approximate cost per acre of \$92,000. We have included a 15% contingency for each of the options which is appropriate for this early Preliminary Engineering Report Phase.

Part of the disparity in cost could be attributable to the location of the road extending to the farthest point on the property because the road in Engineering Option 1 is located on the lower (western) side of the peninsula, allowing a simpler drainage design than Option 2. The layout for Option 2 could be revised to locate the road on the lower side of the peninsula as we enter the design phase of the project. Option 2 provides for a logical phasing of the park expansion by building the permanent cul-de-sac as shown on Figure 8. A summary of the preliminary costs for each Engineering Option are shown in the table below.

**Table 1. Preliminary Cost Opinion Summary**

	<b>Option 1</b>	<b>Option 2</b>
Site Prep (Grading, Clearing, etc.)	\$725,500	\$744,100
Road Finishes/Ditches	\$243,200	\$322,900
Storm Piping	\$235,300	\$321,200
Water/Sewer	\$474,600	\$522,000
Subtotal	\$1,679,000	\$1,911,000
15% Contingency	\$252,000	\$287,000
<b>Grand Total</b>	<b>\$1,931,000</b>	<b>\$2,198,000</b>

For additional details, see full cost opinions in **Appendix E**.

## Recommendations

Timmons Group recommends that the Town conduct the appropriate topographical, geotechnical, environmental, and engineering necessary to validate the above preliminary cost opinions and identify any unknown conditions that might exist. The field studies and engineering work will also provide an opportunity to work with a local contractor to validate unit costs and recommend where to phase the project in a way that minimizes the Town's capital expense associated with building the infrastructure until such time that lots can be sold to advance the remaining infrastructure. The costs for these additional items include the following. A detailed proposal will be prepared for the Town to consider.

Geotechnical Investigation	\$14,500
Wetland Delineation/Confirmation	\$ 7,000
Topographical Survey	\$33,000
Construction Documents	\$40,000

These costs do not include boundary survey, easements plats, or individual subdivision plats that may be necessary once the final construction phasing is completed. We also recommend that the town deploy a certified forester to inspect the property and determine the potential value for the existing timber.

## Appendix A – Meeting Minutes

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## **MEETING MEMORANDUM**

<b>PROJECT:</b>	Kilmarnock Technology Park	<b>JOB NUMBER:</b>	
<b>REPORT BY:</b>	Dan Ruby	<b>CLIENT:</b>	Town of Kilmarnock
<b>DATE/TIME:</b>	1/13/2015	<b>LOCATION:</b>	Kilmarnock, VA

<b>Attendees</b>	<b>Position – Opening Comments</b>
Marshall Sebra	Town of Kilmarnock
Chris Allen	Town Council
Susan Cocknell	Town Community Development Marketing
Reness Greene (Reporter)	Rappahannock Record
Bob Sowder	*Property Owner of 60 lots adjacent *Grace Hill; Med Shed (Portable Hospital Rooms)
Neil Fridenstine	*Lot 4 owner next to Earth store *Could Subdivide *Concern of sitting empty commercial
Jeff Brown	Earth Resources: own cleared piece and in woods
David Jones	Interested in seeing plans
Stacey Harmon	RE Michel (not owner)
Joey McNeal	L Wholesale Healthy Supplier (Branch Manager)

Keith Butler  
Tom Saunders  
Don Gill

Frank Pleva

Town Council  
Town Manager  
Director of Planning for  
Lancaster County  
\*Lancaster County

\*Wants to learn what is  
going on

Not much inventory of  
properties

Pro Economic

Development but some  
folks are not

Emerson Gravatt

Town Council  
Chairman of Economic  
Development Committee  
Bon Secours Hospital

Jimmy Carter

## Meeting Notes

Marshall Sebra led off the meeting providing a brief background before introducing Tim Davey with Timmons Group.

Tim Davey reviewed the agenda for the meeting, the scope of the Timmons Group assignment and then led a discussion seeking input on the following items. The following notes are intended to give a brief summary of the discussion.

### Branding

- Regional Tourism marketing
  - Tourists become residents down the road
- Commercial hub for Lower North Neck
  - Hospitality/Recreation
- Conversation with the state about economic development
  - 30+ and 50+ employees size employers
- Not much branding from County or Region
- Technology Park took on life of its own
  - Medical office potential as response to Bon Secours
- Business Park on the River
  - People want to live here
  - Has water and sewer
- If want to avoid town taxes and can have less water and sewer, it can be out of town, but all businesses that require sewer and water are encouraged to be in the Technology Park.
- King William had no public industrial park
- Public vs. Private owned – Public advantage, tax advantage. It does not appear that the Town is competing with private developers for these type of businesses.
- People/Talent to support the development i.e. medical
- Community College/Training
- What is Bon Secours long term plan?

### Negatives

- Cub/gutter/ditch/lighting/sidewalk are not a major concern of current residents in the park.
- Business for construction poor economic cycle
- Signage – Marshall said someone asked about it
  - Plans previously have a location hindrance

- Balance curb appeal vs. standards that are cost prohibitive/too long term

## Internet Availability

- Verizon problematic for 911, much less broadband
- May take years to get redundant, reliable broadband services
- All businesses want in subdivision if Town adds

Note from RE Michel who is a tenant in the park: tractor trailer traffic, do we fit in your future plan?

## Engineering

- Stormwater - design guidelines for park and potentially suggesting regional opportunities where possible
- Trails - can we use the creek crossing as Low Impact Development type of stormwater BMPs
- Topography –how does that affect the type of building pad sites and potential layouts
- Mass grading? – not likely for whole site, but we will do some mass grading exercises to assure that we are placing infrastructure in the right place.
- Water pressure is good because tank at hospital.

## Next Steps

Timmons Group will meet with representatives from VEDP to discuss the potential target markets/projects for the park.

Timmons Group will meet with the Hospital and other current residents in the park at Marshall's request.

Timmons Group will prepare three bubble diagram exhibits for review and comment from Town

Timmons Group will prepare three SiteOps models to calculate the required mass grading associated with the three bubble diagrams.

Timmons Group will schedule follow-up meeting with the Town staff in February.

## Appendix B – Site Photographs and Plans

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# Kilmarnock Technology Park



Map of Technology Park Addresses

[WWW.TIMMONS.COM](http://WWW.TIMMONS.COM)

  
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# Kilmarnock Technology Park



Intersection of Technology Park Drive  
and Harris Road facing north



Technology Park Drive and Harris Road  
facing south

# Kilmarnock Technology Park



Sevarg Pools Site (100 Technology Park Drive)

[WWW.TIMMONS.COM](http://WWW.TIMMONS.COM)

  
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# Kilmarnock Technology Park



Old Dominion Eye Care Site  
(101 Technology Park Drive)



Neal D Fridenstine, Inc. Site  
(141 Technology Park Drive)

[WWW.TIMMONS.COM](http://WWW.TIMMONS.COM)

  
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# Kilmarnock Technology Park



MTEQ Buildings (140, 160 and 180 Technology Park Drive)

[WWW.TIMMONS.COM](http://WWW.TIMMONS.COM)

  
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# Kilmarnock Technology Park



Geoproducts Facilities (161 Technology Park Drive)

[WWW.TIMMONS.COM](http://WWW.TIMMONS.COM)



# Kilmarnock Technology Park



RE Michel Site (198 Technology Park Drive)

[WWW.TIMMONS.COM](http://WWW.TIMMONS.COM)





# Kilmarnock Technology Park



Technology Park Drive facing west at  
Geoproducts



Technology Park Drive facing west at  
MTEQ

[WWW.TIMMONS.COM](http://WWW.TIMMONS.COM)

  
**TIMMONS GROUP**  
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MATCH LINE - SEE SHEET 9

ET 7

26

0 S.F.

17'16"15" W  
70.30

S 17'38"56" W  
101.15'

PROPOSED UTIL.  
EASEMENT

54.60± ACRES  
GEORGE RAY SIMMONS, JR.  
& EVELYN ELIZABETH SIMMONS  
TAX #28-138  
INST #020001772  
DB 346, PG 168  
DB 283, PG 262  
DB 186, PG 262

18,636 S.F. 7'x17' RIP RAP APRON  
L=15', d50=9", 24" THICK  
UNDERLAY WITH FILTER CLOTH

STA. 10+19.71  
40.08' R  
ES # 7  
VDOT ES-1  
INV. 53.16

STA. 17+08.56  
36.71' R  
MH # 11  
TOP 59.55  
INV. IN 51.39  
INV. OUT 51.34

PROPOSED DRAIN.  
& UTIL. EASEMENT  
STA. 11+12.76  
47.55' R  
ES # 9  
VDOT ES-1  
INV. 52.93

MH # 9  
TOP 60.15  
INV. IN 50.27  
INV. OUT 50.22

7'x17' RIP RAP APRON  
L=15', d50=9", 24" THICK  
UNDERLAY WITH FILTER CLOTH

STA. 19+01.30  
35.01' R  
MH # 10  
TOP 58.80  
INV. IN 50.57  
INV. OUT 50.52

**PLEASANTS LANE**  
CD-2 UNDERDRAIN  
CONNECT TO CD'S  
S 20'17'52" W 18+00 137.60' -0.50% 61.49  
297.72' 61.83  
STA. 18+75.97, 18' R  
CDI # 27  
VDOT DI-3C, L=8'  
TOP 61.30  
INV. 54.08  
S 20'17'52" W 291.02'

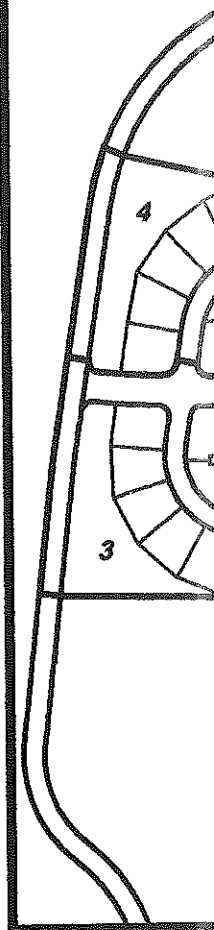
PROPOSED DRAIN.  
& UTIL. EASEMENT  
STA. 18+75.97, 18' L  
CDI # 26  
VDOT DI-3C, L=8'  
TOP 61.30  
INV. 55.30  
8"x8"x8" TEE  
6" GATE VALVE  
FIRE HYDRANT

STA. 11+55.90  
38.40' L  
ES # 8  
VDOT ES-1  
INV. 56.12

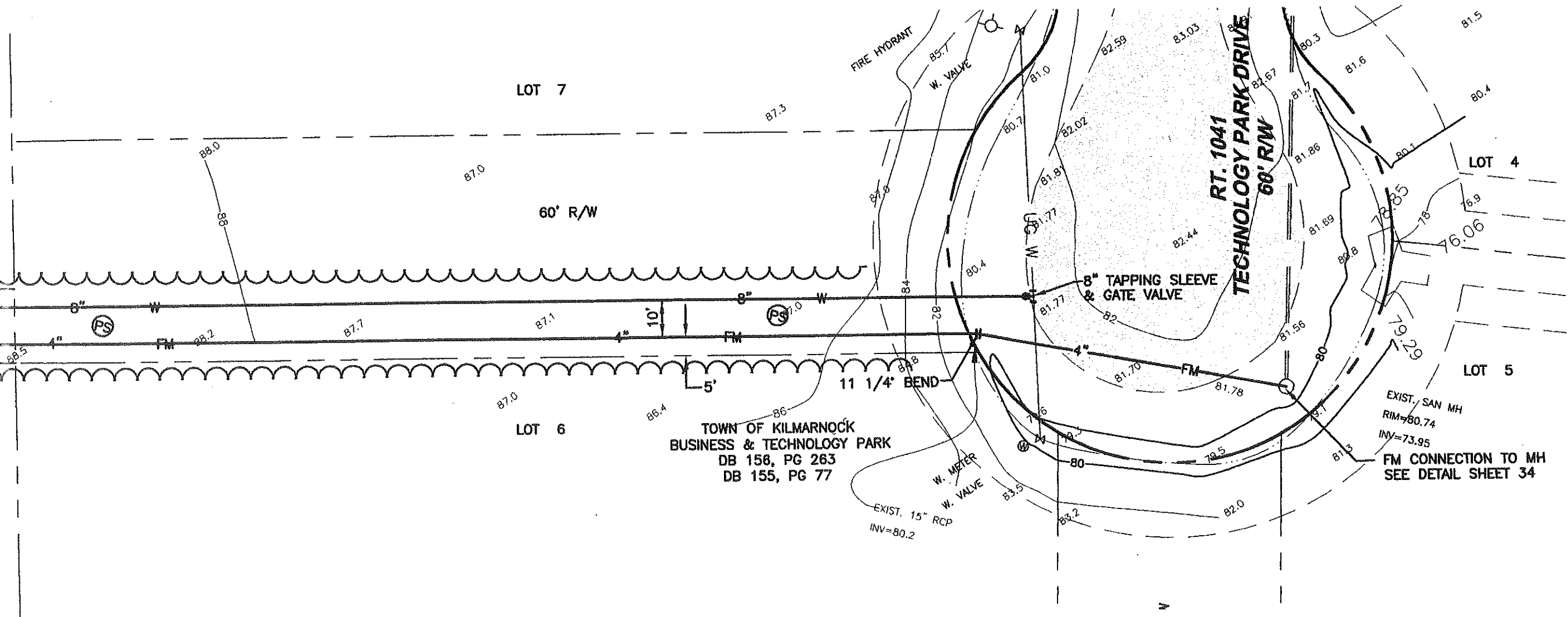
TEMPORARY TURN  
AROUND EASEMENT

STA. 19+87.55 35' L  
8"x8"x8" TEE  
8" GATE VALVE (2)  
8" BLIND FLANGE  
R. PT  
19+89.92  
68.61  
20+00  
67.52

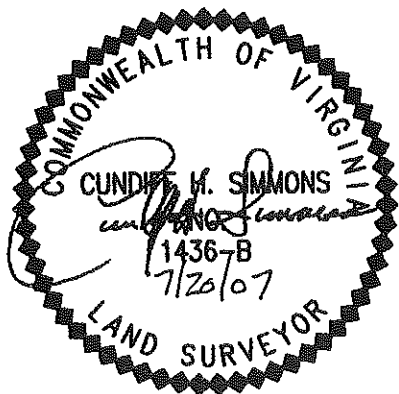
TEMPORARY TURN  
AROUND EASEMENT



NOTE: UTILITY INSTALLATION SHALL BE BY JACK, PUSH OR BORE METHOD IN ACCORDANCE WITH THE LAND USE PERMIT MANUAL.



2  
TOMLIN & KEYSER PLAT OF



WAPLE &  
WAPLE, L.P.  
TAX #28-139B  
DB 377, PG 463  
PLAT OF CONKLE  
DB 265, PG 486  
DB 225, PG 190

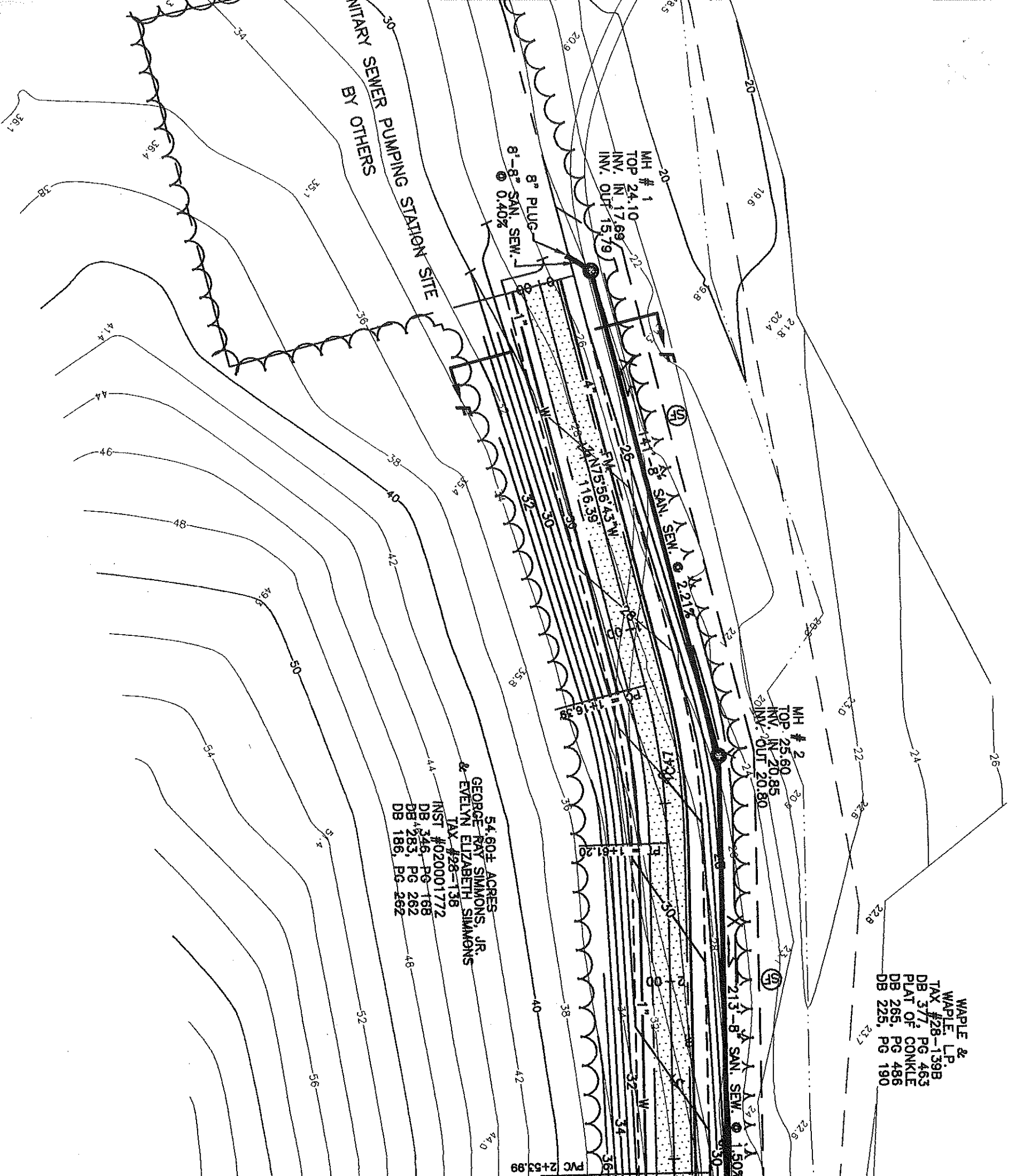
MH # 2  
TOP 25.60  
INV. IN 20.85  
INV. OUT 20.80

MH # 1  
TOP 24.10  
INV. IN 17.69  
INV. OUT 15.79

8" PLUG  
8"-8" SAN. SEW.  
@ 0.40%

54.60± ACRES  
GEORGE RAY SIMMONS, JR.  
& EVELYN ELIZABETH SIMMONS  
TAX #28-138  
INST #020001772  
DB 346, PG 188  
DB 1283, PG 262  
DB 186, PG 262

SEW. PUMPING STATION SITE  
BY OTHERS



NO. DATE

DESCRIPTION OF REVISION

REVISED BY

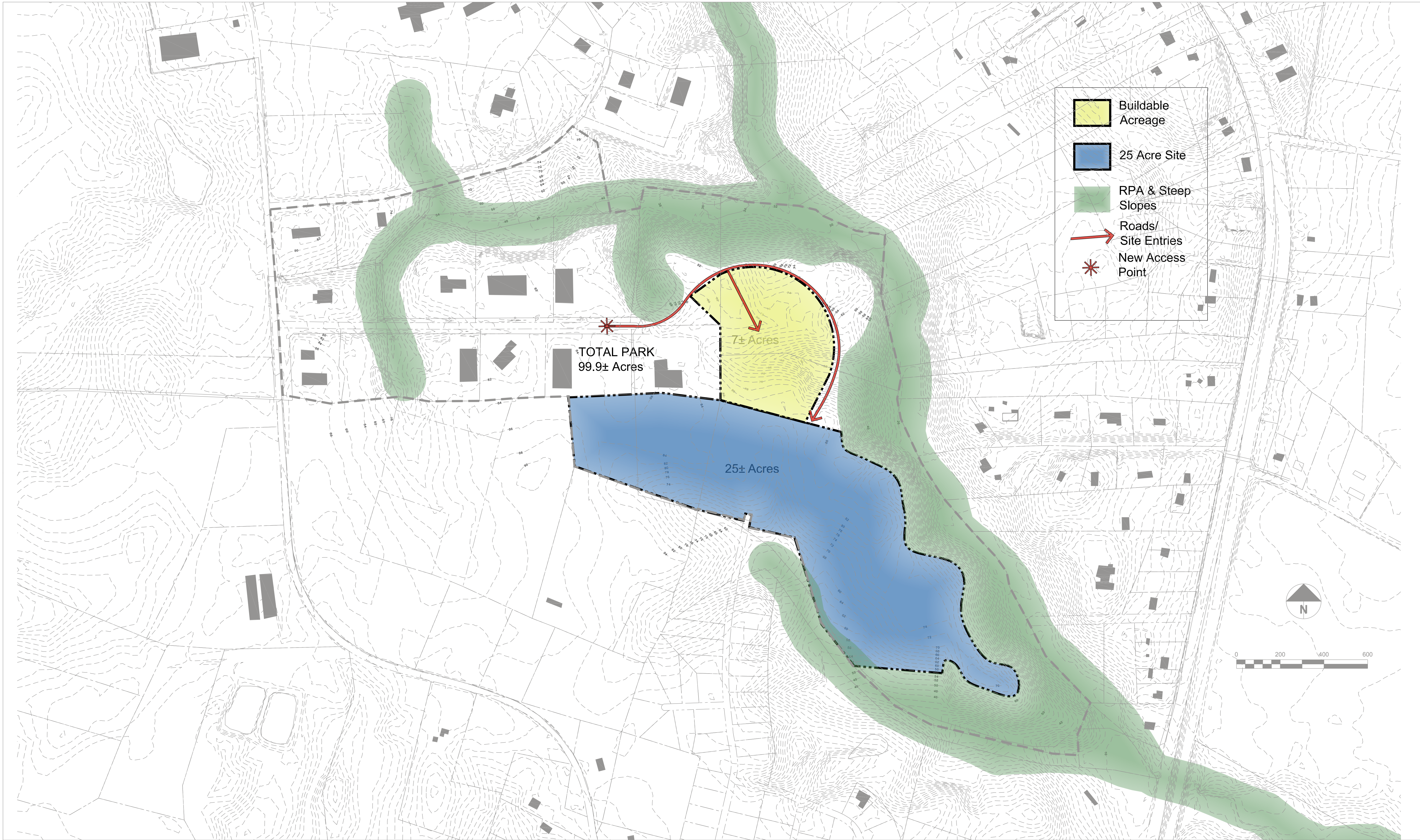
CI



## Appendix C – Bubble Diagrams

DRAFT

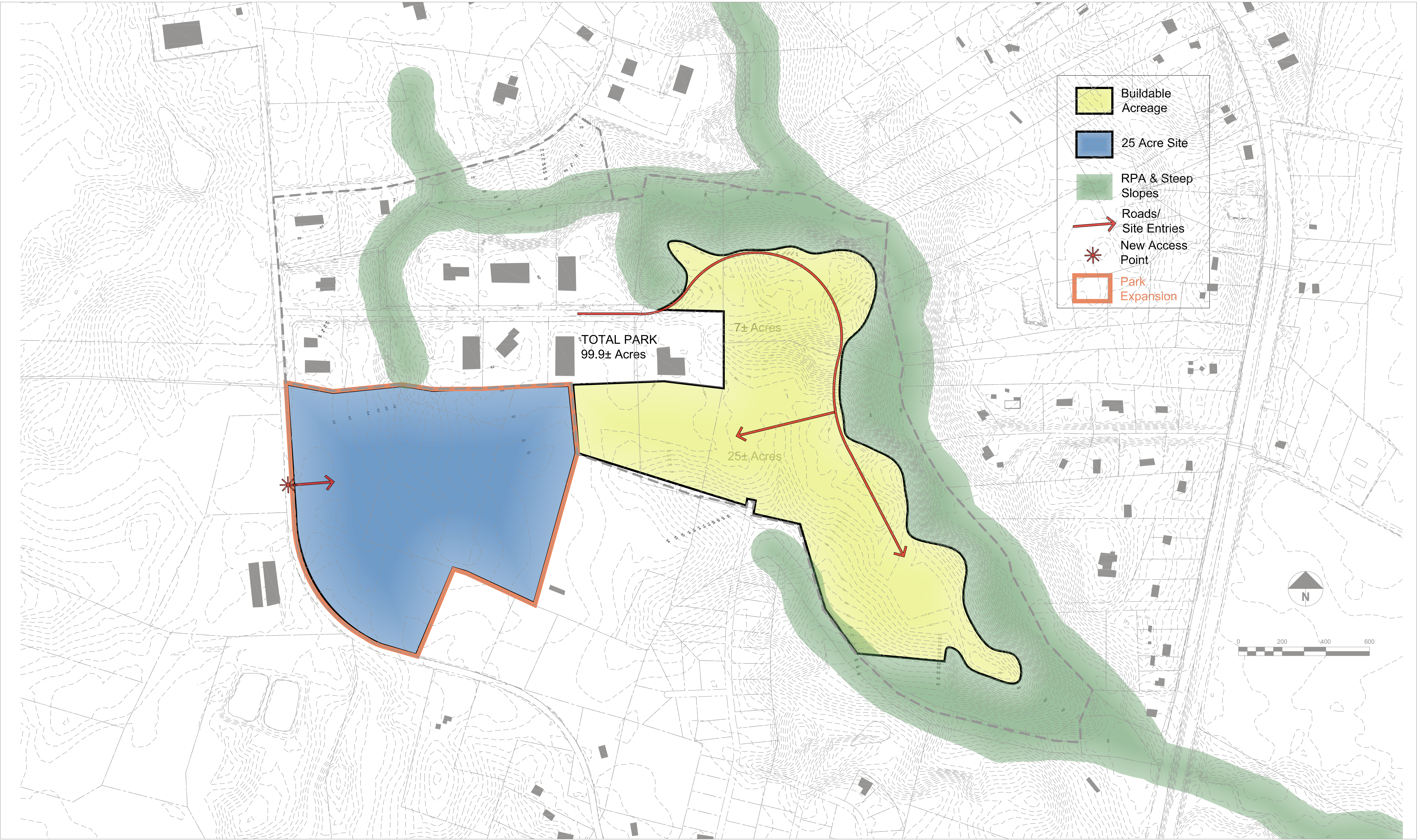




# KILMARNOCK TECHNOLOGY PARK

OPTION 1: EXISTING PARK BOUNDARIES WITH 25 ACRE PARCEL

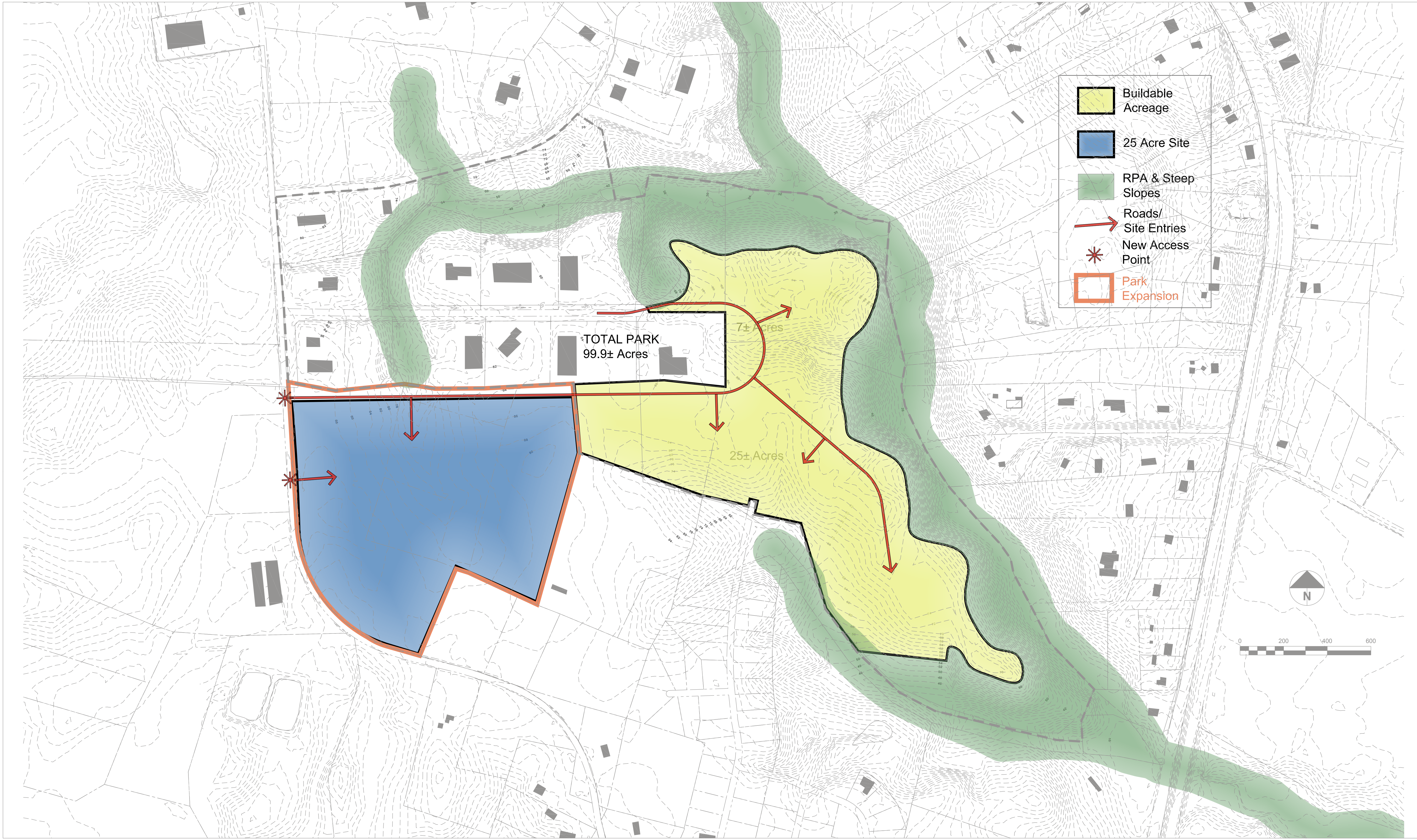




# KILMARNOCK TECHNOLOGY PARK

OPTION 2: 25 ACRE SITE ON EXPANDED PARK - NO CONNECTION





# KILMARNOCK TECHNOLOGY PARK

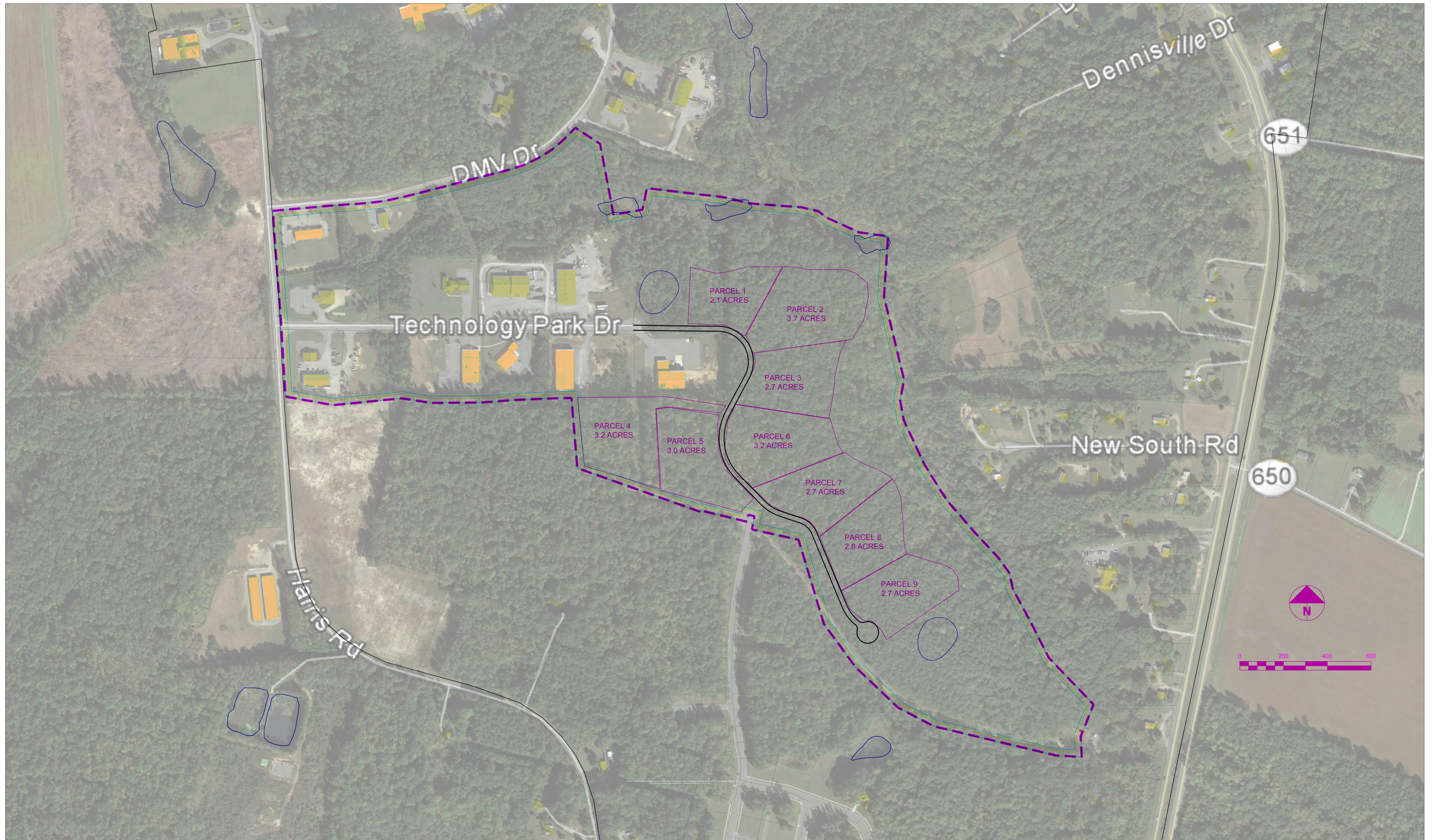
OPTION 3: EXPANDED PARK WITH SECOND ENTRANCE



## Appendix D – Concept Layouts

DRAFT

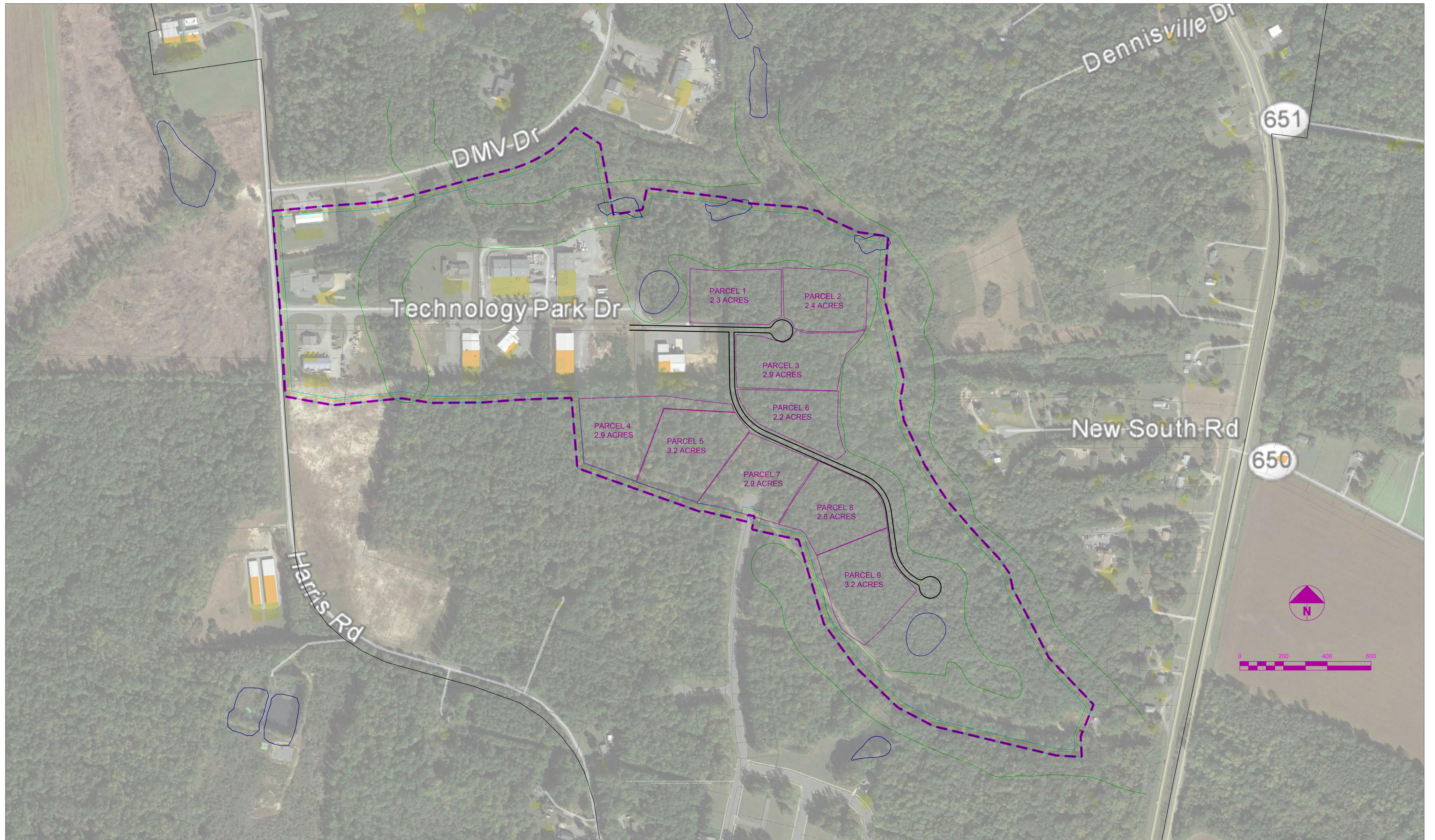




# KILMARNOCK TECHNOLOGY PARK

OPTION 1: EXISTING PARK BOUNDARIES AND FUTURE PARCELS - MARCH 30, 2015





# KILMARNOCK TECHNOLOGY PARK

OPTION 2: EXISTING PARK BOUNDARIES AND FUTURE PARCELS - MARCH 30, 2015



## Appendix E – Opinions of Probable Cost

DRAFT

# TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.



**Project:**  
**Created:**  
**Data Assumptions:**

Kilmarnock Option 1  
4/6/2015  
See PER

WORK ACTIVITY	QUANTITY	UNIT	UNIT COST	SUBTOTAL	TOTAL
<b>SITE PREPARATION</b>					
Site Clearing					
Clearing	30.22	AC	\$6,300.00	\$190,386.00	
Topsoil Strip/Cut	24376.84	CY	\$2.30	\$56,066.73	
Topsoil Fill	23287.88	CY	\$2.30	\$53,562.12	
Topsoil Export	1088.97	CY	\$10.00	\$10,889.70	
Total Site Clearing				\$310,904.55	\$310,905
Grading Cut					
BMP Cut	8100.00	CY	\$2.00	\$16,200.00	
Earth Cut	47179.25	CY	\$3.00	\$141,537.75	
Unsuitable Cut	0.00	CY	\$5.52	\$0.00	
Total Grading Cut				\$157,737.75	\$157,738
Grading Fill					
Earth Fill	46982.12	CY	\$3.00	\$140,946.36	
Import/Borrow Fill	0.00	CY	\$19.95	\$0.00	
Total Grading Fill				\$140,946.36	\$140,946
Grading Export					
Earth Export	197.13	CY	\$10.00	\$1,971.30	
Unsuitable Export	0.00	CY	\$9.98	\$0.00	
Total Grading Export				\$1,971.30	\$1,971
Retaining Wall	0.00	SF	\$25.00		\$0
Other Preparation					
Fine Grading (Building)	0.00	SY	\$1.45	\$0.00	
Fine Grading (Non-Building)	5656.02	SY	\$1.00	\$5,656.02	
Erosion Control	28.87	AC	\$2,500.00	\$72,175.00	
Seeding	28.87	AC	\$1,250.00	\$36,087.50	
Total Other Preparation				\$113,918.52	\$113,919
				<b>TOTAL</b>	<b>\$725,500</b>
<b>PUBLIC IMPROVEMENTS</b>					
Paving - Asphalt					
Asphalt Paving - Streets (Light Duty)	0.00	SY	\$30.00	\$0.00	
Asphalt Paving - Streets (Heavy Duty)	5656.02	SY	\$35.00	\$197,960.70	
Total Paving - Asphalt				\$197,960.70	\$197,961
Paving - Pedestrian					
Pedestrian Asphalt	0.00	SY	\$17.45	\$0.00	
Pedestrian Concrete	0.00	SY	\$34.29	\$0.00	
Total Paving - Pedestrian				\$0.00	\$0
Road Drainage					
Roadside Ditch	4522.00	LF	\$10.00	\$45,220.00	
Curb & Gutter	0.00	LF	\$24.00	\$0.00	
Total Drainage				\$45,220.00	\$45,220
				<b>TOTAL</b>	<b>\$243,200</b>

**PUBLIC STORM DRAINAGE**

Storm Water FES					
12 in FES	0.00	EA	\$200.00	\$0.00	
15 in FES	0.00	EA	\$225.00	\$0.00	
18 in FES	0.00	EA	\$250.00	\$0.00	
24 in FES	0.00	EA	\$350.00	\$0.00	
30 in FES	2.00	EA	\$450.00	\$900.00	
36 in FES	2.00	EA	\$675.00	\$1,350.00	
42 in FES	0.00	EA	\$795.00	\$0.00	
48 in FES	0.00	EA	\$825.00	\$0.00	
54 in FES	0.00	EA	\$1,450.00	\$0.00	
60 in FES	0.00	EA	\$1,850.00	\$0.00	
Total Storm Water FES				\$2,250.00	\$2,250
Storm Water Pipes					
18 in Pipe	50.00	LF	\$33.00	\$1,650.00	
24 in Pipe	1070.00	LF	\$45.50	\$48,685.00	
30 in Pipe	830.00	LF	\$78.50	\$65,155.00	
36 in Pipe	400.00	LF	\$100.00	\$40,000.00	
42 in Pipe	0.00	LF	\$125.00	\$0.00	
48 in Pipe	0.00	LF	\$149.00	\$0.00	
Total Storm Water Pipes				\$155,490.00	\$155,490
Inlets	8.00	EA	\$1,475.00		\$11,800
Manholes	10.00	EA	\$1,075.00		\$10,750
Rip Rap	8.00	EA	\$2,500.00		\$20,000
BMP Outfall Structures	2.00	EA	\$17,500.00		\$35,000
<b>TOTAL</b>					<b>\$235,300</b>

**PUBLIC WATER**

8" Ductile Iron (including appertenances)	2000.00	LF	\$50.00	\$100,000	
8" Ductile Iron connect to Rt 3	1750.00	LF	\$50.00	\$87,500	
Fire Hydrants	4.00	EA	\$3,000.00	\$12,000	

**PUBLIC SANITARY SEWER**

8" PVC Gravity Sewer	1730.00	LF	\$120.00	\$207,600	
Manhole (4-12' deep)	11.00	EA	\$4,500.00	\$49,500	
Manhole (12+' deep)	2.00	EA	\$6,500.00	\$13,000	
Pump Station Improvements	1.00	LS	\$5,000.00	\$5,000	

**TOTAL** **\$474,600**

**SUBTOTAL ALL** **\$1,679,000**  
**15% Contingency** **\$252,000**

**Total Cost Estimate For Site** **\$1,931,000**

This plan was generated by SITEOPS and is not intended for permitting or construction without review and confirmation by a professional engineer.  
All volumes for cut, fill, import and export are considered compacted.



# TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.



**Project:**  
**Created:**  
**Data Assumptions:**

Kilmarnock Option 2  
4/6/2015  
See PER

WORK ACTIVITY	QUANTITY	UNIT	UNIT COST	SUBTOTAL	TOTAL
<b>SITE PREPARATION</b>					
Site Clearing					
Clearing	30.35	AC	\$6,300.00	\$191,205.00	
Topsoil Strip/Cut	24481.19	CY	\$2.30	\$56,306.74	
Topsoil Fill	23188.72	CY	\$2.30	\$53,334.06	
Topsoil Export	1292.48	CY	\$10.00	\$12,924.80	
Total Site Clearing				\$313,770.60	\$313,771
Grading Cut					
BMP Cut	8100.00	CY	\$2.00	\$16,200.00	
Earth Cut	48951.03	CY	\$3.00	\$146,853.09	
Unsuitable Cut	0.00	CY	\$5.52	\$0.00	
Total Grading Cut				\$163,053.09	\$163,053
Grading Fill					
Earth Fill	48845.47	CY	\$3.00	\$146,536.41	
Import/Borrow Fill	0.00	CY	\$19.95	\$0.00	
Total Grading Fill				\$146,536.41	\$146,536
Grading Export					
Earth Export	105.56	CY	\$10.00	\$1,055.60	
Unsuitable Export	0.00	CY	\$9.98	\$0.00	
Total Grading Export				\$1,055.60	\$1,056
Retaining Wall	0.00	SF	\$25.00		\$0
Other Preparation					
Fine Grading (Building)	0.00	SY	\$1.45	\$0.00	
Fine Grading (Non-Building)	7786.83	SY	\$1.00	\$7,786.83	
Erosion Control	30.35	AC	\$2,500.00	\$75,875.00	
Seeding	28.75	AC	\$1,250.00	\$35,937.50	
Total Other Preparation				\$119,599.33	\$119,599
				<b>TOTAL</b>	<b>\$744,100</b>
<b>PUBLIC IMPROVEMENTS</b>					
Paving - Asphalt					
Asphalt Paving - Streets (Light Duty)	0.00	SY	\$30.00	\$0.00	
Asphalt Paving - Streets (Heavy Duty)	7786.83	SY	\$35.00	\$272,539.05	
Total Paving - Asphalt				\$272,539.05	\$272,539
Paving - Pedestrian					
Pedestrian Asphalt	0.00	SY	\$17.45	\$0.00	
Pedestrian Concrete	0.00	SY	\$34.29	\$0.00	
Total Paving - Pedestrian				\$0.00	\$0
Road Drainage					
Roadside Ditch	5036.00	LF	\$10.00	\$50,360.00	
Curb & Gutter	0.00	LF	\$24.00	\$0.00	
Total Drainage				\$50,360.00	\$50,360
				<b>TOTAL</b>	<b>\$322,900</b>

**PUBLIC STORM DRAINAGE**

Storm Water FES					
12 in FES	0.00	EA	\$200.00	\$0.00	
15 in FES	0.00	EA	\$225.00	\$0.00	
18 in FES	0.00	EA	\$250.00	\$0.00	
24 in FES	2.00	EA	\$350.00	\$700.00	
30 in FES	2.00	EA	\$450.00	\$900.00	
36 in FES	1.00	EA	\$675.00	\$675.00	
42 in FES	0.00	EA	\$795.00	\$0.00	
48 in FES	0.00	EA	\$825.00	\$0.00	
54 in FES	0.00	EA	\$1,450.00	\$0.00	
60 in FES	0.00	EA	\$1,850.00	\$0.00	
Total Storm Water FES				\$2,275.00	\$2,275
Storm Water Pipes					
18 in Pipe	825.00	LF	\$33.00	\$27,225.00	
24 in Pipe	1965.00	LF	\$45.50	\$89,407.50	
30 in Pipe	905.00	LF	\$78.50	\$71,042.50	
36 in Pipe	550.00	LF	\$100.00	\$55,000.00	
42 in Pipe	0.00	LF	\$125.00	\$0.00	
48 in Pipe	0.00	LF	\$149.00	\$0.00	
Total Storm Water Pipes				\$242,675.00	\$242,675
Inlets	10.00	EA	\$1,475.00		\$14,750
Manholes	13.00	EA	\$1,075.00		\$13,975
Rip Rap	5.00	EA	\$2,500.00		\$12,500
BMP Outfall Structures	2.00	EA	\$17,500.00		\$35,000
<b>TOTAL</b>					<b>\$321,200</b>

**PUBLIC WATER**

8" Ductile Iron (including appertenances)	2360.00	LF	\$50.00	\$118,000	
8" Ductile Iron connect to Rt 3	1630.00	LF	\$50.00	\$81,500	
Fire Hydrants	4.00	EA	\$3,000.00	\$12,000	

**PUBLIC SANITARY SEWER**

8" PVC Gravity Sewer	2100.00	LF	\$120.00	\$252,000	
Manhole (4-12' deep)	9.00	EA	\$4,500.00	\$40,500	
Manhole (12+' deep)	2.00	EA	\$6,500.00	\$13,000	
Pump Station Improvements	1.00	LS	\$5,000.00	\$5,000	

**TOTAL** **\$522,000**

**SUBTOTAL ALL** **\$1,911,000**  
**15% Contingency** **\$287,000**

**Total Cost Estimate For Site** **\$2,198,000**

This plan was generated by SITEOPS and is not intended for permitting or construction without review and confirmation by a professional engineer.  
All volumes for cut, fill, import and export are considered compacted.