TOWN OF RYE – PLANNING BOARD
WORK SESSION
Tuesday, January 30, 2018
6:30 p.m. – Rye Town Hall

Members Present: **Chairman Bill Epperson, Vice-Chair Patricia Losik, J.M. Lord, Mel Low, Jerry Gittlein, Selectmen's Rep Priscilla Jenness, Alternates Katy Sherman and Steve Carter**

Others Present: **Attorney Michael Donovan and Planning Administrator Kimberly Reed**

- Major Subdivision, Lot Line Adjustment and Conditional Use Permit by the Housing Partnership for property located at 0 Airfield Drive, Tax Map 10, Lot 15-4, for construction of a residential development consisting of a mixture of multi-family dwellings with a portion being dedicated as Workforce Housing. **Property is in the Commercial Zoning District and the Multi-Family Dwelling District Overlay and Aquifer and Wellhead Protection Districts. Case #07-2017.**

  Note: ***The work session is a public meeting, not a public hearing and no input from the public will be heard. The public was given an opportunity to submit questions or concerns in writing by January 12th, so that it may be reviewed by the Board, Consultants and interested parties.***

I. Call to Order and Pledge of Allegiance

Chairman Epperson called the work session to order at 6:30 p.m.

II. Review:

Attorney David Brown, representing the applicant, stated that the proposal was before the Board in September for a conceptual, in November for the first hearing and a site walk was held. After the site walk, some more work had to be done on septic and hydrogeology, which has been done. He commented that they feel this is the best place in Rye for this project.

Chairman Epperson stated that there were discussions about the hydrological study and septic. There was also a discussion about the density.

The Hydrogeologic Study was submitted to the Board.

Doug LaRosa, Ambit Engineering, explained that the study is similar to the previous study. It has additional information that was requested by Danna Truslow and verifies the required criteria.

Cynthia Thayer, Stonehill Environmental, reviewed the Hydrogeological Assessment prepared for The Housing Partnership, residential development, Airfield Drive, dated January 29, 2018.

Please see attached

Referring to the septic systems, Attorney Donovan asked what the nitrate levels are coming out of the systems. The Septi-Tech Systems have 15mg.

Ms. Thayer replied that they use 25mg. The general rule of thumb is that 40mg is going into the system and it reduces it to 25mg. That is what is used in the model. She continued that one of the positive aspects is that the groundwater table allows for a lot of dilution.

Member Gittlein asked for the term effluent to be defined.

Ms. Thayer explained that for the purposes of their work it is waste water that gets applied to the subsurface waste water disposal system. The effluent is made up of organic material and nitrogen compounds, which is the most relevant to human health and drinking water standards.

Chairman Epperson asked if 25 parts per million is a high number. It seems that most systems show 15 parts per million at the outflow.

Ms. Thayer explained that they strive to be very cautious and conservative. That number came from the manufacturer; however, they may get better treatment.

Mr. LaRosa stated that the manufacturer provided data that shows 25 parts per million is a conservative number. Other systems can have lower numbers.

Attorney Donovan pointed out this is a different system than Septi-Tech, which can have 15. This is an Advance Solutions System. Apparently, it has a higher manufacturer's number coming out of the systems. He asked why the Septi-Tech would be 15 and this 25.

John Chagnon, Ambit Engineering, explained that both Septi-Tech and Advanced Onsite Treatment have advanced denitrification. That would bring the number to 15. That is not what is being proposed.

Mr. LaRosa explained the proposal is for a system that re-influences air and allows the effluent to circulate in one of the treatment tanks.

Attorney Donovan asked if the systems could be provided with the denitrification which could lower it to 15.

Mr. Chagnon replied yes.

Chairman Epperson commented that the septic is a huge issue. In his research he was looking for a development similar to this and he could not find anything that had that density. He asked if there was some antidotal information that could be provided with a development that is similar.

Mr. Chagnon asked if by density he is referring to the number of units going to a leachfield.

Chairman Epperson confirmed.

Mr. Chagnon noted there are only two systems at White Birch that treat all the units.

Chairman Epperson asked if it is the same system.

Mr. Chagnon replied that they did not go with an advanced treatment system.

Chairman Epperson commented that the system has worked okay.

Member Low pointed out that the development has a lot less people.

Mr. Chagnon noted that the proposal is to spread it out to five systems with this development.

Vice-Chair Losik stated that there is some concern about the basements in the units. The levels are higher for leachfields D and E.

Ms. Thayer explained the effluent is applied to the leachfield and infiltrates downward to the groundwater table. It is not at the basement level. It is way beneath the units.

Vice-Chair Losik stated that there is a reserve area indicated on the plan toward Airfield Drive. She asked if this could be used for D if for some reason the leachfield failed. If so, what would be the boundary calculations?

Ms. Thayer replied that she did not do an analysis on the reserve areas; however, this could be done. She pointed out there is more than 55ft to the boundary. Groundwater is not going to cross the line.

There was discussion on anecdotal data being provided by The Housing Partnership on developments with these systems with similar density and soils.

Attorney Donovan noted that a concern would be how the systems are going to be managed. If a septic system fails, whose responsibility is it going to be for repair? Will all units be responsible for that system? Or will it only be the units that are going into that particular system? It would

be helpful to understand the challenges that other similar developments may have in managing the systems.

Selectmen's Rep Jenness stated there are workforce units scattered throughout the development. If something goes wrong with a system, do those units share equally in the repair?

Attorney Brown explained that generally in a condo development there is a reserve fund and everyone pays in every month, whether it is to repair a roof, replace a septic or repair a driveway.

Attorney Donovan pointed out that at some point the presentation should show what the anticipated homeowners' association fees are going to be. That will have to be part of the equation in determining whether the workforce units are affordable.

Marty Chapman, The Housing Partnership, explained that it is common for a mortgage company to include all factors of a housing expense in determining if someone can afford the home. That would include the HOA fees.

Member Carter stated that one concern he has is that heading east, after Drive C, it seems to get pretty crowded. There is only 30ft between building D and E. There are two septic systems in one spot. He is concerned because everything is feeding into one area and it is not a very big area. That area is mostly taken up by leachfields.

Mr. LaRosa stated that at the last meeting the architect did a presentation on why the development is designed the way it is. The reason it was designed this way was to create pocket neighborhoods. Those were designed to be close together so the front of the houses face each other. The front covered porches would face each other. That is a specific design intent for this type of development. People are buying into a neighborhood with a sense of community.

Chairman Epperson commented that he does not have an issue with the design; however, Member Carter's observation is accurate.

Attorney Donovan asked if there are examples of the pocket neighborhood concept in the area.

Hershey Hirschkop, The Housing Partnership, replied that the Village at Salisbury Center is an example.

Member Low stated that he is concerned because some of the units are going to be very close to the houses off Random Road and there is going to be drainage in that area. Trees were going to be taken down between these units and the houses. The neighbors were concerned.

Mr. LaRosa stated that this has been addressed. The landscape plan shows that evergreens will be planted. The evergreens grow between 5ft to 12ft high and are deer tolerant.

Vice-Chair Losik stated that it was discussed on the site walk that the trees growing on the border of the commercial property on the southwest side would have to be cleared. When thinking about what will happen when that forest is taken out, that is shock. There is commercial property that is southwest of the development. That will be opening that up and looking all the way to the skate park building. She struggles with that. There is a pretty significant treed area right now. In looking towards the building (skate park), there are a lot of trees there right now. With the change in lot line, looking at how treed this is and thinking about the change, it is a very big change. She asked how they can make sure they get the best job to make everyone more comfortable. (She submitted photos to the Board showing the lots from Random Road looking through to the proposed development area.) She pointed out that the lots on Random Road have a pretty good buffer right now. She asked what can be done to the buffers. Maybe they do not have to take out all the trees. She thinks there is a legitimate concern as to what people are going to be looking at.

Mr. LaRosa stated that the majority of the vegetation that is shown on the subject is small pine. In the back, the majority of it is either large pine or large deciduous trees, which provides very little screening. What has been proposed is a spot of large evergreens that will fill in over time and be up to 15ft high. This will be a greater visual buffer than what exists currently. (He reviewed Sheet C-2 showing the buffer and explained their proposal.)

Chairman Epperson asked for information on the density of the buffer behind units 13, 14, 15 and 16. That is significantly less than behind units 25 through 28.

Mr. LaRosa stated that three different evergreens will be planted 8ft on center that will grow together. The buffer behind 25 through 28 has an additional row of conifers.

Attorney Donovan stated that he believes the zoning requires a 50ft buffer along 13, 14, 15 and 16. There are adjacent abutting uses that are not permitted in a residential district; the private school and commercial. It is also required along drive A to the west. That could probably be easy to do along drive A. The property line would just need to be moved enough to pick up a 50ft buffer. It would probably be problematic behind 13 and 15.

Member Low stated that he is concerned about the density. Part of the settlement on Whitehorse was a 10 acre piece of land to conservation. He noted that the land is near this development just beyond White Birch. He asked if there were any restrictions on that land.

Attorney Donovan stated that if it was deeded to the town there are probably no restrictions on it because it becomes conservation land managed by the Conservation Commission. It is the Commission's practice to give a third party easement, when they get land deeded to them, so the town voters can never sell the conservation land. He continued that he is not sure if they have done that with this land or not.

Speaking to the applicant, Chairman Epperson noted that the issue is the buffer between the commercial property and the units. They want something that makes sense.

Vice-Chair Losik stated that LDR Section 606 addresses the protection of significant features such as trees. In that particular area the buffer matters. She knows they have agreed that this has good architectural design. However, does it mean that those four units should be looked at to see if there is something else that might work? Maybe it might have a little different character to preserve a 50ft buffer to have some separation.

Attorney Donovan stated that he is hearing that whether or not the applicant agrees with his interpretation of the zoning ordinance the Board would like to see a thicker buffer.

There was discussion on how to create a denser buffer.

Member Lord asked if they could lose unit 4 and unit 9 and slide it to the north.

Ms. Hirschkop stated that they looked at making adjustments to the units that are closer to the buffer line. There is some adjusting that can be done; however, there comes a point where a certain amount of road and driveway can't be lost. The building would have to be changed entirely and it becomes unattainable at that point.

Speaking to Mr. Chapman, Member Carter asked if 40 units were needed to make this work financially.

Mr. Chapman replied yes. He continued that is why this site was attractive for this. Losing 10 percent of the units would be a loss. He commented that they are not in a position to sacrifice buildings. He does not think it is necessary to address these concerns.

Member Lord stated that density has been his issue. There are 40 units and the buildings are very tight to each other. There is a lifestyle that goes with that. There are 22ft roadways and some of the buildings are 15ft off the road. There is no sidewalk. There is almost no drainage, besides sheet flow, on this entire site. He thinks there is a bigger issue here of safety for the residents. Putting buildings 30ft apart with a whole series of air compressors, the sound is going to be bouncing back and forth. People are going to be sitting on their porches and listening to compressors all the time. He thinks there is a whole series of issues here.

Mr. LaRosa stated that AOS recommends that the air compressors be inside the buildings.

Mr. Chagnon noted that there is an enclosure in the design for the air compressors.

Member Lord commented that even inside an enclosure they will be fairly loud and are going to be running a good amount of the time. This is a lifestyle and safety issue for him.

Vice-Chair Losik stated that the building inspector raised the concept of sidewalks. She thinks there were discussions about a mailbox area and a possible bus stop. She asked how 40 units would operate. Where do the residents go? Where do they get out? Where do they walk?

Sarah Hourihane, Lassel Architects, stated it goes back to the difference in community style. Even though sidewalks have not been included, it is anticipated that paths will naturally form between the different pods. The area in the middle of the pods is really where the children will be playing. They may be riding their bikes on the streets in the summertime but during the winter they will be building snowmen in the pod area. It has to be remembered that this is a different lifestyle than what would be seen in a typical development.

In regards to the mailbox area, Mr. LaRosa stated that he met with Deb Staples from the Post Office and they are requiring a centralized mailbox location. The proposed area is near the parking area for the playground. People will be able to pull in, park and get to their mailbox.

The Board reviewed the area on the plan.

Vice-Chair Losik noted that in front of the garages there is space to park two cars. She asked if they really feel that five extra parking spaces are even near adequate. This is a big neighborhood.

Mr. LaRosa explained that each unit has a two-car garage, for parking inside, and there is space in front of that where four cars could go.

Vice-Chair Losik stated that in Section 606.6 open areas are discussed. She noted that there is the playground and the raingardens. She asked if there are targeted areas for open space.

Ms. Hirschkop explained that they purposely made the pocket neighborhoods for a lot of different reasons. The neighborhoods are fairly big, surrounded by the housing and enclosed. They are going to be the natural resource that everyone has to build community and have space to do other things. She commented that they could have done a typical development. However, they went out of their way to spend more money and make a more expensive product because they believe this is going to be a really nice neighborhood.

Mr. LaRosa pointed out the open spaces on the plan for the Board.

Ms. Hirschkop stated that she encourages the Board to visit the Village at Salisbury Center. It has a huge pod in the middle that is generous and is actually smaller than what is being done here. There are all sorts of programs that could be put in it. There could be sitting spaces and vegetable gardens. There will be a lot of space in this. She reiterated that they could have gone a different route and made this a less expensive project but this is a good direction for communities to go in.

Speaking to Mr. Chapman, Attorney Donovan stated that at the last meeting it was said that the market research has been done on these units. He imagines the pocket concept was part of that research. He asked if this research is something that could be shared with the Board.

Mr. Chapman stated that they did not commission a market study. They looked at the demographics of the area and the competing units. In this case, they met with two or three of the most reputable real estate firms in the area. The development was presented to them to see what they thought about the style, location and whether it would attract buyers. The consensus was that this is a very appealing development and there will be no trouble with people buying them. It is believed that the units will sell out before they are built.

Attorney Donovan asked if this was before or after it went from single family to fourplexes.

Mr. Chapman stated that it has always had multi-family in it. In general, the idea of a development in this location, the size of the units and the amenities being proposed is very strong.

Attorney Donovan asked if The Housing Partnership is going to be the developer through the entire project.

Mr. Chapman stated that they will be the developer. Once a certain number of units are sold, the condo association takes over the management of the units. In terms of selling the buildings and developing the land, that would be The Housing Partnership.

Member Low asked the price range of the units.

Mr. Chapman stated that the price of the affordable units is a maximum of $300,000. In terms of the market side, the goal is to keep those less than half a million dollars. There is very little product at that price point in Rye. He noted that the price of the market units will be driven by the market at the time they go on the market.

Attorney Donovan asked if there is a phasing plan with 8 or 9 units built before another 8 or 9 units are built.

Mr. Chapman explained that they will build a model in the beginning. They will not break ground on 40 units and build them all at once. They will move through the development in a way that makes sense. They are hopeful that they will have presales as the units get developed.

Selectmen's Rep Jenness stated that they have discussed the number of people living in this development but they have never discussed pets. There could be a dog for each unit or more. She asked where the residents would walk their dogs.

Mr. Chapman stated they will have to research what condo associations typically do and if it is something that needs to be built into the rules and regulations.

Attorney Brown stated the usually pets are allowed but there is a limit.

Ms. Hirschkop commented that there will be a pet policy of some type. Like anywhere, people will own pets, walk them and hopefully pick up after them.

Vice-Chair Losik stated that another question that came up from department heads was in regards to snow storage and a maintenance area for landscape equipment. She assumes this would all be contracted.

Mr. Chapman replied that it will be contracted.

Member Carter asked if there is room on the plan to put in sidewalks. He thinks it would add a lot for people walking the neighborhood.

Mr. Chagnon stated the sidewalks introduce the idea of whether or not they are protected with a curb. Given the site, paths might work between the units, as opposed to the street.

Vice-Chair Losik asked if they have talked to Conservation about the access of that land.

Ms. Hirschkop stated that she does not know anything about the land. It just seems to be unused.

Vice-Chair Losik commented that the land would be a very big plus to this.

Member Low noted that people already use the land.

In regards to the roads and their walkability, Mr. LaRosa stated they are 22ft wide with gravel shoulders. He is fairly certain in the last 30 years there has been no mud on the site. It is so bone dry. The site is well drained.

Member Lord stated that amenities that are going in. Real loam and real grass will get muddy in wet weather.

Mr. LaRosa explained the first two feet will be compacted gravel.

Member Lord asked if the kids could walk on the gravel versus the pavement.

Mr. LaRosa confirmed.

There was some discussion in regards to areas in the development that can be used by the residents.

Mr. LaRosa noted that they need to discuss driveways versus street issues.

Attorney Donovan explained the Board needs to decide if these are going to be streets, which means they need to meet the street design criteria, or whether they are going to be what is being proposed.

Mr. LaRosa stated that under the ordinance there is a definition for streets. There are two things that are required; a right-of-way and access to abutters. In this development these are proposed as driveways. They are asking that the Board rule that they are driveways so they do not have to meet driveway separation, street width and street geometry requirements. He continued they meet most of the requirements generally. This is going to be a private road. There is no 400ft straightaway. These were designed as driveways.

Chairman Epperson stated that he would have to differ to Sebago and Attorney Donovan. He would not be able to make a decision on that at this meeting.

Selectmen's Rep Jenness asked if there is a difference between the construction of a driveway as opposed to a road as far as the bed.

Mr. LaRosa explained that this will be built to standard road construction even though it is called a driveway.

Attorney Donovan commented the principal difference is the width. If it was a street there would have to be a right-of-way. That would probably make the development not feasible because the buildings are too close to the driveways.

Selectmen's Rep Jenness asked if the condo association will end up with potholes and other issues, sooner than they should, if the road is not built to town standards.

Attorney Donovan stated that the cross sectionals will be to the Planning Board's specifications and meet road standards. The principal difference is the width and the horizontal curvature.

Mr. Chagnon stated it is a 10 acre site plan development as a condominium with units on it.

Attorney Donovan stated that his concern is that the amount of traffic on the streets will be comparable to Sea Glass, which has 20 units. In looking at driveway C, there are 20 units that will be using that to get in and out of the development. There will not be any police control over this. It is an issue that needs to be resolved. He is not sure how a requirement of 24ft wide streets would affect the plan. A right-of-way would certainly affect the development.

Attorney Brown stated that to be feasible it has to be something like what is being proposed.

Attorney Donovan stated that in multi-family dwellings that he is most familiar with they have short streets that end up in parking lots with the houses along the parking lot. The plan being presented is really a street system.

Mr. Chagnon pointed out that it would be like the Cedars and Springbrook developments in Portsmouth. The association owns and maintains the roads. The roads remain private.

Vice-Chair Losik asked if there would be any issue with the town taking over the road if they had to.

Attorney Donovan explained that these would be private streets and the town could not be forced to take these over, if these are approved by the Planning Board.

Selectmen's Rep Jenness asked if the fire department still needs to look at this.

Mr. LaRosa replied that they did review the plan and provided comments to the Board.

Attorney Donovan suggested that they resubmit the plan to the new fire chief. Referring to the curvatures of the road, he asked if there are site issues on any of the curves.

Mr. LaRosa replied that the site is flat as a pancake.

Attorney Donovan asked if each driveway will have an acceptable site distance.

Mr. LaRosa replied yes for the low speed of the development.

Attorney Donovan asked who will enforce the low speed. A private road would not have police patrol to enforce the speed limits.

Mr. LaRosa stated that the neighbors will look out for each other. He asked if the Board could come to a consensus on the streets versus driveway issue.

Chairman Epperson stated that once they really understand the design they can.

Attorney Donovan stated there are probably three principal issues involving the street issue. One is if the Board required them to be streets this would require a 40ft right-of-way. This would essentially make this development not feasible. Assuming the answer is no, the Board then needs to decide if they are comfortable with the 22ft width or do they want the 24ft. From what he has heard, they can do 24ft if they have to. The question is whether they should leave the 22ft and put in a 4ft sidewalk, which would be a preferable solution.

Member Lord agreed.

Mr. LaRosa stated that instead of the concrete drainage on this well drained site there would need to be an additional collection system along the curb line on the sidewalk side.

Vice-Chair Losik pointed out that the impervious right now is over 35 percent. There would be some impact to that number if the streets are widened.

Mr. LaRosa noted that the sidewalks will also add to that. He suggests that they add a pathway system to alleviate some of this concern.

Member Lord stated that the kids could walk on a curbed sidewalk to Lafayette Road to the bus stop.

Attorney Donovan pointed out Sebago's letter outlining the design criteria in order for the roadways to be streets.

Mr. LaRosa noted that the lots cannot be subdivided to create more density. There will be up to 8 units per acre. If this was subdivided with a sharp pencil there could be more units on it with this type of soil. If a right-of-way is put in, that is really a subdivision rather than a site plan. This is definitely focused on being a site plan.

Attorney Donovan stated that it is legally a subdivision too. Any condominium arrangement is a subdivision. He asked if there are any limited common areas around the dwellings. Is it going to be all one common space from the back of one's porch?

Attorney Brown stated that it would be limited for the deck and driveway.

Attorney Donovan noted that the common area is further diminished if there is going to be 10ft of land around the house that becomes limited common area.

Mr. LaRosa commented that this is not proposed here.

Ms. Hirschkop stated that this has not been thought of yet.

Vice-Chair Losik commented there might be issues with the setbacks for the septics.

Mr. LaRosa stated that realistically it will most likely be all common area.

Mr. Chapman stated that one of the reasons for that is because of aesthetics. He continued that they are leaning towards a full common area beyond the building.

Chairman Epperson noted that they need a decision about the roads.

Vice-Chair Losik commented that they need fire department input.

Mr. LaRosa stated that the next issue is the 50ft buffer; commercial versus residential.

Member Lord asked why they have buffers like this when they should be able to get 50ft buffers. He asked why they can't change it just a little bit to create bigger buffers. It seems that this was designed to maximize everything without any ability to tweak anything.

Chairman Epperson asked if he is saying that the lot line adjustment should be another 75ft or 100ft.

Member Lord stated there should be something that can done to accommodate what they are all trying to get to. It seems like a lot of things are trying to be squeezed in without a lot of give. Maybe the land is not quite big enough. Maybe there has to be lessor units for what is needed.

Mr. Chapman stated that they cannot lose two buildings because they would lose four. If one unit is lost it is really the entire four units. He continued that they are listening very carefully. They would like to go back and look at the overall site. He thinks that most of the issues can be solved without affecting density. The density of the site design is partial of the design.

Chairman Epperson asked if the lot line is something that can be changed.

Mr. Chagnon commented that they will have to look at it. He pointed out that they received the letter from Attorney Donovan on January 10th stating that the 50ft buffer is what they were going to have to design to. It was designed to the frame they had. Now they have to reassess.

The applicant and his team agreed to reevaluate the plan based on the discussions from the work session. The application is scheduled to be presented to the Planning Board at the monthly meeting on February 13th.

Adjournment

Chairman Epperson adjourned the work session at 8:50 p.m.

Respectfully Submitted,
Dyana F. Ledger

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1/30/2018
handout

January 29, 2018

StoneHill Project No. 16126

The Housing Partnership
c/o John Chagnon
Ambit Engineering, Inc.
200 Griffin Road, Unit 3
Portsmouth, NH 03901

RE: Hydrogeologic Assessment
Residential Development, Airfield Drive, Rye, NH

Dear Mr. Chagnon:

StoneHill Environmental, Inc. (StoneHill) has completed a hydrogeologic study and nitrate impact assessment at the above referenced property (Site) in general accordance with the aquifer protection ordinance of the Town of Rye (Town), New Hampshire. The Housing Partnership (THP) is proposing to develop 40 residential dwelling units at the Site. The dwellings will be serviced by public water and on-site subsurface wastewater disposal systems. While the subject Site is not within the boundary of a mapped Rye Water District Wellhead Protection District, the Site is within a mapped stratified drift aquifer. As such, provisions of the Town of Rye Zoning Ordinance *Section 306 – Aquifer and Wellhead Protection District* pertain to the Site. Since six subsurface wastewater disposal systems are proposed to serve the development, a hydrogeologic assessment which includes a wastewater nitrogen loading analysis is required to determine whether the subject residential project will result in adverse short- or long-term impacts on the local aquifer.

The hydrogeologic assessment included the following activities:

- A Site visit to observe geological and environmental conditions in the project area.
- Review site survey plans and soils test pit data for the proposed development.
- Advance test borings and install four (4) monitoring wells. Gauge groundwater levels in the monitoring wells and collect groundwater samples for laboratory water quality testing.
- Collect soil samples from on-site test pits and test borings and submit for laboratory grain size analysis testing.
- Review published geological and hydrogeological maps for the project area.
- Review groundwater resource maps published on the NH GRANIT geographic information system and the Town of Rye website.
- Review New Hampshire Department of Environmental Services (NHDES) One-Stop database records for potable water supply wells in the Site vicinity.
- Complete a groundwater nitrate impact hydrogeologic assessment.

Project Location and Description

The Site of the proposed residential development is located on the south side of Airfield Drive, to the east of the Lafayette Road (U.S. Route 1) intersection in Rye, New Hampshire. The United States Geological Survey (USGS) 7.5 minute topographic map shown as Figure 1 depicts the project location. The Town of Rye Tax assessment records indicate the subject property is identified as part of Map 10 Lots 15-4 and 16 as shown on Figure 2. Airfield Drive is identified as a private way on Tax Map 10. As shown on the aerial photograph provided as Figure 3, the northern portion of the Site along Airfield Drive is a level, open field with sparse vegetation transitioning to wooded uplands in the southern portion of the property. A stormwater detention pond is present at the east end of the Site. The open area of the Site was the western portion of a former aircraft landing strip which extended to the east. A former aircraft hangar on the northern abutting parcel now houses the Rye Airfield indoor skateboard and BMX bicycle park facility. White Birch at Rye, a multi-unit retirement community, is located to the southeast of the Site at 11 Airfield Drive. A single family residential subdivision is situated to the south of the Site along Random Road. Mixed commercial and residential properties are present to the southwest, west, and northwest along Lafayette Road.

It is StoneHill's understanding, based on information provided by project civil engineering consultant Ambit Engineering, Inc. (Ambit) that a 40 unit, residential development is proposed for the 10 acre property. Vehicular access to the new residences will be from Airfield Drive via several loop roads as illustrated on Figure 4 and on site plans provided in the Appendix. The development will consist of 12 four-bedroom residences and 28 three-bedroom residences to be served by the municipal public water supply and six subsurface wastewater disposal fields designed in accordance with the NH Department of Environmental Services (NHDES) subsurface disposal system criteria.

Naturally deposited soils at the project site are mapped as predominantly Hoosic gravelly fine sandy loam (510A) and Canton gravelly fine sandy loam (42B) as indicated on the Existing Conditions Site Plan and in test pit logs prepared by Ambit contained in the Appendix. Near-surface soils at the northern portion of the site are mapped as Regraded/Filled material (299) attributed by the septic designer to disturbance and placement of fill material from former gravel mining activities at the Site. The general subsurface profile consists of about 0.5 to 1 foot of gravelly to fine loamy sand and fine sandy loam overlying gravelly, coarse to medium sand and stony, coarse sand deposits with intermittent layers containing cobble-size stones. Most of the test pits completed by Ambit were advanced to depths of about 7 feet to 9 feet below existing grade with no evidence of the groundwater table observed. Refusal surfaces interpreted to be bedrock were encountered in five of the test pits as the southeast end of the Site at depths ranging from about 3.5 feet to 7 feet below the existing ground surface level. To evaluate soil texture characteristics, soil samples for laboratory grain size analysis were collected by StoneHill from

test pit TP-13 below the fill layer, at depths of 2 to 5 feet and 5 to 8 feet below ground surface. Results for the 2 to 5 feet interval indicate materials consisting of about 50 percent fine to coarse sand, 40 percent fine to coarse gravel, and less than 10 percent fines (silt and clay) with a Unified Soil Classification System (USCS) designation of SP-SM. The sample from 5 to 8 feet had about 15 percent fines and 15 percent gravel respectively, with 70 percent fine to coarse sand with a USCS designation of SM. Soil gradation test results are included in the Appendix.

Monitoring Well Installation and Groundwater Sampling

As part of this hydrogeologic study, overburden monitoring wells were installed within four test borings on the Site during a field event spanning December 18 through 20, 2017. StoneHill supervised the completion of the soil borings and installation of monitoring wells by New England Boring of Londonderry, New Hampshire. The soil borings were installed using an all-terrain drill rig equipped with 4-1/4-inch inner diameter hollow stem augers. Split spoon soil samples were collected at varying intervals depending upon the soil conditions encountered. Significant difficulty was encountered advancing borings due to the presence of large cobbles in the overburden deposits therefore drive and wash drilling methods were also employed. Monitoring wells MW-1, MW-2, MW-3, and MW-4 were completed as two-inch diameter PVC groundwater monitoring wells with 10-foot lengths of 0.10-inch slotted screen installed to depths ranging from 29 feet to 39.5 feet below ground surface. Each well was completed with PVC riser pipe extending about 2.7 to 2.9 feet above ground surface and secured with a locking steel standpipe. The monitoring well locations are identified on Figure 4 and boring logs with well completion details are included in the Appendix. Subsurface materials encountered during the monitoring well installation consisted primarily of fine to coarse, gravelly sand with varying amount of silt, large cobbles and boulders similar to results of earlier test pit investigations. Samples of the overburden materials from MW-2, MW-3, and MW-4 were submitted for laboratory gradation analysis with results contained in the Appendix.

Groundwater levels were measured in the monitoring wells on December 22, 2017 and correlated with survey elevations provided by Ambit Engineering, see Table 1—Groundwater Elevation Data for a summary. The monitoring wells were then developed in anticipation of groundwater quality sampling. A second round of groundwater level measurements were collected on January 4, 2018 and utilized to develop the groundwater table contour map presented as Figure 4. Groundwater samples were also collected on January 4, 2018 by StoneHill and submitted for laboratory analysis for chloride, nitrate, and ammonia nitrogen parameters. Field parameters consisting of pH and specific conductivity were measured in the field. An additional round of groundwater level and field groundwater quality measurements was completed on January 24, 2018. Table 2 provides a summary of groundwater analytical data; laboratory data reports are contained in the Appendix. As indicated on Table 2, groundwater at the site has a slightly basic pH, with elevated specific conductivity values for MW-1 and MW-2 located in the southern and

northwestern portions of the Site, respectively. Chloride concentrations are also elevated in MW-1 and MW-2 and are attributed to road salt influences from Lafayette Road/Route 1 and the large parking areas associated with Washington Square the commercial property located to the southwest of the Site. Chloride concentrations reported in the samples from the monitoring wells were below the secondary drinking water standard of 250 milligrams per liter (mg/L). Background nitrate concentrations ranged from 2.7 to 3.6 mg/L and are below the primary drinking water standard of 10 mg/L. Ammonia nitrogen was not detected in any of the samples submitted for laboratory testing.

In general, ground surface topography slopes gradually downward to the northeast within southwestern end of the property, and downward toward the north at the southeast end of the Site. The central and northern sections of the property are relatively level as shown on Figure 4. Stormwater drainage is directed toward the detention pond at the northeast corner of the Site, adjacent to Airfield Drive. Groundwater flow directions on the Site and within nearby areas are interpreted to generally mirror surface topographic trends, with flows from southwest to northeast across the Site toward Berrys Brook and associated wetlands to the northeast. Based on January 4, 2018 measurements, groundwater at the Site flows from upland areas in the southwest toward the northeast as shown on Figure 4, with a calculated hydraulic gradient of 1.1 percent across the Site. Depth to groundwater in the monitoring wells ranged from 31.0 feet below ground surface at MW-1 in the southwestern upland area of the site, to 13.4 feet at MW-4 in the northeastern site area. As shown on Figure 5, on site surficial deposits are mapped by the USGS as part of a Stratified Drift Aquifer, composed of variable sand and gravel and silty sand materials deposited during the last glaciation. USGS mapping indicates the elevation of the local groundwater table is about 60 feet, or 30 feet below the ground surface in the Site vicinity which generally correlates with on-site measurements. The Rye Master Plan Stratified Drift Aquifers Map contained in the Appendix indicates aquifer transmissivity values in the range of 1,000 to 2,000 ft^2/day at the west end of the Site, transitioning to transmissivities of less than 1,000 ft^2/day in the central and eastern areas of the property due to the decreasing interpreted thickness of the aquifer to the east. Field investigations at the Site in support of the development confirm USGS surficial geology and aquifer mapping. Hydraulic conductivity of the aquifer formation was determined by soil grain size analysis of test boring samples to be in the range of 10 to 15 feet per day. Based on the calculated hydraulic gradient, hydraulic conductivity, and porosity values typical of silty sand deposits, the average linear groundwater velocity is in the range of 30 to 50 feet per day.

Disposal Field Locations and Nitrate Loading Calculations

Subsurface disposal field sizing and design parameters were provided to StoneHill by Ambit. Six subsurface wastewater disposal fields are proposed at locations depicted on Figure 4. Septic Plan sheets C5a and C5b provide details of the individual disposal systems identified as Fields A

through F. The systems are designed to accommodate domestic wastewater flows from 40 units consisting of 12 four-bedroom residences and 28 three-bedroom residences. Flow rates of 150 gallons per day (gpd) per bedroom are assumed in accordance with plans provided by Ambit and New Hampshire septic design guidelines, for total daily flows on the order of 19,800 gallons for the development. Use of Advanced Onsite Treatment Systems (AOS) technology is proposed for the project to treat the wastewater prior to application at the disposal fields. As such, nitrate loading at wastewater disposal field areas is anticipated to be at 25 mg/L based upon the AOS manufacturer's performance specifications. Design parameters for wastewater disposal fields A through F are summarized as follows:

	Size ft^2	Field Dimension, ft	Flow Rate, gpd
Field A	1,000	25 by 40	3,000
Field B	1,000	25 by 40	3,000
Field C	1,250	25 by 50	3,900
Field D	1,250	25 by 50	3,900
Field E	1,250	25 by 50	3,900
Field F	800	20 by 40	2,100

Nitrate loading and potential aquifer impacts may be analyzed using several different models. For this project the nitrate plume analysis was completed using an analytical technique that models vertical and horizontal spreading based on contaminant dilution and dispersion within the underlying aquifer. Dispersion refers to the spreading and mixing caused by both molecular diffusion and mechanical mixing due to microscopic variation in velocities within individual pores within an aquifer formation.

The plume model used to estimate nitrate attenuation downgradient of the leach fields was developed by Domenico and Palciauskas (1982) as adapted by the United States Environmental Protection Agency (US EPA) and published in the Federal Register, Volume 50 Number 229 pp. 48898-48910, November 27, 1985. The model calculations used the leach field sizes provided by Ambit. The model estimates the ability of an aquifer to dilute the nitrate concentration from a specific volume of wastewater effluent and predicts the nitrate concentrations at a specific distance downgradient from the leach field source. As summarized on the explanation sheet contained in the Appendix, the model utilizes site-specific variables consisting of initial nitrate concentration of the effluent, background nitrate concentrations in the aquifer, and geometry of the wastewater disposal field. The other values for the model's parameters (i.e. dispersivity) are fixed and were selected by the US EPA through the Federal Register review process and determined to be reasonable worst-case values. The longitudinal dispersivity term is calculated relative to the travel distance downgradient from the leach field source. Transverse (horizontal) dispersivity and vertical dispersivity are determined relative to the calculated longitudinal

dispersivity at ratios of 3:1 and 10:1 respectively, see explanation sheet in the Appendix for the equations and further details.

The analytical model is favored because it enables prediction of nitrate plume geometry based upon leach field sizing and configuration, while it also considers conditions that would occur during a severe drought because dilution from infiltrating precipitation is ignored in the model. The model approach is also deemed conservative because physicochemical and bacteriological reactions which also reduce nitrate concentrations have not been considered. If these reactions were considered in addition to the dilution and dispersion analyses, as is the case under actual field conditions, nitrate concentrations in groundwater would be markedly lower than those calculated.

Model assumptions relative to subsurface soil characteristics were made on the basis of geologic mapping; on-site observations and grain size analyses, as well as review of the soil test pit logs prepared by NH Subsurface Disposal System Designer Sandy Edgerly and Certified Soil Scientist Marc Jacobs, as witnessed by Dennis Plante for the Town of Rye. A background concentration of 3 mg/L nitrate in groundwater as selected for modeling purposes for Fields A, B, D, E and F based upon nitrate concentrations measured in groundwater at monitoring wells MW-1, MW-2 and MW-4. A background nitrate concentration of 3.6 mg/L was selected for Field C based on testing results from adjacent MW-3. Additionally, evaluations at potential nitrate plume "stacking" or merging of flows from upgradient Field B to downgradient Field A was performed. Nitrate attenuation calculations are contained in the Appendix along with an explanation of the methodology employed by StoneHill.

As indicated by the nitrate attenuation analysis provided in the Appendix, the results predict nitrate levels below 10 mg/L (Primary Drinking Water Standard) would occur at a distance of 55 feet or less from the disposal fields. Figure 4 presents the predicted 10 mg/L nitrate plumes for the six individual disposal fields, as well as the interpreted plume flow directions which are influenced by local groundwater flow, ground surface topography, and nearby surface water bodies. As such, nitrate concentrations in excess of 10 mg/L are not anticipated to extend beyond the northern property boundary.

Water Supply Well Inventory

The Rye Water District municipal Public water supply serves the project area and will provide potable water to the Housing Partnership development. The project Site is not located within or in close proximity to a Wellhead Protection Area (WHPA) established by the Rye Water District as indicated on the Source Water Protection Area Map contained in the Appendix. Because individual water supply wells are in use in the site vicinity, an inventory was prepared of nearby public and private water supplies using the NHDES One-Stop database and geographic

information system mapping. A copy of the Supply Wells and WHPA map for Rye, NH identifying wells in areas surrounding the Site is contained in the Appendix. Records of the individual supply wells shown on this map were obtained and reviewed, with pertinent details compiled in the Well Inventory Summary provided as Table 3. To augment NHDES One-Stop data, the Rye Water District was contacted to confirm the extent of service in the Airfield Drive area. The Rye Water District serves Airfield Drive including the White Birch at Rye development and the Random Road neighborhood. While the NHDES One-Stop records indicate on-premises public water supplies, the Rye Water District indicated they provide water to the Rosewood at Rye Motor Inn (150 Lafayette Road) and Adams Mobile Home Park (120 Lafayette Road) properties. Based upon available supply well and hydrogeologic data, StoneHill concludes that there are no identified water supply wells that are downgradient of the Site at locations where THP development activities could potentially impact water quality in a supply well.

Summary and Conclusions

The Housing Partnership development Site is situated in a mapped Stratified Drift Aquifer with the groundwater table measured to range from 13 to 31 feet below the ground surface level. Groundwater flows are from upland areas at the southwest end of the Site toward Airfield Drive to the northeast. Beyond Airfield Drive groundwater flows to the northeast across the adjacent Rye Airfield property and toward mapped wetlands situated about 1,500 to 2,000 feet to the northeast. Berrys Brook is located about 3,000 feet northeast of the Site. The Rye Water District serves Airfield Drive and the surrounding areas. No sensitive groundwater receptors were identified downgradient of the proposed wastewater disposal systems.

Based on results of this hydrogeologic assessment and the use of AOS advanced treatment systems, groundwater nitrate concentrations at the downgradient property boundary are predicted to be below the Primary Drinking Water Standard of 10 mg/L. Water supply wells were not identified downgradient of the Site where development activities could impact water quality in a supply well.

This report has been prepared on behalf of The Housing Partnership c/o Ambit Engineering, Inc., for the specific application to the subject project for their exclusive use and submittal to the Town of Rye. In the event any changes in nature, design or location of the project and site features are made, the conclusions and recommendations in this report may require modification and should be reviewed by StoneHill. The report was prepared in accordance with generally accepted practices consistent with the level of skill ordinarily practiced by members of the profession in the same locality under similar conditions.

StoneHill appreciates the opportunity to be of assistance with this project. If there are any questions, or if StoneHill can be of additional service, please contact us.

Sincerely,
StoneHill Environmental, Inc.

Cynthia A. Thayer, P.G.
Project Manager

STATE OF NEW HAMPSHIRE
CYNTHIA A. THAYER
No. 526
LICENSED
PROFESSIONAL GEOLOGIST

Timothy S. Stone, P.G.
President

Attachments: Figure 1 - Site Location Map
Figure 2 – Tax Map
Figure 3 – Site Aerial Photograph
Figure 4 – Groundwater Contour Map & 10 mg/L Nitrate Plumes
Figure 5 – USGS Aquifer Map
Table 1 – Groundwater Elevation Data
Table 2 – Summary of Groundwater Analytical Data
Table 3 -- Well Inventory Summary

Appendix: Existing Conditions Plan and Septic Designer Test Pit Logs
Septic Overall Plan – Sheet X1
Laboratory Groundwater Analysis Report
Laboratory Soil Gradation Curves
Nitrate Attenuation Explanation and Calculations
Supply Well and Wellhead Protection Area Map
Rye Wellhead Protection Map
Rye Master Plan Stratified Drift Aquifers Map

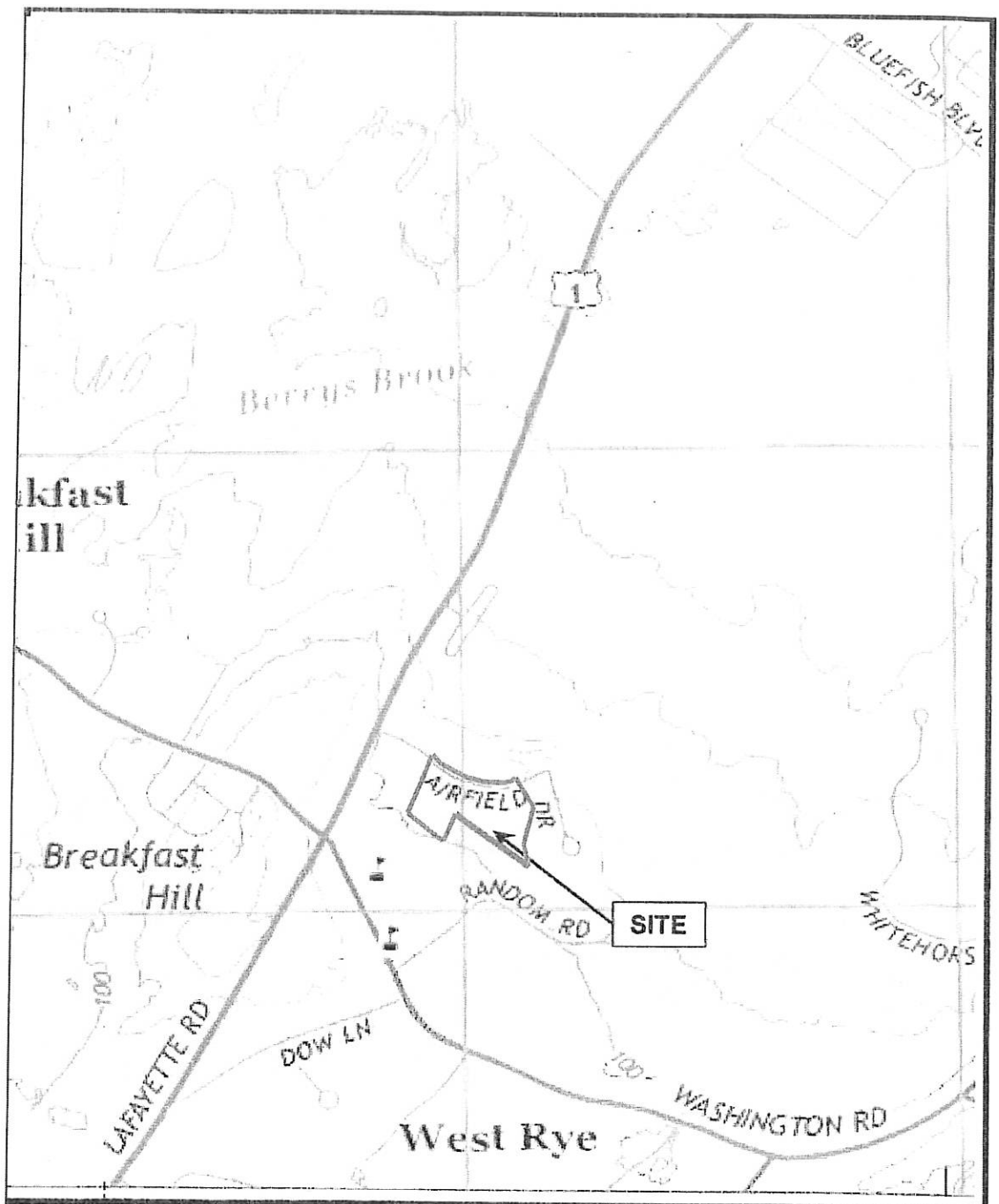


FIGURE 1

0 1000 2000

approximate scale in feet

Contour Interval 20 Feet

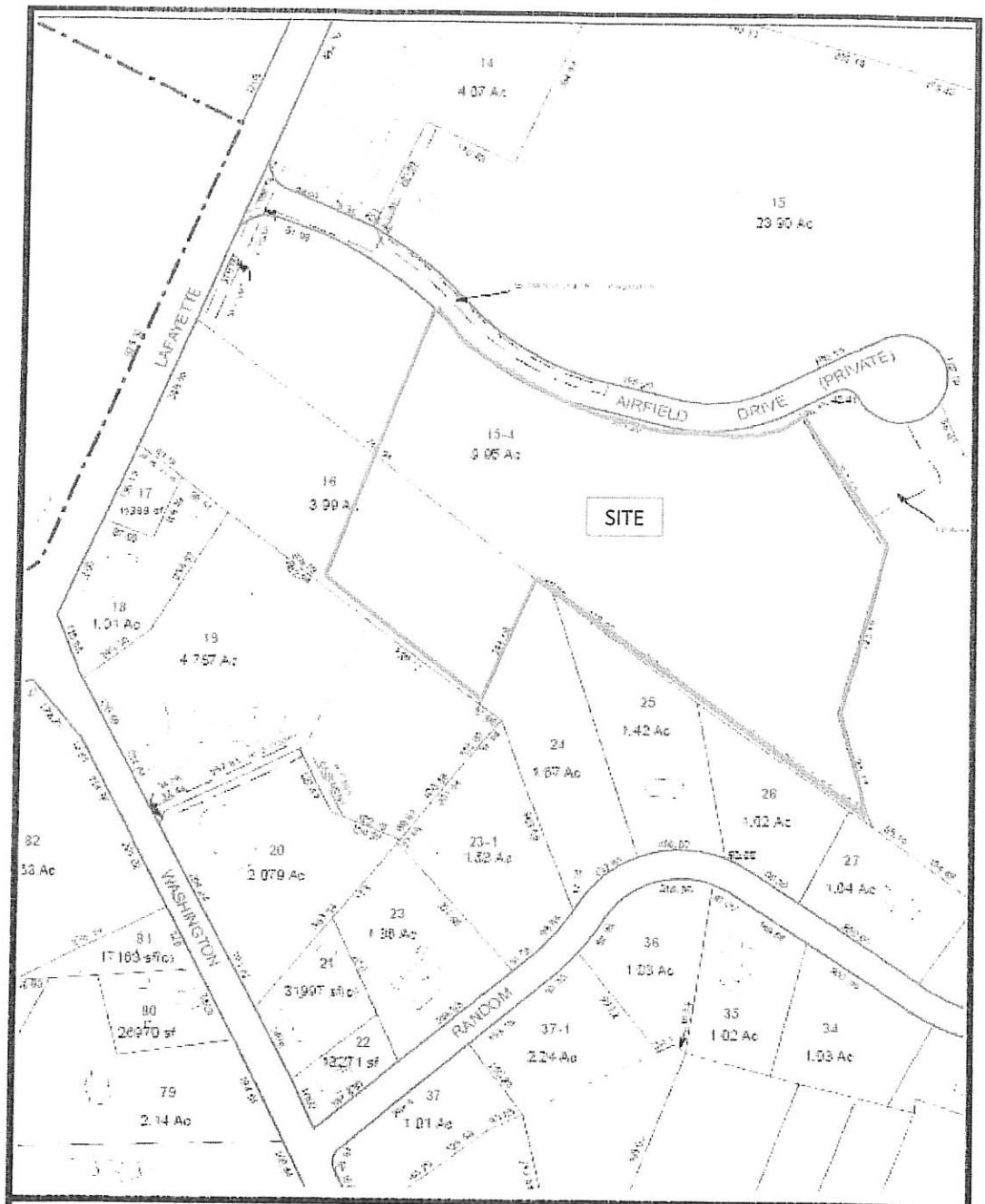
N

SITE LOCATION MAP

Airfield Drive Development
Rye, NH

Map Source:
USGS 7.5 Minute
Topographic Quadrangle
Portsmouth, NH
2015

Prepared by:
StoneHill Environmental, Inc.
Project No. 16126



0 250 500

approximate scale in feet

N

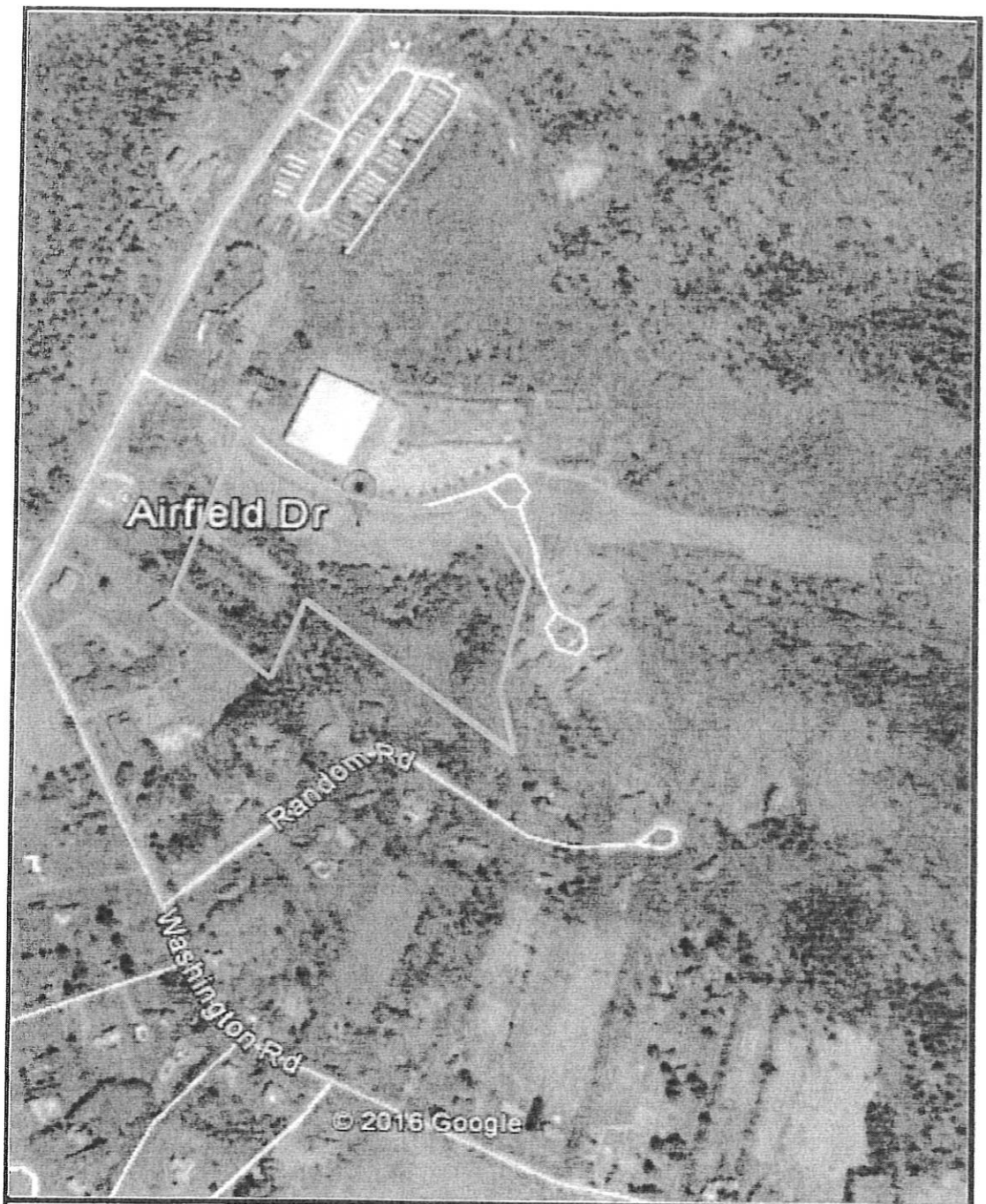
Map Source:
Town of Rye, NH
Tax Map 10

FIGURE 2

TAX MAP

Airfield Drive Development
Rye, NH

Prepared by:
StoneHill Environmental, Inc.
Project No. 16126



0 1000 2000

approximate scale in feet

N

Map Source:
Google Earth
2016

FIGURE 3

SITE AERIAL PHOTOGRAPH

Airfield Drive Development
Rye, NH

Prepared by:
StoneHill Environmental, Inc.
Project No. 16126

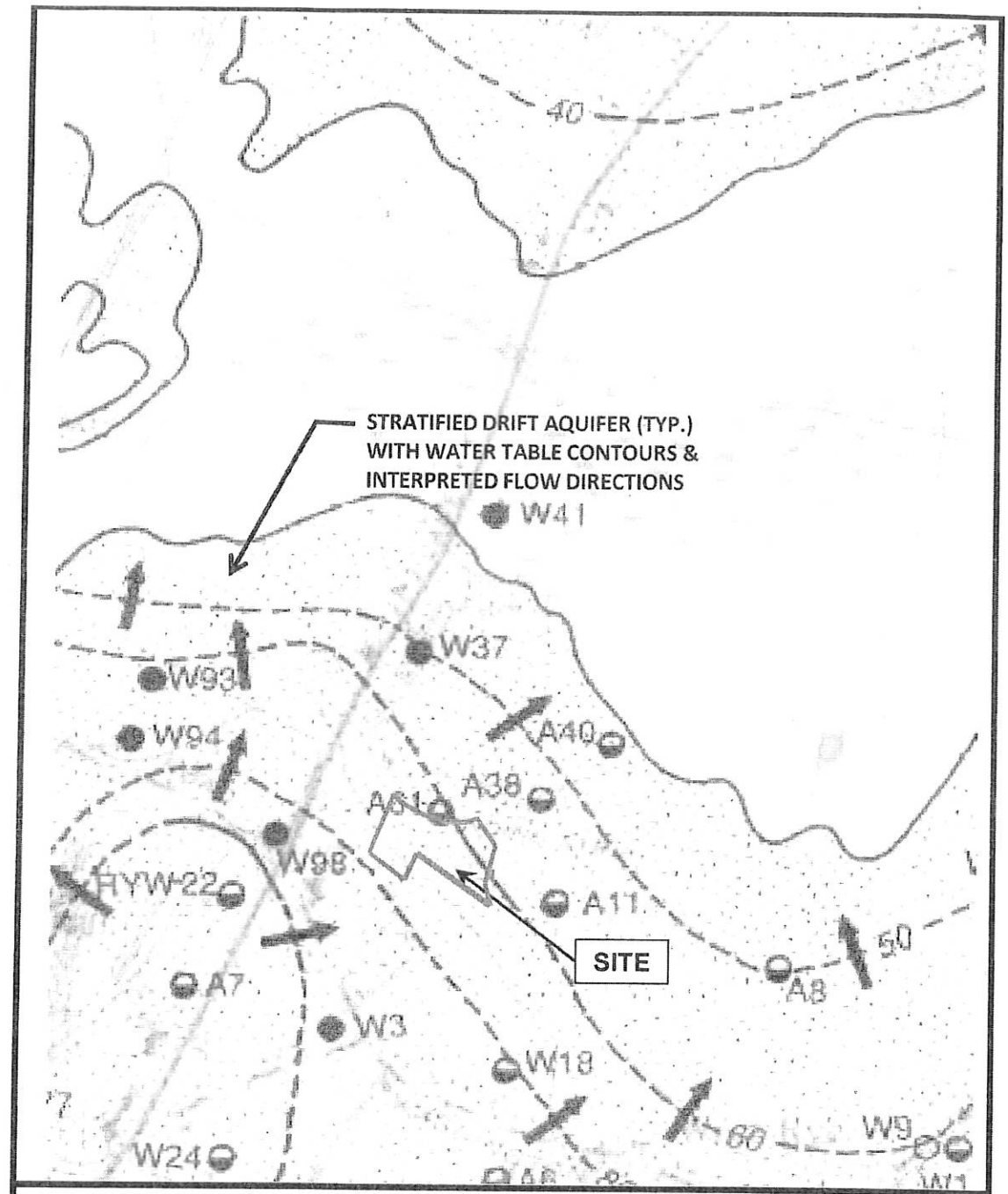


FIGURE 5

0 1000 2000

approximate scale in feet

Contour Interval 10 Feet

Map Source:
USGS Water Resources
Investigation Report 91-4025
Stekl and Flanagan
1988

N

USGS AQUIFER MAP

Airfield Drive Development
Rye, NH

Prepared by:
StoneHill Environmental, Inc.
Project No. 16126

Table 1
Groundwater Elevation Data
THP Rye Airfield
Airfield Drive, Rye, NH

Monitoring Well	Top of Casing Elevation[1,2]	Measurement Date	Depth to Groundwater BTOC	Groundwater Elevation
MW-1	105.14	12/22/17	33.64	71.50
		01/04/18	33.72	71.42
		01/24/18	33.11	72.03
MW-2	89.01	12/22/17	22.06	66.95
		01/04/18	22.07	66.94
		01/24/18	22.38	66.63
MW-3	86.78	12/22/17	19.23	67.55
		01/04/18	19.26	67.52
		01/24/18	18.86	67.92
MW-4	83.60	12/22/17	16.27	67.33
		01/04/18	16.31	67.29
		01/24/18	15.72	67.88

Notes:

[1]Monitoring wells are 2 - inch diameter

[2]Level survey by Ambit Engineering January 2018 using National Geodetic Vertical Datum based on mean sea level.

All measurements in feet.

bgs = below ground surface.

BTOC = below top of PVC casing.

Table 2
Summary of Groundwater Analytical Data
THP Rye Airfield
Airfield Drive, Rye, NH

Monitoring Well	Date Sampled	Field Measurements			Laboratory Analyses		
		Temp (C)	pH	Specific Conductivity (µS)	Nitrate -N (mg/l)	Ammonia as N (mg/l)	Chloride (mg/l)
MW-1	01/04/18	nm	8.80	830	2.8	<0.5	200
	01/24/18	9.9	6.70	795	ns	ns	ns
MW-2	01/04/18	nm	8.43	1013	2.7	<0.5	230
	01/24/18	11.8	8.16	986	ns	ns	ns
MW-3	01/04/18	nm	7.84	481	3.6	<0.5	94
	01/24/18	9.8	7.10	410	ns	ns	ns
MW-4	01/04/18	nm	7.78	307	2.9	<0.5	62
	01/24/18	9.9	7.10	319	ns	ns	ns

Notes:

µS = microSiemens
C = degrees Celsius
N = as Nitrogen
mg/l = milligrams per liter
ns = no sample collected for lab analysis
nm= not measured

Table 3 -- Well Inventory Summary
Proposed Residential Development
Airfield Drive
Rye, NH

Street Address	Map/Lot	State Well ID	Well Use	Date Installed	Reported Well Depth (feet bgs)	Depth to Bedrock (feet bgs)	Reported Static Water Depth[1] (feet bgs)	Reported Well Yield (gpm)
Rye								
Dow Lane	10/10-97	207.0169	Test Well	5/3/2010	17	--	6	--
50 Lafayette Road	14/30	207.0008	Domestic	7/2/1986	160	30	--	100
71 Lafayette Road	--	204801	Domestic (Public)	--	100	--	--	2
72 Lafayette Road	14/18	207.0102	Test Well	2/4/2004	12	--	--	--
113 Lafayette Road	10/8	207.009	Domestic	12/5/2002	303	12	30	25
120 Lafayette Road	14/28	207.0005	Domestic	8/23/1984	300	40	--	20
120 Lafayette Road	--	204301	Domestic (Public)	--	125	--	--	0
120 Lafayette Road	--	204301	Domestic (Public)	--	250	--	--	15
120 Lafayette Road	--	204301	Domestic (Public)	--	110	--	--	15
150 Lafayette Road	--	204804	Domestic (Public)	--	0	--	--	0
296 Lafayette Road	--	207.0116	Domestic	10/18/2006	320	47	--	15
8 Random Road	23/01-08	207.0065	Domestic	11/10/1997	143	40	30	25
60 Sagamore Road	--	204101	Domestic (Public)	--	49	--	--	365[2]
960 Washington Road	7/32	207.0057	Domestic	6/19/1996	460	55	--	60
West Road	6/010	207.0035	Domestic	11/8/1993	220	60	--	30
10 West Road	17/--	207.0001	Domestic	4/10/1984	215	17	--	50
3 Whitehorse Drive	--	207.0103	Domestic	4/26/2004	520	42	--	12
Greenland								
Breakfast Hill Road	--	99.0066	Domestic	9/26/1989	175	41	30	30
Route 1	--	099.0015	Domestic	3/1/1985	100	22	--	6
North Hampton								
Birchwood Drive	--	180.0005	Domestic	6/11/1985	140	9	--	50
AVERAGES:					228	37	24	< 19 gpm: 8.125 gpm; > or =20 gpm: 43.3 gpm; All wells: 37 gpm

Notes:
Source of Well Data is on-line New Hampshire Water Well Board well inventory database as of April 2017.
bgs = Below Ground Surface
gpm = Gallons Per Minute
NA = Not Applicable
-- = Information not available from NHWWB well inventory database.
[1] = Static Water Level Depth reported on NHWWB well inventory database.
[2] = Well yield measurement excluded from average since the reported yield is unlikely to be representative of typical study area conditions
[3] = Available well borehole groundwater storage was estimated using the following formula:
Available Storage = [(pump depth-20 feet) - static water level depth] x 1.5 gallons/foot
(The pump depth is assumed to be set 25 feet above the bottom of wells. All wells are assumed to be 6-inch diameter.)

Appendix

Existing Conditions Plan and Septic Designer Test Pit Logs

Septic Overall Plan – Sheet X1

Test Boring Logs and Monitoring Well Details

Laboratory Groundwater Analysis Data Report

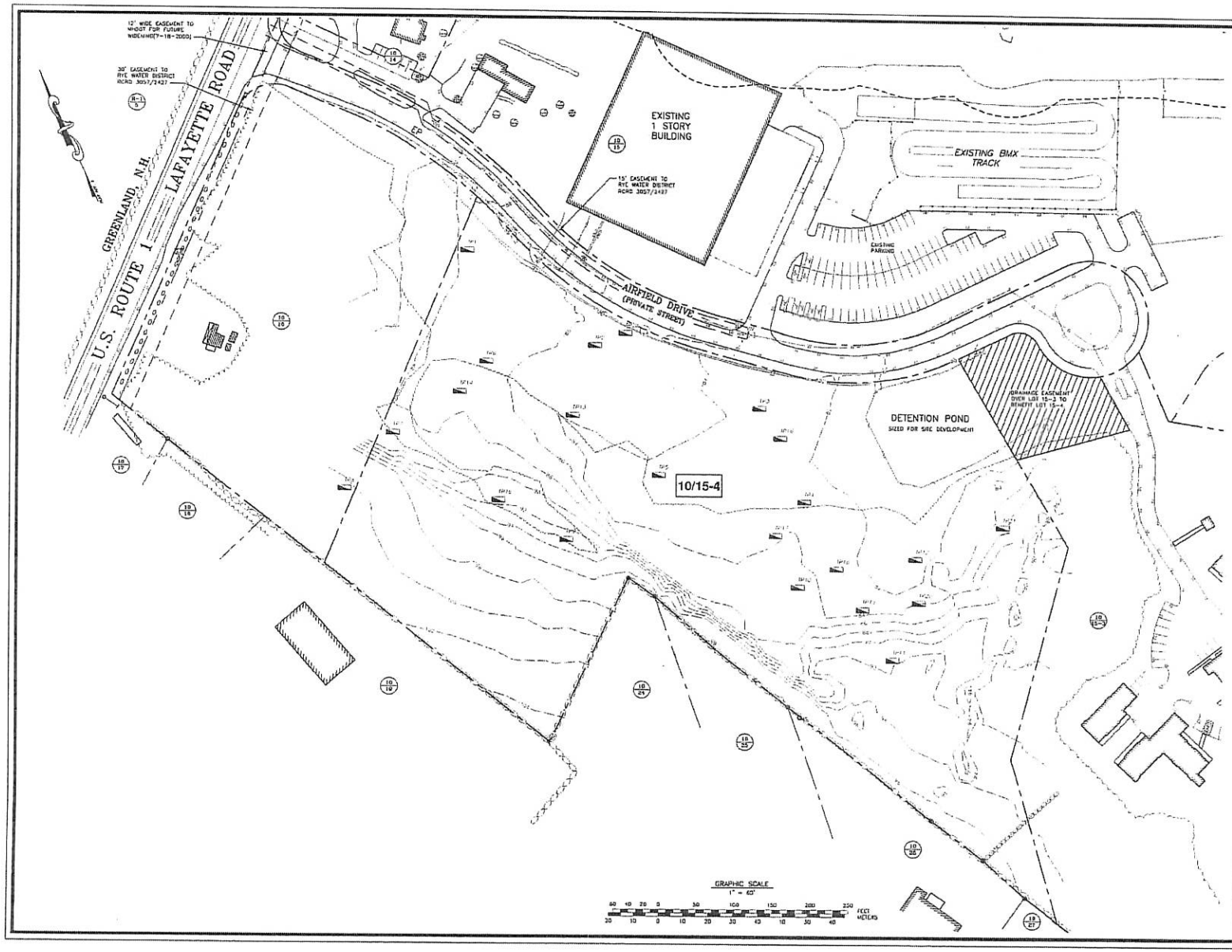
Laboratory Soil Gradation Curves

Nitrate Attenuation Explanation and Calculations

Supply Well and Wellhead Protection Area Map

Rye Source Water Protection Area Map

Rye Master Plan Stratified Drift Aquifers Map



AMBIT ENGINEERING, INC.
Civil Engineers & Land Surveyors
200 Griffin Road - Unit 3
Portsmouth, N.H. 03801-7414
Tel (603) 436-8207
Fax (603) 436-2315

NOTES:

1) PARCEL IS SHOWN ON THE TOWN OF RYE ASSESSOR'S MAP 10 AS LOT 15-4 (AFTER LOT LINE RELOCATION).
2) OWNER OF RECORD
   RICKERT INVESTMENT REAL ESTATE, LLC
   P.O. BOX 667
   633 CENTRAL ROAD
   RYE BEACH, N.H. 03871
   3579/2935
   RCRD PLAN D-29437

   APPLICANT:
   THE HOUSING PARTNERSHIP
   P.O. BOX 486
   PORTSMOUTH, N.H. 03802
3) PARCEL IS NOT IN A FLOOD HAZARD ZONE AS SHOWN ON FIRM PANEL 33015C0270E, EFFECTIVE MAY 17, 2005.
4) EXISTING LOT AREA
   437,904 S.F.
   10.0529 AC.
5) PARCEL IS LOCATED IN THE COMMERCIAL DISTRICT (C) AND THE MULTI-FAMILY DWELLING OVERLAY DISTRICT.
6) REQUIREMENTS FOR MULTI-FAMILY OVERLAY DISTRICT (SECTION 402) WORKFORCE HOUSING
   MIN. LOT AREA: 2 ACRES
   FRONTAGE: 150 FEET (CONTIGUOUS)
   MAXIMUM NUMBER OF DWELLING UNITS:
   8 DWELLING UNITS PER BUILDING
   40 DWELLING UNITS PER DEVELOPMENT
   DENSITY: 6 DWELLING UNITS PER UPLAND ACRE
   BUILDING TO BUILDING SETBACK: 25 FEET
   SETBACKS:
   FRONT: 30 FEET - 60 FEET ON LAFAYETTE ROAD
   SIDE: 20 FEET
   REAR: 24 FEET
   REQUIRED PARKING PER UNIT: 1 GARAGE, 1 OPEN OR 2 GARAGE.
7) THE PURPOSE OF THIS PLAN IS TO SHOW A THE EXISTING CONDITIONS ON THE PROPERTY.
8) BOUNDARY FROM SURVEY BY AMES, MSC ARCHITECTS & ENGINEERS
9) SITE SOILS:
   310A HOOSIC GRAVELLY FINE SANDY LOAM
   428 CANTON GRAVELLY FINE SANDY LOAM
   299 REGRADED/FILLED
10) LOT LOADING (SEPTIC) w/MUNICIPAL WATER SUPPLY.
   ALLOWED: 10.05 ACRES x 2000 (GPD PER ACRE) / 1.3 (LOADING FACTOR) = 15,461 GPD.
   PROPOSED: 108 BEDROOMS X 150 GPD PER BEDROOM = 16,200 GPD.

RESIDENTIAL DEVELOPMENT
THE HOUSING PARTNERSHIP
AIRFIELD DRIVE
RYE, N.H.

NO.	DESCRIPTION	DATE
1	ISSUED FOR PLANNING BOARD SUBMITTAL	12/16/16
0	ISSUED FOR CONCEPT REVIEW	8/18/16

REVISIONS

SCALE: 1" = 60' AUGUST 2016

EXISTING CONDITIONS PLAN

C1

FB. PG 1936

TEST PITS WERE LOGGED ON 6/13/16 BY SANDY EDGERLY, DESIGNER #1508.
TEST PITS WERE WITNESSED BY DENNIS PLANTE FOR THE TOWN OF RYE.

TEST PITS WERE LOGGED ON 11/18/16 BY MARC JACOBS, CSS #836.
TEST PITS WERE WITNESSED BY DENNIS PLANTE FOR THE TOWN OF RYE.

BORE HOLES WERE LOGGED ON 5/15/2017 BY: DOUGLAS LANDSA, DESIGNER #549 AND WERE PERFORMED AFTER 1.25" OF RAIN IN 5/14/2017

BORING	DEPTH	RATE (LAST HOUR)
B1	24"	21"/HOUR
B2	24"	23"/HOUR
B3	24"	24"/HOUR
B4	24"	21"/HOUR

APPROVED BY THE RYE PLANNING BOARD

CHAIRMAN

DATE

SITE SEPTIC LOADING (MAXIMUM)

SYSTEM	NO. OF BEDROOMS	SYSTEM DESIGN FLOW (GPD)
A	30	4,500
B	24	4,350
C	24	3,900
D	24	3,900
E	18	3,150
	120	19800
BEDROOM TOTAL:	120 BEDROOMS	
DESIGN FLOW TOTAL:		19,800 GPD

AMBIT ENGINEERING, INC.
Civil Engineers & Land Surveyors
200 Griffin Road - Unit 3
Portsmouth, N.H. 03801-7114
Tel (603) 430-9282
Fax (603) 436-2315

NOTES:

1) THE CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE (1-888-344-7233) AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY

2) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY AND/OR ALL OF UNDERGROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND/OR THE OWNER. UTILITY CONFLICTS SHOULD BE REPORTED AT ONCE TO THE DESIGN ENGINEER.

3) CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE "NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION, (NHDES DECEMBER 2008).

RESIDENTIAL DEVELOPMENT
THE HOUSING PARTNERSHIP
AIRFIELD DRIVE
RYE, N.H.

NO.	DESCRIPTION	DATE
2	REVISED FOR APPROVAL	5/16/17
1	ISSUED FOR COMMENT	4/21/17
0	ISSUED FOR PLANNING BOARD SUBMITTAL	12/16/16

PS

SCALE: NONE

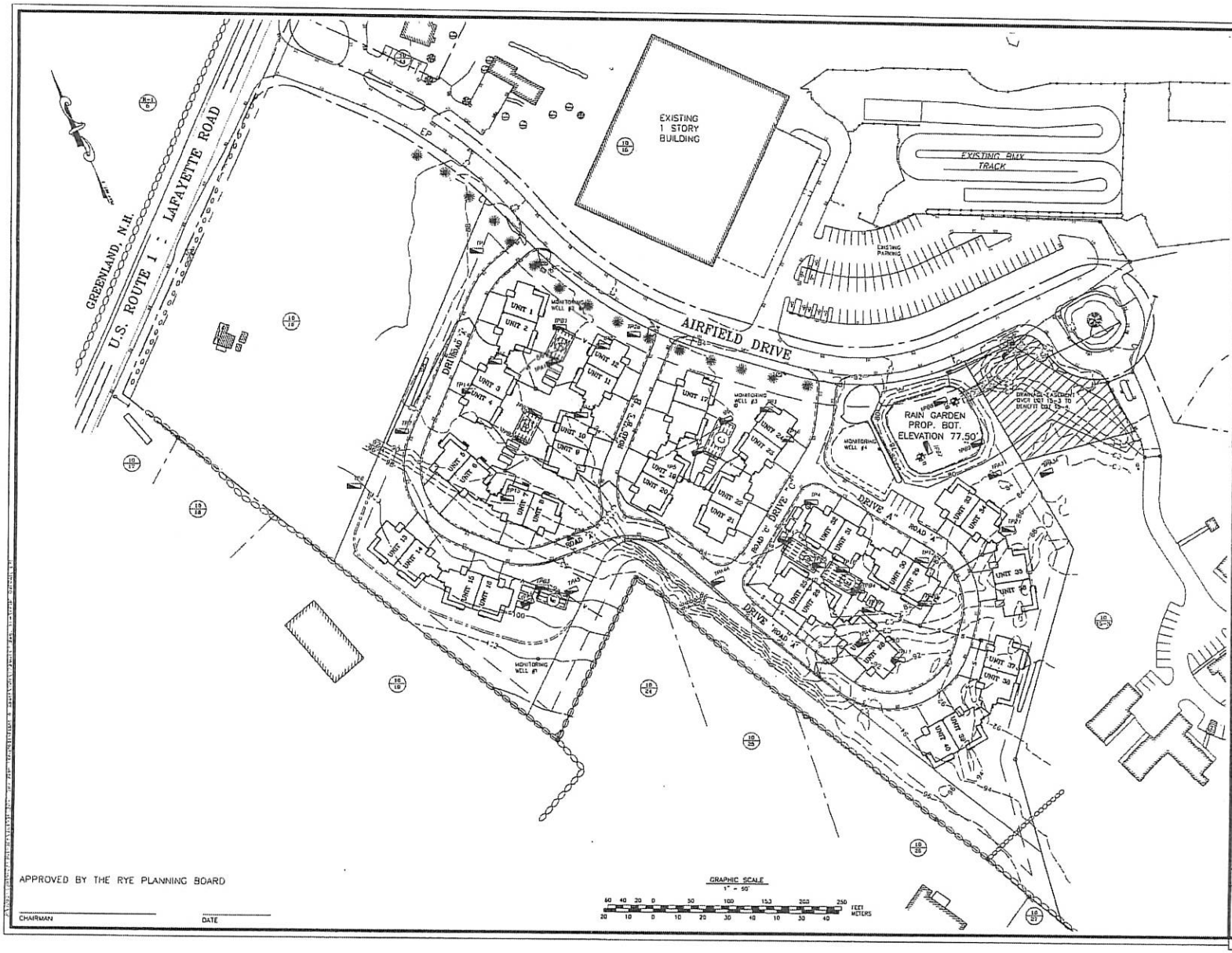
APRIL 2017

TEST PIT LOGS

TP1

FB 346 PG 1

1935



APPROVED BY THE RYE PLANNING BOARD

CHAIRMAN

DATE

AMBIT ENGINEERING, INC.
Civil Engineers & Land Surveyors
200 Griffin Road - Unit 3
Portsmouth, N.H. 03801-7114
Tel (603) 436-0202
Fax (603) 436-5316

NOTES:

1) THE CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE (1-888-344-7233) AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.

2) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED LOCATING AND PROTECTING ANY ABOVEGROUND OR UNDERGROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND/OR THE OWNER. UTILITY CONFLICTS SHOULD BE REPORTED AT ONCE TO THE DESIGN ENGINEER.

3) CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE NEW HAMPSHIRE STORMWATER MANUAL VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION. (NHDES DECEMBER 2008).

ZONING CALCULATIONS:

PARCEL IS LOCATED IN THE COMMERCIAL DISTRICT (C) AND THE MULTI-FAMILY DWELLING OVERLAY DISTRICT

	REQUIRED	PROPOSED
MIN. LOT AREA:	2 ACRES	10+ ACRES
MAX DWELLINGS PER BUILDING:	6 UNITS	4 UNITS
MAX. DWELLINGS PER DEVELOPMENT:	40 UNITS	40 UNITS
MAX. DWELLINGS PER UPLAND ACRE:	6 UNITS	4 UNITS
FRONTAGE:	150 FEET	711 FEET
DEPTH:	60 FEET	315 FEET
FRONT SETBACK:	30 FEET	30 FEET
SIDE SETBACK:	20 FEET	21.5 FEET
REAR SETBACK:	24 FEET	30.5 FEET
MAX. STRUCTURE HEIGHT:	35 FEET	35 FEET
MAX. BUILDING COVERAGE:	25%	18.5%
MAX. IMPERVIOUS COVERAGE:	35%*	35%

*IMPERVIOUS COVERAGE MAY BE INCREASED IF A STORMWATER MANAGEMENT PLAN IS SUBMITTED AND APPROVED BY THE PLANNING BOARD.

LIGHTING NOTE:

NO STREET LIGHTS ARE PROPOSED. EACH UNIT WILL HAVE MOTION ACTIVATED LIGHTS OVER THE GARAGE DOORS.

RESIDENTIAL DEVELOPMENT
THE HOUSING PARTNERSHIP
AIRFIELD DRIVE
RYE, N.H.

NO	DESCRIPTION	DATE
2	MONITORING WELLS 1-4 ADDED	12/28/17
0	ISSUED FOR PLANNING BOARD SUBMITTAL	10/20/17

REVISIONS

SCALE: 1" = 60'

MAY 2017

SEPTIC OVERALL PLAN

X1

FB 348, PG 01

1936

StoneHill
Environmental, Inc.

PROJECT
The Housing Partnership
Airfield Drive, Rye, NH

BORING/WELL NO: MW-1

PROJECT NO: 16126
PREPARED BY: M. Cawthern
CHKD BY: C. Thayer

BORING CO: NE Boring
FOREMAN: Matt and Garrett
GEOLOGIST: Clark Fero

DRILLING METHOD: Drive and wash
BORING LOCATION: West corner, top oh hill
DATE START: 12/19/17 DATE END: 12/19/17

STICKUP HT: 2.7 ft
CASING ELEV: 105.14 ft
GROUND ELEV: 102.45 ft

SAMPLER
TYPE: 2-ft long split spoon
DIAMETER: 1-3/8 inch ID
FALL: 30 inches WT: 140 pounds

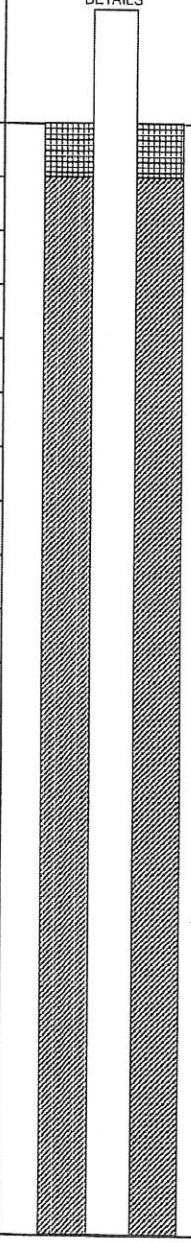
Method Used

GROUNDWATER

DATE	DEPTH	REFERENCE	STABILIZATION TIME
12/20/2017	31 ft	Ground	17 hours

DEPTH (FT.)	SAMPLE NUMBER	X	SAMPLE PEN/REC	BLOWS/ 6 inches	Casing (blows/ft) Drill (min/ft)	SAMPLE DESCRIPTION	NOTES	FIELD HEAD-SPACE SCREEN (ppm)	DEPTH
						Surface:			
1						Advance to 19' without sampling.			1
2									2
3									3
4									4
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16									16
17									17
18									18
19									19
20	S-1	x	18/8	60 70 100		Olive brown to rusty brown fine SAND, SILT and CLAY with rocks to 1 inch. Unsorted, cohesive, hard.		N/A	20

WELL COMPLETION DETAILS



GRANULAR SOILS		COHESIVE SOILS	
BLOWS/ft.	DENSITY	BLOWS/ft.	CONSISTENCY
0-4	V.LOOSE	<2	V.SOFT
4-10	LOOSE	2-4	SOFT
10-30	M.DENSE	4-8	M.STIFF
30-50	DENSE	8-15	STIFF
>50	V.DENSE	15-30	V.STIFF
		>30	HARD

NOTES:
N/A = Not applicable

LEGEND
- Bentonite
- Cement
- Backfill
- Sand
- Well screen
- Water Table

X = Approximate depth of sample recovered for possible laboratory analyses
PEN/REC = Penetration depth of split spoon/inches of sample recovered in split spoon

WOR = Weight of Rods.
WOH = Weight of Hammer.

StoneHill
Environmental, Inc.

PROJECT
The Housing Partnership
Airfield Drive, Rye, NH

BORING/WELL NO: MW-1
Page 2 of 2
PROJECT NO: 16126
PREPARED BY: M. Cawthern
CHKD BY: C. Thayer

BORING CO: NE Boring
FOREMAN: Matt and Garrett
GEOLOGIST: Clark Fero

DRILLING METHOD: Drive and wash
BORING LOCATION: West corner, top of hill
DATE START: 12/19/17 DATE END: 12/19/17

STICKUP HT: 2.7 ft
CASING ELEV: 105.14 ft
GROUND ELEV: 102.45 ft

SAMPLER
TYPE: 2-ft long split spoon
DIAMETER: 1-3/8 inch ID
FALL: 30 inches WT: 140 pounds

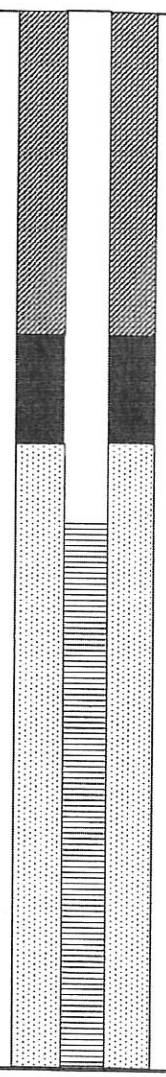
Method Used

GROUNDWATER

DATE	DEPTH	REFERENCE	STABILIZATION TIME
12/20/2017	31 ft	Ground	17 hours

DEPTH (FT.)	SAMPLE NUMBER	X	SAMPLE PEN/REC	BLOWS/ 6 inches	Casing (blows/ft) Drill (min/ft)	SAMPLE DESCRIPTION	NOTES	FIELD HEAD-SPACE SCREEN (ppm)	DEPTH
						Surface:			
21									21
22									22
23									23
24									24
	S-2	x	24/12	N/A		Olive brown layered fine SAND with little silt, dry.			
25				N/A					25
				N/A					
26				N/A					26
27									27
28									28
29									29
	S-3	x	24/2	41		Olive brown fine SAND with clay, rocks to 1 inch and angular gravel.			
30				35					30
				25					
31				44					31
32									32
33									33
34									34
35									35
36									36
37									37
38									38
39									39
40						End of boring. Bedrock not encountered.			40

WELL COMPLETION DETAILS



GRANULAR SOILS		COHESIVE SOILS	
BLOWS/ft.	DENSITY	BLOWS/ft.	CONSISTENCY
0-4	V.LOOSE	<2	V.SOFT
4-10	LOOSE	2-4	SOFT
10-30	M.DENSE	4-8	M.STIFF
30-50	DENSE	8-15	STIFF
>50	V.DENSE	15-30	V.STIFF
		>30	HARD

NOTES:
Installed 2 inch diameter PVC well with 10 feet of well screen.

N/A = Not applicable

LEGEND
- Bentonite
- Cement
- Backfill
- Sand
- Well screen
- Water Table

X = Approximate depth of sample recovered for possible laboratory analyses
PEN/REC = Penetration depth of split spoon/inches of sample recovered in split spoon

WOR = Weight of Rods.
WOH = Weight of Hammer.

StoneHill
Environmental, Inc.

PROJECT
The Housing Partnership
Airfield Drive, Rye, NH

BORING/WELL NO: MW-2

PROJECT NO: 16126
PREPARED BY: M. Cawthern
CHKD BY: C. Thayer

BORING CO: NE Boring
FOREMAN: Matt and Walter
GEOLOGIST: Clark Fero

DRILLING METHOD: Drive and wash
BORING LOCATION: Northeast corner, closest to Rt. 1
DATE START: 12/20/17 DATE END: 12/20/17

STICKUP HT: 2.7 ft
CASING ELEV: 89.01 ft
GROUND ELEV: 86.32 ft

SAMPLER
TYPE: 2-ft long split spoon
DIAMETER: 1-3/8 inch ID
FALL: 30 inches WT: 140 pounds

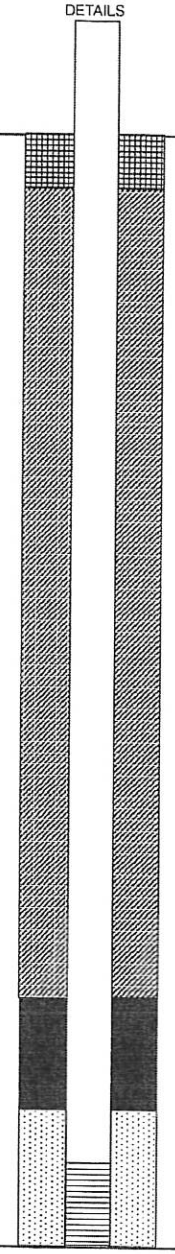
Method Used

GROUNDWATER

DATE	DEPTH	REFERENCE	STABILIZATION TIME
12/20/2017	17.7 ft	Ground	6 hours

DEPTH (FT.)	SAMPLE NUMBER	X	SAMPLE PEN/REC	BLOWS/ 6 inches	Casing (blows/ft) Drill (min/ft)	SAMPLE DESCRIPTION	NOTES	FIELD HEAD-SPACE SCREEN (ppm)	DEPTH
						Surface:			
1						Drive and wash casing to 15 feet.			1
2									2
3									3
4									4
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
	S-1		24/19	45		Brown fine SAND with angular gravel, little coarse sand and trace silt.			
15				93		Very dense.			15
				108					
16				114					16
17									17
18									18
19									19
20									20

WELL COMPLETION DETAILS



GRANULAR SOILS		COHESIVE SOILS	
BLOWS/ft.	DENSITY	BLOWS/ft.	CONSISTENCY
0-4	V.LOOSE	<2	V.SOFT
4-10	LOOSE	2-4	SOFT
10-30	M.DENSE	4-8	M.STIFF
30-50	DENSE	8-15	STIFF
>50	V.DENSE	15-30	V.STIFF
		>30	HARD

NOTES:

LEGEND
- Bentonite
- Cement
- Backfill
- Sand
- Well screen
- Water Table

X = Approximate depth of sample recovered for possible laboratory analyses
PEN/REC = Penetration depth of split spoon/Inches of sample recovered in split spoon

WOR = Weight of Rods.
WOH = Weight of Hammer.

StoneHill
Environmental, Inc.

PROJECT
The Housing Partnership
Airfield Drive, Rye, NH

BORING/WELL NO: MW-2

PROJECT NO: 16126
PREPARED BY: M. Cawthern
CHKD BY: C. Thayer

BORING CO: NE Boring
FOREMAN: Matt and Walter
GEOLOGIST: Clark Fero

DRILLING METHOD: Drive and wash
BORING LOCATION: Northeast corner, closest to Rt. 1
DATE START: 12/20/17 DATE END: 12/20/17

STICKUP HT: 2.7 ft
CASING ELEV: 89.01 ft
GROUND ELEV: 86.32 ft

SAMPLER
TYPE: 2-ft long split spoon
DIAMETER: 1-3/8 inch ID
FALL: 30 inches WT: 140 pounds

Method Used

GROUNDWATER

DATE	DEPTH	REFERENCE	STABILIZATION TIME
12/20/2017	17.7 ft	Ground	6 hours

DEPTH (FT.)	SAMPLE NUMBER	X	SAMPLE PEN/REC	BLOWS/ 6 inches	Casing (blows/ft) Drill (min/ft)	SAMPLE DESCRIPTION	NOTES	FIELD HEAD-SPACE SCREEN (ppm)	DEPTH	WELL COMPLETION DETAILS
						Surface:				
21									21	
22									22	
23									23	
24									24	
25									25	
26									26	
27									27	
28									28	
29									29	
						End of boring. Bedrock not encountered.				
30									30	
31									31	
32									32	
33									33	
34									34	
35									35	
36									36	
37									37	
38									38	
39									39	
40									40	

GRANULAR SOILS		COHESIVE SOILS	
BLOWS/ft.	DENSITY	BLOWS/ft.	CONSISTENCY
0-4	V.LOOSE	<2	V.SOFT
4-10	LOOSE	2-4	SOFT
10-30	M.DENSE	4-8	M.STIFF
30-50	DENSE	8-15	STIFF
>50	V.DENSE	15-30	V.STIFF
		>30	HARD

NOTES:
Installed 2 inch diameter PVC well with 10 feet of well screen.

LEGEND
- Bentonite
- Cement
- Backfill
- Sand
- Well screen
- Water Table

X = Approximate depth of sample recovered for possible laboratory analyses
PEN/REC = Penetration depth of split spoon/inches of sample recovered in split spoon

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StoneHill
Environmental, Inc.

PROJECT
The Housing Partnership
Airfield Drive, Rye, NH

BORING/WELL NO: MW-3
Page 1 of 2
PROJECT NO: 16126
PREPARED BY: M. Cawthern
CHKD BY: C. Thayer

BORING CO: NE Boring
FOREMAN: Matt and Garrett
GEOLOGIST: Clark Fero

DRILLING METHOD: Drive and wash
BORING LOCATION: North, adjacent to Airfield Drive
DATE START: 12/18/17 DATE END: 12/18/17

STICKUP HT: 2.8 ft
CASING ELEV: 86.78 ft
GROUND ELEV: 84.03 ft

SAMPLER
TYPE: 2-ft long split spoon
DIAMETER: 1-3/8 inch ID
FALL: 30 inches WT: 140 pounds

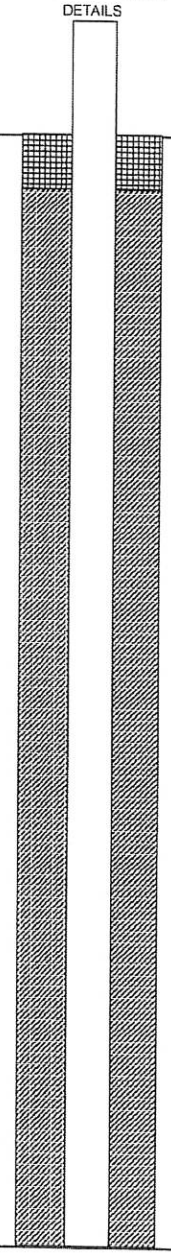
Method Used

GROUNDWATER

DATE	DEPTH	REFERENCE	STABILIZATION TIME
12/19/2017	16.7 ft	Ground	24 hours

DEPTH (FT.)	SAMPLE NUMBER	X	SAMPLE PEN/REC	BLOWS/ 6 inches	Casing (blows/ft) Drill (min/ft)	SAMPLE DESCRIPTION	NOTES	FIELD HEAD-SPACE SCREEN (ppm)	DEPTH
						Surface:			
1						Drive and wash casing to 15' without sampling.			1
2									2
3									3
4									4
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16	S-1	x	4/1	200/4		Rock fragments and brown SILT.			16
17									17
18									18
19									19
20	S-2	x	24/8	27 46		Brown fine and coarse SAND with silt and rock fragments.			20

WELL COMPLETION DETAILS



GRANULAR SOILS		COHESIVE SOILS	
BLOWS/ft.	DENSITY	BLOWS/ft.	CONSISTENCY
0-4	V.LOOSE	<2	V.SOFT
4-10	LOOSE	2-4	SOFT
10-30	M.DENSE	4-8	M.STIFF
30-50	DENSE	8-15	STIFF
>50	V.DENSE	15-30	V.STIFF
		>30	HARD

NOTES:

LEGEND
- Bentonite
- Cement
- Backfill
- Sand
- Well screen
- Water Table

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StoneHill
Environmental, Inc.

PROJECT
The Housing Partnership
Airfield Drive, Rye, NH

BORING/WELL NO: MW-3
Page 2 of 2
PROJECT NO: 16126
PREPARED BY: M. Cawthern
CHKD BY: C. Thayer

BORING CO: NE Boring
FOREMAN: Matt and Garrett
GEOLOGIST: Clark Fero

DRILLING METHOD: Drive and wash
BORING LOCATION: North, adjacent to Airfield Drive
DATE START: 12/18/17 DATE END: 12/18/17

STICKUP HT: 2.8 ft
CASING ELEV: 86.78 ft
GROUND ELEV: 84.03 ft

SAMPLER
TYPE: 2-ft long split spoon
DIAMETER: 1-3/8 inch ID
FALL: 30 inches WT: 140 pounds

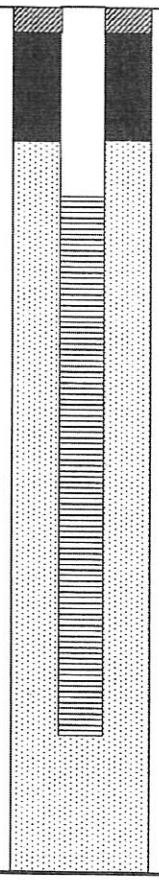
Method Used

GROUNDWATER

DATE	DEPTH	REFERENCE	STABILIZATION TIME
12/19/2017	16.7 ft	Ground	24 hours

DEPTH (FT.)	SAMPLE NUMBER	X	SAMPLE PEN/REC	BLOWS/ 6 inches	Casing (blows/ft) Drill (min/ft)	SAMPLE DESCRIPTION	NOTES	FIELD HEAD-SPACE SCREEN (ppm)	DEPTH
			6/0	59		Surface:			
21									21
22									22
23									23
24									24
	S-3	x	24/15	16		Brown to dark brown fine SAND with silt			
25				44		Fine sand and clay, rock fragments.			25
				58		Medium sand			
26				47					26
27									27
28									28
29									29
	S-4	x	24/7	53		ROCKS, fine SAND and CLAY, brown to rust colored			
30				60					30
				55					
31				82					31
32									32
33									33
34									34
	S-5	x	24/14	40		Brown to rust colored fine SAND and CLAY with rounded gravel,			
35				38		ROCKS			35
				48					
36				59					36
						End of boring. Bedrock not encountered.			
37									37
38									38
39									39
40									40

WELL COMPLETION DETAILS



GRANULAR SOILS		COHESIVE SOILS	
BLOWS/ft.	DENSITY	BLOWS/ft.	CONSISTENCY
0-4	V.LOOSE	<2	V.SOFT
4-10	LOOSE	2-4	SOFT
10-30	M.DENSE	4-8	M.STIFF
30-50	DENSE	8-15	STIFF
>50	V.DENSE	15-30	V.STIFF
		>30	HARD

NOTES:
Installed 2 inch diameter PVC well with 10 feet of well screen.

LEGEND
- Bentonite
- Cement
- Backfill
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- Well screen
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WOR = Weight of Rods.
WOH = Weight of Hammer.

SEBAGO TECHNICS

January 19, 2018
16343

Kim Reed, Town Planner
Town of Rye
10 Central Road,
Rye, NH 03870

SUBJECT: **Airfield Drive Multifamily Residential Development**
Subdivision & Lot Line Adjustment Application

Dear Kim:

We have received and reviewed a January 8, 2018 submission package for the subject project. The package included the following:

1. A January 8, 2018 comment response letter addressed to you from John Chagnon of Ambit Engineering.
2. A 30-page drawing set of the project plans most recently revised January 8, 2018 from Ambit Engineering, Inc. which included two, undated architectural floor plan drawings as prepared by Lassel Architects.
3. A summary of the Drainage Analysis, revised January 2018, as prepared by Ambit Engineering.
4. January 8, 2018 Site Work Construction Cost Estimate as prepared by Ambit Engineering.

We have also received a copy of Michael Donovan's January 10, 2018 memorandum to the Planning Board outlining threshold decisions to be made on this project by the Board.

We understand that other consultants have been hired by the Town to focus on legal, environmental, hydrogeologic related issues, and the review of the proposed subsurface wastewater system. We have focused our review attention on the proposed project's traffic, drainage considerations, and other general engineering aspects. Based on our review of the submitted material and the project's conformance to the technical requirements of the Land Development Standards for the Town of Rye, we offer the following comments:

General Engineering Comments:

1. The applicant is proposing to construct ten (10), 4-unit buildings for a total of 40 dwellings with associated access roads, utilities, and drainage structures. Domestic water and underground electric utilities will be extended from existing infrastructure in Airfield Drive to service the proposed dwellings. The dwellings will be serviced by on-site subsurface wastewater disposal systems. The applicant is proposing to transform an existing Detention Pond into a Rain Garden in order to treat stormwater runoff from the newly proposed impervious areas.

2. While this development constitutes a subdivision, it is not a typical residential subdivision with individual residential house lots. This development more closely resembles a multi-family site plan with driveways and, as such, some of the Town's subdivision regulations regarding

roadways may not apply to this project. As Michael Donovan has noted in his memo to the Board, the Planning Board will need to make a threshold decision to determine if the project roadways should be required to follow the Land Development Regulations (LDR) for the Town of Rye or if these roadways can be considered "drives" as the application currently proposes and not be required to meet the LDR. Should the Board determine that the roads do need to follow the Land Development Regulations for roads then the applicant's team has stated that they will be requesting waivers of the following items:

- Intersections must be separated by 300-feet. The proposed intersections with Airfield Drive appear to have less of a separation than this standard requires.
- The horizontal alignment of all new streets shall be straight within 100-feet of an intersection. There are several locations where the streets are curved within the 100-foot zone of an intersection.
- Pavement width must be 24-feet. The current design contains a pavement width of 22-feet.
- Grades shall fall into a range of zero to three percent within 50-feet of an intersection. Technically, the profile for Road A on Sheet P1 suggests a 3.12% slope profile for the road grade at the intersection with Road B.
- Driveways shall not be located within 100-feet of a street intersection. Many driveways within the subdivision are located within 100-feet of an intersection.

3. The designer has lowered the storm drain in the area between Units 29 through Unit 34 to address minimal cover over the pipes. The revisions appear to have addressed this issue for Units 29/30. As the pipe into Catch Basin #2 was only lowered by 0.05 feet, however, it appears that the storm drain pipe still has less than 2-feet of cover in the drive area of Units 31/32. The site is predominately free draining soils with a deep groundwater condition so this issue may not be as detrimental as on other sites, but the designer may wish to revisit this area to ensure that suitable cover is provided.

4. A note has been added to the retaining wall detail indicating that plans that the wall will be designed in accordance with the manufacturer's recommendations and sealed by a Professional Engineer. This note should be clarified to state that it will be prepared and sealed by a State of New Hampshire Professional Engineer.

5. The designer has revised the grading behind Units 39/40, however it still appears that the grading may not be correct. The designer should review the grading to clarify the design intent and provide clear direction to the contractor so that ponding or the misdirecting of runoff does not occur.

6. The design[illegible]

[illegible]

D5 or on sheet C3b, Site Layout & Landscape Plan.

Stormwater (HydroCAD) Comments:

1. The current site has a detention basin at the low point of the site which was constructed to flow into another stormwater basin as part of an earlier off-site project. This basin will be converted into a rain garden with a filter media layer and wetland vegetation which is proposed to provide water quality treatment as well as control the site runoff. In both cases, the report asserts that runoff will essentially infiltrate into the subsurface and no runoff be discharged from the site's stormwater features up to the 100-yar storm event beyond the infiltration process.

2. The stormwater report indicates that both in the detention basin pre-development and rain garden post-development conditions that an exfiltration rate (i.e., flow leaving the detention basin/rain garden and infiltrating into the subsurface soils) will be 8 inches/hour. This rate seems to be very rapid. We question whether the rain garden buildup of 4-inches of surface mulch overlaying 18-inches of soil filter media would impinge on the 8-inch/hour exfiltration rate. If the surface runoff exits the rain garden this rapidly it would appear that the wetland vegetation to be planted within the rain garden would not be sustainable. We understand that there are hydrogeologists working on behalf of both the applicant and the Town. It would be beneficial to get their opinions on this infiltration rate to determine if the rain garden will truly function as designed and be able to treat and efficiently infiltrate all of the received runoff while still maintaining healthy vegetation.

3. As Michael Donovan has noted in his memo to the Board, the design needs to provide for adequate groundwater recharge and be consistent with the NHDES Stormwater Manual in order to exceed the maximum 25% impervious coverage. In general, it appears that the design may be in conformance with the DES Stormwater Manual if the exfiltration rates can be confirmed. Since the project will need a DES Alteration of Terrain (AoT) permit, however, the receipt of the DES AoT permit would confirm that this standard has been achieved.

4. There also appears to be some confusion as to the percentage of impervious lot coverage. Michael Donovan's memo includes a 35.5% impervious surface coverage while the stormwater report references a 25.69% coverage. The stormwater report states that 169,893 (3.83 acres) square feet of impervious area for the area analyzed in the study. While some of this area may be from off-site sources, the impervious area coverage would become 38.1% if it were all to be on the 10.05 acre site. The designer should clarify the lot impervious coverage percentage.

Traffic Engineering Comments:

1. As noted in our November 10, 2017 review comment letter, we have reviewed and confirmed the findings and conclusions of the traffic study prepared for this project

Cost Estimate Comments:

1. We have reviewed the January 8, 2018 Construction Site Work Cost Estimate submitted with the application materials. The estimate has included a 10-percent contingency. The $1,080,925 estimate appears reasonable for the items that have been included in the estimate.

2. In our November 10, 2017 letter, we suggested that quantities and unit costs should be provided for the on-site retaining wall, the rain garden, outlet control structure, and transformer pads. All of these items are now itemized in the estimate with the exception of the

outlet control structure which may be included in the rain garden cost. The designer should clarify if the outlet control structure is considered part of the rain garden or add a separate line item to cover the outlet control structure.

We trust that these comments will assist in future discussions and submissions related to this project. Should there be any questions or comments regarding our review, please do not hesitate to contact us.

Sincerely,

SEBAGO TECHNICS, INC.

Stephen D. Harding, P.E.

SDH:cca

cc: John Chagnon, Ambit Engineering
Michael Donovan, Attorney
Dennis McCarthy, Public Works Director
Peter Rowell, Code Enforcement Officer
Danna Truslow, Truslow Resource Consulting LLC
Caitlyn Abbott, Sebago Technics

ROCKINGHAM COUNTY CONSERVATION DISTRICT
110 North Road, Brentwood, NH 03833-6614
Tel: 603-679-2790 • Fax: 603-679-2860
www.rockinghamccd.org

Bill Epperson, Chair
Rye Planning Board
10 Central Road
Rye, NH 03870

RCCD Job# RY10-15-4-L18

18 January 2018

Dear Mr. Epperson;

At the request of the Planning Board, RCCD has conducted a second plan review of the wastewater disposal systems proposed for The Housing Partnership multifamily residential development on Airport Drive in Rye. The disposal systems were designed by Ambit Engineering, Inc. A response letter from Ambit Engineering dated 9 January 2018 and a revised plan set dated 8 January 2018 were reviewed.

Additional test pit data and plan changes have addressed all the issues raised in RCCD's previous letter. We conclude the wastewater disposal system portion of this plan set is in compliance with Rye's requirements.

Sincerely,

Michael Cuomo
NH Certified Soil Scientist #6
NH Certified Wetland Scientist #4
NH Designer #788

Leonard A. Lord
District Manager

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Bill Epperson, Chairman
Town of Rye Planning Board
10 Central Road
Rye, NH 03870

RE: The Housing Partnership
Airfield Drive
RCCD Job# RY10-15-4-L17

15 November 2017

Dear Mr. Epperson,

At the request of the Planning Board, RCCD has conducted a plan review of the wastewater disposal systems proposed for The Housing Partnership multifamily residential development on Airport Drive in Rye. The disposal systems were designed by Ambit Engineering, Inc. and the plan set was dated 20 October 2017.

The following items were noted:

1. Rye Building Code 7.10.2 requires at least 2 test pits per disposal area. Building Code 7.10.3 further states "The test pits shall be located within the proposed effluent disposal area, and the two test pits shall be spaced at least 30 feet apart." None of the disposal areas meet these requirements.

2. The plan set does not specify which units are 3 bedrooms and which are two bedrooms, so it cannot be verified that the bedroom count for each disposal area is correct.

3. Rye Land Development Regulations 603.3.A. requires a reserve area of 4,000 square feet per disposal area. None has been provided.

4. Rye Land Development Regulations 603.3.A.1.c requires a disposal area be at least 75 feet from soils with bedrock less than 24 inches deep. Disposal area E does not meet this requirement.

5. The test pit used for disposal area F is not deep enough to confirm the bottom of the stone is at least six feet to bedrock (Building Code 7.9.3.1).

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6. The length of disposal area D is not specified on sheet c5b.

7. All disposal areas show the distribution boxes outside the stone bed.

Sincerely,

Michael Cuomo
NH Certified Soil Scientist #6
NH Certified Wetland Scientist #4
NH Designer #788

Leonard A. Lord
District Manager

MICHAEL DONOVAN LAW, P.L.L.C

Michael L. Donovan
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52 Church Street
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Fax: send a pdf
mdonovanlaw62@gmail.com

MEMORANDUM

TO: Rye Planning Board

RE: The Housing Partnership's Proposed Multi-Family Development

DATE: January10, 2018

Dear Board Members:

This memorandum presents my initial, preliminary comments on The Housing Partnership's (THP's) proposed 40 unit multi-family condominium development proposal. The proposal is the first multi-family development proposal under RZO § 402 which was enacted in 2010 in order to comply, in part, with the RSA 674:59 requirement that municipal land use regulations "shall provide reasonable and realistic opportunities for the development of work force housing, including multi-family housing."

I have reviewed the following materials.

- Plan set dated 10/20/17.
- TEC 4/24/17 Traffic Study and 9/22/17 update.
- StoneHill 10/19/17 Report.
- Ambit Engineering 10/20/17 letter.
- RCRD 11/15/17 Report.
- Sebago 11/10/17 Report.
- Truslow 11/8/17 Report.
- 11/18/17 Site Walk Minutes.
- 12/12/17 Planning Board Minutes.
- Department Head Review Comments 11/7/17.

In this memorandum I have tried to identify "threshold concerns" which should be resolved by the planning board before the applicant proceeds with further expense on the application.

Streets or Driveways.

As the Sebago Report indicates the drawings label the access ways as "Drives" (*e.g.* Sht. C2) and "Roads" (*e.g.* Sht. C3a). The planning board needs to make a threshold decision as to whether these access ways are private streets or private driveways. If these are streets, they must comply with the street requirements of the LDR's or waivers must be obtained. As the Sebago

Report indicates, the proposed access ways do not comply with several of the LDR requirements for streets, including the requirement for a 24 ft. wide pavement width.

The proposed pavement width is 22 ft. The planning board has allowed 22 ft. wide streets in environmental sensitive areas where only a few homes will be using the streets. On this proposal 20 homes will utilize the first 150 ft. of "Drive C" to enter from or leave on Airfield Drive. This will generate almost 400 trips per day.[1] If this were a subdivision of 20 residential lots, it is unlikely that the board would reduce the 24 ft. pavement width requirement.

A safe street design that complies with accepted design standards is very important because these will be private streets. Sidewalks are not proposed. The town police will not have authority to enforce speed or parking regulations on these streets.

The decision on whether the proposed access ways should comply with the LDR requirements for streets is a threshold decision because, if the LDR standards are applicable and not waived, a redesign to comply with the requirements will likely result in fewer units. For example, a private street requires a 40 ft. wide right-of-way, which would be common space under the condominium documents. Front setbacks are measured from the right-of-way line. Virtually all of the proposed units would not meet the setback requirement.

Whether the proposed access ways are treated as streets or drives, I recommend that the applicant submit cross-sections drawings for each 50 ft. station so that the adequacy of roadside ditches and lot grading may be reviewed.

RZO § 202.10, A (1) Buffer.

RZO § 202.10, A requires the following buffer between residential and non-residential uses.

> A. **Buffer between Residential and Non-Residential Uses:** In circumstances where a buffer will not be provided by Section 202.10, a fifty (50) feet wide buffer, measured from the property line, shall be provided, as follows. Said buffer shall include natural or added planting of evergreens which will screen non-residential uses from residential areas during winter months.
>
> 1) New residential building or development shall provide such a buffer from an existing non-residential use not permitted by right in a residential district or the boundary of an abutting non-residential district.

RZO § 202.10, A.

[1] Using the more conservative April 24, 2017 TEC Trip Generation estimates.

There are non-residential uses on Tax Map 10, Lots 16 and 19 which are not allowed by right in a residential district. Thus, the above 50 ft. wide buffer required along the property lines of those two lots.

Is the Layout Overcrowded?

The planning board may want to consider whether the proposed layout is too crowded. The space between the rears of Unit 18 and Unit 23 is 45 to 50 ft.; the space between the rears of Units 19 and Unit 22 is 40 ft.; The rears of Units 25 & 26 are separated from the rears of Units 31 & 32 by only 35 ft. By comparison, the rear yard requirement of Rye's densest residential district (GR) is 30 feet. That would assure a spacing of at least 60 ft. between residential units if homes were built right on the rear setback lines (which seldom happens).

The spaces between the rears of the units are occupied by the sophisticated Advanced Onsite Solutions effluent disposal systems, which include 25 ft. x 50 ft. or 25 ft. x 40 ft. leachfields; air supply compressors; and vents. These are not aesthetically pleasing features. It is not clear whether there will be odors from the vents or noise from the compressors which will impact the quality of life in the nearby residential units. It is also not clear whether the grading of the leachfields depicted on the plans reflects the Rye Building Code § 7.9.3.1 requirement that the bottom of the proposed EDA be a minimum of six feet above bedrock or impermeable substrata.[2]

It should be noted that the 25 ft. minimum spacing requirement of RZO § 402.3H is intended to be a side yard spacing along the street frontage for the purpose of providing fire apparatus and firefighting access. It was not intended to apply to rear year spacing where privacy and aesthetics are paramount concerns.

The site lacks adequate recreational space and a community building, both of which are amenities which might be expected in a development of this size.

It is possible that a layout which eliminated Drives B & C in favor of a large loop similar to Drive A might provide for 7 or 8 of these four-plex structures and materially increase the open spaces between units.

Impervious Coverage.

The impervious coverage of 35.5% exceeds the 25% limitation of the Aquifer and Wellhead Protection District by 42%. The notation on Sht. C2 does not accurately state the provision of Aquifer and Wellhead Protection District which allows impervious coverage to exceed 25%.

[2] See RCCD 11/15/17 letter noting the absence of test pit data.

> **Coverage**. The impervious coverage of a lot shall not exceed 25%. However, impervious coverage may be increased to that allowed by the underlying use district if the applicant submits a stormwater management plan to the planning board for review and approval. As part of its review, the planning board shall determine, among other things, **whether the plan provides for adequate recharge on the property to be developed and whether the plan is consistent with New Hampshire Stormwater Manual** Volumes 1-3, December 2008, NH Department of Environmental Services, as amended.

RZO § 306.6B (emphasis added).

The planning board should ask its consultants to opine on whether the above emboldened standards are met.

Marketability.

At the November 14 planning board meeting the applicant represented that THP has done "market research" to determine that people would be interested in buying is such a development. (11/14/17 Minutes, p. 5). I suggest the board pursue this further by requesting copies of the marketing research. What is the profile of the typical purchaser? How many children will there be? If these units are not marketable, what happens? Should there be a phasing plan?

Conclusion.

This memorandum is not intended to be a comprehensive review. It is intended to identify some threshold concerns which the board may want to review with the applicant before the application proceeds further.

Very truly yours,

MKD.

Michael L. Donovan

Cc: (By Email)
Stephen Harding, PE
Caitlyn Abbott, PE
John Chagnon, LLS
Danna Truslow
David Brown, Esq.

AMBIT ENGINEERING, INC. CIVIL ENGINEERS AND LAND SURVEYORS
200 Griffin Road, Unit 3, Portsmouth, NH 03801 Phone (603) 430-9282 Fax 436-2315

8 January, 2018

Kim Reed, Town Planner
Town of Rye
10 Central Road
Rye, NH 03870

RE: **Airfield Drive Multifamily Residential Development**
Site Plan & Lot Line Adjustment Application

Dear Kim and Planning Board members:

We have received and reviewed an November 10, 2017 Sebago Technics review letter for the subject project. Our responses (**in bold**) to these review comments are as follows:

General Engineering Comments:

1. The applicant is proposing to construct ten (10), 4-unit buildings for a total of 40 dwellings with associated access roads, utilities, and drainage structures. Domestic water and underground electric utilities will be extended from existing infrastructure in Airfield Drive to service the proposed dwellings. The dwellings will be serviced by on-site subsurface wastewater disposal systems. The applicant is proposing to transform an existing Detention Pond into a Rain Garden in order to treat stormwater runoff from the newly proposed impervious areas. **We concur.**

2. As a general comment, there is opportunity for the designer to provide additional clarity with the plan set. It appears that the "Utility and Drainage Plan," "Septic System and Layout Plan," and "Grading & Erosion Control" Plan depict many of the same proposed improvements. For instance, all three plans show septic and sewer structures on them. **We have shown the items that will require co-ordination during construction for clarity, we have revised our drawing layers to clarify the plan set and renamed the plans accordingly.**

3. The interior roadways of the subdivision are labeled as both "Roads" and "Drives." The designer should revise the drawings for consistency. **We have relabeled all interior access ways as Drives.**

4. While this development constitutes a subdivision, it is not a typical residential subdivision with individual residential house lots. This development more closely resembles a multi-family site plan with driveways and, as such, some of the Town's subdivision regulations regarding roadways may not apply to this project. For instance, The Town's regulations indicate that intersections must be separated by 300-feet per the Land Development Regulations for the Town of Rye. The proposed intersections with Airfield Drive appear to have less of a separation than this standard requires. The Planning Board may wish to consider whether the applicant should adhere to this standard or if waiving this requirement would be appropriate. **We have reviewed the Land Development Standards of the Town of Rye, dated Revised October 14, 2014. Section 602.2 Streets, Section A. 5 Intersections states: "...all (street) intersections shall be separated by at least 300' . In Appendix A of the Town of Rye, NH Zoning Ordinance, Revised March 18, 2017 – Definitions the definition of Street is as follows: STREET: A public roadway which has been accepted by the Town, or such a roadway otherwise established by law as a Town or State highway, or an officially approved private road if not less than forty (40) feet in width, which affords means of access to abutting property. Out interpretation is that since the proposed driveways have not and will not be accepted by the Town, are less than 40; in width, and do not afford access to abutting property they are not Streets and are not required to be separated by 300'. If the Planning Board disagrees with this interpretation and deems these Drives shall meet the requirement of Streets, we will request a formal waiver from the street separation requirement.**

5. Similar to Comment #3 above, the regulations require that the horizontal alignment of all new streets shall be straight within 100-feet of an intersection per the Land Development Regulations. Again, the Planning Board may wish to consider whether the applicant should adhere to this standard or if waiving this requirement would be appropriate. **We re-iterate our understanding that the proposed driveways are not streets, therefore this regulation does not apply. If the Planning Board deems these Driveways shall meet the requirement of Streets, we will present a formal waiver...**

6. The interior roads of the subdivision are being proposed at a 22-foot width. Figure 1 within the Land Development Regulations suggests that pavement width must be 24-feet. Additionally, the profile for Road A on Sheet P1 suggests that the intersection with Road B will be at a 3.12% slope. Per the Town of Rye Land Development Regulations, grades shall fall into a range of zero to three percent within 50-feet of an intersection. The Planning Board should review these items as well with the applicant to determine if the additional width should be required for the interior roadway and whether any adjustments to the Road B profile are warranted. **We had**

reviewed the issue of roadway width at the concept meeting and we believe the Board is comfortable with the 22' width proposed. The section of Drive "A" within 50' of the intersection is within a vertical curve and complies with the requirement.

7. Finally as per the previous three comments, the Land Development Regulations state that driveways shall not be located within 100-feet of a street intersection. Many driveways within the subdivision are located within 100-feet of an intersection. The Planning Board should direct as whether the applicant adhere to this standard if it applies or if waiving this requirement would be appropriate. **We re-iterate our understanding that the proposed driveways are not streets, therefore this regulation does not apply. If the Planning Board deems these Driveways shall meet the requirement of Streets, we will present a formal waiver from Street Regulations.**

8. The hexagon symbol associated with the UGE on Sheets C3a, C3b, C4a and C4b should be shown included within on the legend. **The cover sheet has been revised to add the hexagon symbol for Electric Hand Holes to the legend.**

9. It would be beneficial for the water main and sewer main to be shown on the roadway profiles to ensure appropriate cover and separation distances have been provided. **We have revised the roadway plan and profiles to show the Septic Effluent Pipes, Drainage Pipes and the Water mains in profile and plan view.**

10. It appears that minimal cover has been provided (approximately 1 to 2 feet) for the interior drainage storm drainage pipes along Road a near Units 29 through 34. The designer may wish to revisit this area to ensure that enough cover is provided so that pavement damage from winter frost does not occur. **We have lowered the 12" drain pipe in front of units 29-32 so that the minimum depth of cover is generally greater than three feet except where it is 2.7' in the drive for units 31/32.**

11. The designer should revisit the grading in front of the retaining wall as minimal to no pitch behind the units is currently shown. A swale should be more defined and the designer may want to implement an underdrain pipe system or a stone drain with no pipe to better facilitate drainage in this relatively flat area. **We have revised the wall detail to include the underdrain as suggested. The site grading slopes such that water will flow as intended. Given the small drainage area we believe the swale is not needed.**

12. The retaining wall detail is a generic block wall style retaining wall. A note should be added to the plans that the wall will be designed in accordance with the manufacturer's recommendations and sealed by a State of New Hampshire Professional Engineer. **A Note has been added to plans as requested.**

13. The 90-foot contour crossing Road A is incorrectly labeled with a '92.' **We have revised the labeling so that the contours are more distinctly labeled. The 90 contour label was an existing contour.**

14. It appears that ponding may potentially occur adjacent to and behind Unit 40. The grading should be revised to show positive drainage flow. **We have revised the grading around Unit 40 to show positive drainage flow.**

15. A catch basin detail is provided with a beehive grate which would be appropriate in vegetated areas. An additional detail should be provided for catch basins within the paved areas. To avoid confusion in the field, the designer should also clearly add labels or notes to indicate where beehive grates are to be installed. **All Catch Basins are in vegetated areas, therefore we propose beehive grates only.**

16. Due to the berm created by the 88-foot contour adjacent to Unit 36, it is unclear how water will flow around the unit and into the proposed swale. The designer should also consider creating a swale between Units 38 and 39. **We have regraded the area around Unit 36 to remove the proposed berm, thereby allowing the water to flow directly into the proposed swale.**

17. The designer should ensure that Detail's J and K on Sheet D2 depict Type E asphalt for the wearing course and Type B asphalt for the binder course. The gravel shoulders should be labeled with a 3-inch depth of crushed aggregate (NHDOT 304.33). **We are not proposing super pave type asphalt. We have revised the details on Sheet D2 Details J and K to show the specified reference to the gravel shoulders crushed aggregate (NHDOT 304.33).**

18. Detail BB on Sheet D5 refers to the proposed pipes as being a reinforced concrete material. The plan view sheets refer to the pipes as HDPE. **Drainage pipes are proposed as HDPE. Plan sheets and details have been revised to reflect HDPE pipes.**

19. A Planting Plan should be submitted for the Rain Garden. **The planting list is included in the rain garden detail.**

Stormwater (HydroCAD) Comments:

1. As a general comment, the watershed basin areas in Table 1 and Table 2 (Pre and Post Conditions) of the Stormwater Report do not add up to a consistent area. **The areas in Table 1 of ES1 (the total area on-site changing in the future) is 445,635 sq. ft. The sum of areas Ps1a – Ps1h inclusive (the total watershed basin areas that are changing) is 445,635 sq. ft. These areas equal each other therefor they are consistent.**

2. A 1P node is shown on the Pre-Development Watershed Plan for the existing detention basin. The detention basin is not modeled in the pre-development HydroCAD calculations. **The drainage basin was designed and constructed for the future development of the subject parcel. The design included a calculation that was previously reviewed and approved for this development. We have added the drainage basin to the existing conditions model for your review.**

3. Reach 4P is modeled as an 18-inch culvert, however, the plans call for a 12-inch culvert. **Reach 4P has been revised on the plans to an 18" Culvert.**

4. The Rye Land Development Regulations require storm sewers and drainage facilities be based upon a design flow of a 25-year/24-hour storm with potential hazard structures, such as holding ponds, sedimentation ponds, etc., being designed to 100-year/24-hour storm standards. The Drainage Analysis report provides a summary of the 2-, 25-, and 50-year storm event predictions and then a more complete modeling of the 10-year event for both the pre- and postdevelopment conditions. There is no summary for the 100-year storm although there is a reference to the post-development 100-year storm being contained within the rain garden. The designer should revisit the model for the required 100-year storm event. **We have revised all our calculations for the Town of Rye. We are providing design flows for the 25, 50 and 100 year storm events as required.**

5. We understand that NHDES will be conducting a review of the approved plans. As a general comment, we note that a minimum 4-inch diameter underdrain pipe is normally incorporated into the design of a rain garden per the NHDES Chapter 4, Section 4C Bioretention System. However, the Drainage Analysis suggests that this

rain garden will be an infiltration system with no underdrain pipes. **We understand that most rain gardens are designed with underdrains. In this specific case, the drainage model indicates that the raingarden will function without underdrains and NHDES design requirements for Raingardens (Bioretention systems) only state underdrains be used where required (Pg. 113 NH Stormwater Manual, Volume 2, December 2008).**

6. Orifices for peak rate control should be incorporated with the Outlet Control Structure (OCS). A detail of the OCS should be included with the next submission. **Our calculations show that there is no peak flow, therefor no Outlet Control Structure Orifices are proposed.**

7. We question the functionality of weir elevation between the sediment forebay and the rain garden being placed at a higher elevation (1.2 feet) than the 18-inch inlet pipe to the forebay. During high volume rain events, the inlet pipe would fill with water prior to the water spilling over the weir. **We agree, but we feel the proposed design is appropriate due to the unique nature of the site. Soils are deep, well drained and have no ESHWT found within 10' of finish grade for the majority of the site. There are over 700' of flat road side ditches that will allow sediment to drop out. We do not think that in large storm events, water backing up into the system would lead to the clogging of cross culverts.**

8. Although the site is generally permeable in its natural condition, the designer should ensure that the berm of the forebay that faces the rain garden is made of permeable material to enable the forebay will drain after a rainstorm event. **The forebay berm has been revised to be permeable.**

9. The rim elevation of the OCS is 80.20-feet on the plan view and 80.50-feet on the Rain Garden Stormwater Treatment Detail on Sheet D5. We also question the functionality of placing the OCS structure rim elevation above the top of bank elevation of the rain garden. At that elevation, stormwater would never enter the rim of structure and its ability to act as an overflow device would be eliminated. **We have revised the elevation on the OCS to 79.50.**

10. The outlet pipe for the OCS in Detail CC on Sheet D5 should be shown with cover. **We have revised the detail CC on Sheet D5 as recommended.**

11. We are confused by the modeling of Pond 1P (Rain Garden) in which the surface elevation is 77.5 and the bottom of the build up to the rain garden is approximately 74.16, but the invert of the infiltration and beginning of the pond storage is at 74.5.

The designer should revisit the practicality of these elements as they contribute to the pond function. **The existing detention basin elevation is 74.16 +-. The basin will be filled with media as shown in the detention pond detail. The media has voids which is used in volume computations.**

12. Although the site is expected to operate under a well-draining condition, there should be a note added to the plan that should any extended duration or nuisance ponding of surface water or groundwater occur on the site due to unexpected conditions, construction activities, or unpredictable subsurface groundwater elevations that the area of ponding will be addressed by the applicant in a manner consistent with the Rye Land Development Regulations, Best Management Practices, and standard engineering practices. **We have added Note #4 to Sheet D1 and C6A and C6B as recommended.**

13. As a minor comment, there is a reference to a drainage easement in the narrative that abruptly ends without finishing the sentence or naming the entity holding the easement. The narrative should be reviewed for completeness. **We have revised the narrative to state that a drainage easement exists over Lot 15-3 (White Birch) in favor of Lot 15-4 (Airfield Drive Multi Family Dwelling Development).**

Traffic Engineering Comments:

1. There is adequate sight distance is available at the existing intersection of Airfield Drive and Route 1. **We concur.**

2. There is no apparent crash trend at this location. **We concur.**

3. Trip generation has been estimated using the ITE Land Use for single family housing, rather than condominium/townhouses. This approach will provide a more conservative approach as single family housing has a higher published trip generation rate than the rate for condominium/townhouses. **We concur.**

4. A traffic operations analysis was completed for the intersection of Route 1 and Airfield Road using future year 2021 traffic volumes including project generated traffic. The analysis shows that traffic operations will degrade slightly on the Airfield Road approach, but will still operate at an acceptable level of service. **We concur.**

Cost Estimate Comments:

1. We have reviewed the August 10, 2016 Preliminary Site Cost Estimate provided with the application materials. The estimate should establish the entity that prepared the estimate and also be checked for any changes in the site plan since 2016. The estimate should be currently dated to reflect the current plan. **Please find a dated and revised Site cost Estimate by Ambit Engineering.**

2. Quantities and Unit costs should be provided for the on-site retaining wall, the rain garden and outlet control structure, and transformer pads (and transformers if applicable). **Quantities and Unit Costs have been provided and itemized based on these 1/8/18 revised site plans.**

3. As has been done historically, the estimate should also carry a 10-percent contingency. **A 10% contingency has been added to the estimate as recommended.**

Should there be any questions or comments regarding our revisions, please do not hesitate to contact us.

Sincerely,

John Chagnon, PE; Ambit Engineering, Inc.

Enclosures: 10 Plan Sets, PDF of files on a disc, Drainage Information, Cost Estimate

cc: Stephen D. Harding, Michael Donovan,

AMBIT ENGINEERING, INC. CIVIL ENGINEERS AND LAND SURVEYORS
200 Griffin Road, Unit 3, Portsmouth, NH 03801 Phone (603) 430-9282 Fax 436-2315

9 January, 2018

Kim Reed, Town Planner
Town of Rye
10 Central Road
Rye, NH 03870

RE: Airfield Drive Multifamily Residential Development
Site Plan & Lot Line Adjustment Application

Dear Kim and Planning Board members:

We have received and reviewed the November 15, 2017 RCCD review letter for the subject project. Our responses (**in bold**) to these review comments are as follows:

1. Rye Building Code 7.10.2 requires at least 2 test pits per disposal area. Building Code 7.10.3 further states "The test pits shall be located within the proposed effluent disposal area, and the two test pits shall be spaced at least 30 feet apart." None of the disposal areas meet these requirements. **We have revisted the site and performed additional test pits B1, B2, B2A, B3, B4, B5, and B6 for septic design purposes. Test pits are attached. These additional Test Pit logs are show on Septic System Design A, B, C, D, E and F.**

2. Rye Land Development Regulations 603.3.A. requires a reserve area of 4,000 square feet per disposal area. None has been provided.**The same regulation, Section 603.3.A allows for a reserve area which is twice the leachfield size. Therfore an area of twice the leachfield size has been shown.**

3. Rye Land Development Regulations 603.3.A.1.c requires a disposal area be at least 75 feet from soils with bedrock less than 24 inches deep. Disposal area E does not meet this requirement. **We have performed test pits around Disposal Are E as well as additional boring. The test pits**

indicate that there are no soils with bedrock at less than 24" deep within 75' of Disposal System E.

4. The test pit used for disposal area F is not deep enough to confirm the bottom of the stone is at least six feet to bedrock (Building Code 7.9.3.1). **We have performed an additional test pit B3 . This test pit was excavated to 12' deep with no refusal. We believe this confirms that there is over 6' of separation to Bedrock.**

5. The length of disposal area D is not specified on sheet c5b. **The length of disposal system D has been added to sheet C5b.**

6. All disposal areas show the distribution boxes outside the stone bed. **We show stone under the distributon boxes in the system profile. While the the d-box is outside the stone bed, the stone is shown to ensure the d-box stabilized and well supported.**

Should there be any questions or comments regarding our revisions, please do not hesitate to contact us.

Sincerely,

John Chagnon, PE; Ambit Engineering, Inc.

cc: Stephen D. Harding, Michael Donovan, RCCD

AMBIT ENGINEERING, INC. CIVIL ENGINEERS AND LAND SURVEYORS
200 Griffin Road, Unit 3, Portsmouth, NH 03801 Phone (603) 430-9282 Fax 436-2315

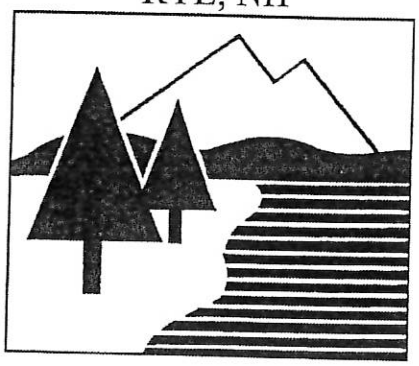
The Housing Partnership - Airfield Drive					
Rye, NH					1/8/2018
Item No.	DESCRIPTION	Units	Quantity	Unit Cost	Total
1	Demo - Erosion Control	LS	1	$ 5,000	$ 5,000
2	Demo - Clearing and Grubbing	AC	6	$ 7,500	$ 45,000
3	Demo - Rock Excavation	CY	0	$ 75	$ -
4	Roadway - Total (22' Width)	LF	2,655		
5	Roadway - 3" Asphalt	TON	1,022	$ 100	$ 102,218
6	Roadway - Crushed Gravel Base	CY	1,082	$ 25	$ 27,042
7	Roadway - Gravel Sub-base	CY	2,163	$ 30	$ 64,900
8	Roadway - Cape Cod Curb	LF	0	$ 10	$ -
9	Site - Landscaping	LS	1	$ 25,000	$ 25,000
10	Site - Sidewalk Crushed Gravel Base	CY	0	$ 40	$ -
11	Site - Signs	EA	10	$ 200	$ 2,000
12	Site - Pavement Striping	LF	500	$ 0.50	$ 250
13	Site -Retaining Wall/Headwall	SF	2,200	$ 40.00	$ 88,000
14	Site-Rain Garden	EA	1	$ 30,000.00	$ 30,000
15	Utility - 6" Sewer Pipes	LF	600	$ 40	$ 24,000
16	Utility - Sewer Manhole	EA	10	$ 3,000	$ 30,000
17	Utility - Septic System	EA	6	$ 25,000	$ 150,000
18	Utility - Domestic Water Service	EA	40	$ 1,500	$ 60,000
19	Utility - 6" Hydrant Laterals	EA	60	$ 60	$ 3,600
20	Utility - 8" Water Main	LF	2,000	$ 70	$ 140,000
21	Utility - Fire Hydrant	EA	3	$ 4,000	$ 12,000
22	Utility - Gate Valve	EA	10	$ 1,500	$ 15,000
23	Utility - Storm Pipes	LF	400	$ 50	$ 20,000
24	Utility - Catch Basin	EA	6	$ 3,500	$ 21,000
25	Utility - Drain Manhole	EA	10	$ 3,000	$ 30,000
26	Utility - Electric/Telephone/Cable Service	LF	7965	$ 10	$ 79,650
27	Utility - Transformers Pads	EA	10	$ 800	$ 8,000
Sub-Total					$ 982,659
	10% Contingency				$ 98,266
Total					$ 1,080,925

DRAINAGE ANALYSIS

SECTION 402 MULTI FAMILY RESIDENTIAL DEVELOPMENT

AIRPORT DRIVE

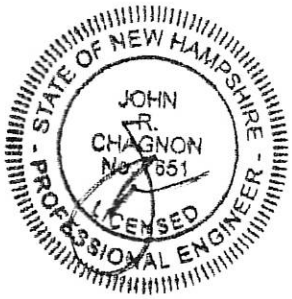
RYE, NH

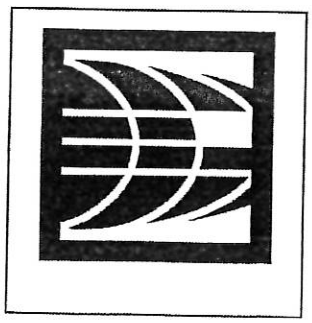


October 2017

Revised January, 2018

FOR THE HOUSING PARTNERSHIP





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APPENDIX

A. Vicinity Map
B. Aerial Photo
C. Tables, Charts, Etc.
D. HydroCAD Drainage Analysis Calculations
E. Colored Soil Plan Pre and Post
F. Soil Survey Information
G. FEMA FIRM Map
H. Inspection & Maintenance Plan

ATTACHMENTS

Pre-Development Drainage Plan - W1
Post-Development Drainage Plan - W2

EXECUTIVE SUMMARY

This drainage analysis examines the pre-development (existing) and post-development (proposed) stormwater drainage patterns for the proposed project at Airport Drive in Rye, NH. The site is shown on the Town of Rye Tax Map 10 as Lot 15-4. The total proposed lot size is 437,904 square-feet (10.0529 acres). The total area, including off-site watershed basins, analyzed in this report is 661,243 square-feet (15.180 acres).

The proposed development will include 10 (4) unit residential structures with associated private drive, landscaping, on-site utilities and an on-site subsurface waste disposal systems. The new residences will be serviced by public water. The site is well suited to country drainage. A drainage retention area was sized and constructed to allow for this development on or about 2007. We are incorporating this Stormwater Facility into our proposed design.

The development has the potential to increase stormwater runoff to adjacent properties, and therefore must be designed in a manner to prevent that occurrence. This will be done primarily by capturing stormwater runoff and routing it through appropriate stormwater facilities, designed to ensure that there will be no increase in peak runoff from the site as a result of this project.

MULTI-FAMILY RESIDENTIAL DEVELOPMENT

AIRFIELD DRIVE, RYE, NEW HAMPSHIRE

This drainage report is designed to assist the owner, planning board, contractor, regulatory reviewer, and others in understanding the impact of the proposed development project on local surface water runoff and quality. The project site is shown on the Town of Rye, NH Assessor's Map 10 as Lot 15-4. Bounding the site to north of the site are existing residences and the BMX Bike Park. To the West to the site is a commercial lot fronting on Lafayette Road with a modest Restaurant located on it. The property to the east has been developed as a Retirement Community. Bounding the site to the south is commercial land and residential homes.

The proposed development will construct a new private driveway network to serve a proposed residential neighborhood consisting of 10 (4) unit residential buildings, and other associated improvements such as utilities and landscaping. The project is anticipated to begin construction in the spring of 2018 and be substantially completed by the fall of 2020.

This report includes information about the existing site and the proposed development necessary to analyze stormwater runoff and to design any required mitigation. The report includes maps of pre-development and post-development watershed areas and calculations of runoff. The report will provide a narrative of the stormwater runoff and describe numerically and graphically the surface water runoff patterns for this site. Proposed stormwater management treatment structures and methods will also be described, as well as erosion and sediment control practices. To fully understand the proposed site development the reader should also review a complete site plan set in addition to this report.

METHODOLOGY

This report uses the US Soil Conservation Service (SCS) Method for estimating stormwater runoff. The SCS method is published in The National Engineering Handbook (NEH), Section 4 "Hydrology" and includes the Technical Release No. 20, (TR-20) "Computer Program for Project Formulation Hydrology", and Technical Release No. 55 (TR-55) "Urban Hydrology for Small Watersheds" methods. This report uses the HydroCAD version 10.0 program, written by HydroCAD Software Solutions LLC, Chocorua, N.H., to apply these methods for the calculation of runoff and for pond modeling. Rainfall data was used from the Extreme Precipitation Tables, provided by the Northeast Climate Center. Runoff curve numbers are taken from "The Stormwater Management and Erosion Control Handbook for Urban and Developing Areas in New Hampshire."

Time of Concentration (Tc) is calculated by entering measured flow path data such as flow path type, length, slope and surface characteristics into the HydroCAD program. For the purposes of this report, a minimum time of concentration of 5 minutes is used.

The storm events used for the calculations in this report are the 2-year, 10-year, 25-year, 50 year and 100-year. Since this project disturbs more than 100,000 square-feet of contiguous terrain, an Alteration of Terrain (AoT) permit from the New Hampshire Department of Environmental Services (NHDES) is required.

Watershed basin boundaries have been delineated using topographic maps prepared by Ambit Engineering and field observations to confirm.

SITE SPECIFIC INFORMATION

The project site and adjacent area was delineated for soils by Marc Jacobs in November 2016 and again in September of 2017. The test pits were witnessed by Dennis Plante. Additional Test Pits were performed and field located by Ambit Engineering, Inc. in September of 2016, and these were also witnessed by Dennis Plante for the Town of Rye. Four borehole tests were performed in the existing detention area to determine Ksat values for infiltration. Additional test pits were performed

in the future Rain Garden Area to confirm that the separation from bedrock and seasonal high water met the AoT requirements.

Based on the Site Specific Soils Survey it was determined that the soils are primarily welled drained soils that were formerly a gravel pit.

See accompanying Site Specific Soil Map and Test Pit Logs for details.

PRE-DEVELOPMENT DRAINAGE

The existing site drains via overland flow from the west side of the lot to the east, where runoff drains off the site via overland flow. Any stormwater that flows across the site is routed into the Detention Pond. The detention pond was designed and approved in 2007, to contain a100 year storm event (6.50 inches of rainfall in a 24 hour period). The detention pond has a stone rubble weir that connects it with the detention basin on the adjacent property.There is also an existing easement on Tax Map 15-3 (White Birch) in favor of Tax Map 15-4 (Airfield Drive Multifamily Residential Development) that allows the drainage flow to cross the property line.

In the pre-development condition, the site has been depicted as a single watershed basin (ES-1) based on localized topography and discharge location. There are also two off-site areas (OS1 and OS2) beyond the project's limits that drain through the site. These areas have been analyzed separately, and are included in the calculations in this report so that the stormwater facilities will be properly sized to account for all drainage that discharges off the site.

Watershed basin ES 1 is comprised of all the area of the lot. This basin is mostly wooded and poor stands of grass with some impervious area associated with Airfield Drive. Stormwater runoff from this area drains via overland flow to a detention area constructed for any future Development. Stormwater exiting the detention area flows over a weir into another stormwater retention area. Runoff that enters this stream is identified in this report as Design Point 1 (DPl). The runoff curve number (CN) for this basin is calculated to be 47 with an impervious coverage of 1.25%.

Watershed basin ES2 is a small area at the west of the lot. The runoff curve number (CN) for this basin is calculated to be 55 with impervious coverage of 0%. Water Basin ES2 remains unchanged for Postdevelopment and will be ignored.

Off-site basin OS 1 is west of the project site. Drainage flows via overland flow to the east where it enters the project property and is collected by road side ditches along Airport Drive.

Off-site basin OS2 is an area located to the east of the project site and is comprised of existing grass area and woods. Drainage flows via overland flow to the north. OS2 remains unchanged for Postdevelopment and will be ignored.

Table 1:Pre-Development Watershed Basin Summary

Watershed Basin ID	Basin Area (SF)	Tc (MIN)	CN	10-Year Runoff (CFS)	50-Year Runoff (CFS)	Design Point
ESl	445,635	40.2	47	1.74	8.43	DPl
OSI	195,063	24.5	31	0.01	0.32	DP1

POST-DEVELOPMENT DRAINAGE

The proposed development has been designed to match the pre-development drainage patterns to the greatest extent feasible. In the post-development condition, the site has been broken down into eight on-site watershed basins (PS la, PS lb, PSI c, PSl d, PS l e, PS l f, Ps1g and PS lh) based on localized topography and discharge locations. The same off-site basins that were delineated in the pre-development analysis were carried forward to the post-development analysis and remain unchanged in the proposed condition. All Basins drain to Design Point 1 (DPl). This allows for a direct review of Design Points to show the comparison of runoff from the site in the pre- development and post-development conditions.

Table 2: Post-Development Watershed Basin Summary

Watershed Basin ID	Basin Area (SF)	Tc (MIN)	CN	25-Year Runoff (CFS)	50-Year Runoff (CFS)	Design Point
PSIa	39,537	24.5	59	0.71	1.90	DPI
PSIb	84,819	26	47	0.40	1.96	DPI
PSIc	94,159	11.5	70	11.5	8.56	DPI
PSId	66,033	11.1	71	3.05	6.25	DPI
PSIe	44,700	7.8	76	2.81	5.32	DPI
PSIf	99,068	20.4	60	2.00	5.17	DPI
PSIg	8,798	5	68	0.52	1.11	DPI
PSIh	8,521	11.9	86	0.64	1.07	DPI

The overall impervious coverage of the area analyzed in this report for all basins, increases from 8,255 square feet (1.25%) in the pre-development condition to 169,893 square feet (25.69%) in the post-development condition. Since the project will increase the amount of impervious area in the post-development condition, groundwater recharge is required. The rain garden biofiltration facilities provide water quality treatment to the tributary area. All stormwater is treated and infiltrated recharging the groundwater.

Rain Garden

Stormwater from all watershed are routed through the Rain Garden. Flow into the Rain Garden is treated in a sediment forebay for pretreatment as this runoff will drain across the proposed Asphalt driveway and will need a greater level of treatment. The forebay is sized to contain greater than the required 10% of the Water Quality Volume (WQV).

A rain garden (sometimes referred to as a "bioretention system") is a type of filtration BMP designed to collect and filter moderate amounts of stormwater runoff using conditioned planting soil beds, gravel beds and vegetation within shallow depressions. The rain garden system has been designed to infiltrate the treated water directly to the subsoil. Rain garden cells are capable of reducing sediment, nutrients, oil and grease, and trace metals. The rain garden systems has been sited in close proximity to the origin of the stormwater runoff to be treated; therefore, there are no negative impacts to downstream receptors or adjacent properties anticipated as a result of this project.

Table 3: Pre-Development to Post-Development Comparison

	Q2(CFS)		Q25 (CFS)		Q50 CFS)		Q100(CFS)	
Design Point	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**
DP 1	0.00	0.00	0.00	0.00	0.06	0.00	0.09	0.00

EROSION AND SEDIMENT CONTROL PRACTICES

The erosion potential for this site as it exists is low due to the existing vegetation. During construction, the major potential for erosion is wind and storm water runoff. The contractor will be required to inspect and maintain all necessary erosion control measures, as well as installing any additional measures as required. All erosion control practices shall conform to "The Stormwater Management and Erosion Control Handbook for Urban and Developing Areas in New Hampshire." Some examples of erosion and sediment control measures to be utilized for this project during construction may include:

Silt Soxx (or approved alternative) located at the toe of disturbed slopes

- Stabilized construction entrances at all access points to the site
- Rock sediment barriers at catch basins and in drainage swales
- Temporary mulching and seeding for disturbed areas Spraying water over disturbed areas to minimize wind erosion

After construction, permanent stabilization will be accomplished by permanent seeding, landscaping and surfacing the access drives and parking areas with either compacted gravel or asphalt paving.

CONCLUSION

The proposed development has been designed to match the pre-development drainage patterns to the greatest extent feasible. This report indicates that the development increases the stormwater runoff generated by the project. With the design of the rain garden, the post-development runoff rates are the same as or less than the pre-development runoff rates, in conformance with the AoT Peak Runoff Control Requirements. Treatment is provided through the use of sediment forebay as pretreatment, with rain garden systems as primary treatment.

TEST PIT B1

Date: 12/6/17
Logged by: DOUGLAS LAROSA, SD#849
Witnessed by: DENNIS PLANTE
ESHWT: NONE
Observed H20: NONE
Restrictive layer: NONE
REFUSAL: NONE
Percolation rate: 2 MIN/IN
Roots:

DEPTH	DESCRIPTION
0" – 16"	10YR 3/4 DARK YELLOWISH BROWN GRAVELLY FINE LOAMY SAND, GRANULAR, FRIABLE
16" – 22"	10YR 4/3 DARK YELLOWISH BROWN MEDIUM SAND, SINGLE GRAINED, LOOSE
22" – 64"	10YR 4/3 DARK YELLOWISH BROWN MEDIUM SAND & COBBLES (40%), SINGLE GRAINED, LOOSE
64" – 126"	10YR DARK YELLOWISH BROWN SAND, SINGLE GRAINED, LOOSE

TEST PIT B2

Date:	12/6/17
Logged by:	DOUGLAS LAROSA, SD#849
Witnessed by:	DENNIS PLANTE
ESHWT:	**NONE**
Observed H20:	NONE
Restrictive layer:	NONE
REFUSAL:	**NONE**
Percolation rate:	2 MIN/IN
Roots:	48"

DEPTH	DESCRIPTION
0" – 16"	10YR 3/3 DARK BROWN LOAMY SAND, MASSIVE, FRIABLE
16" – 52"	10YR 3/3 DARK BROWN MEDIUM SAND 5% COBBLES, SINGLE GRAINED, LOOSE
52" – 120"	10YR 5/4 YELLOWISH BROWN MEDIUM SAND & COBBLES (60%), SINGLE GRAINED, LOOSE

TEST PIT B2A

Date: 12/6/17
Logged by: DOUGLAS LAROSA, SD#849
Witnessed by: DENNIS PLANTE
ESHWT: NONE
Observed H20: NONE
Restrictive layer: NONE
REFUSAL: NONE
Percolation rate: 2 MIN/IN
Roots: 52"

DEPTH	DESCRIPTION
0" – 11"	10YR 3/3 DARK BROWN LOAMY SAND, MASSIVE, FRIABLE
11" – 56"	10YR 3/3 DARK BROWN MEDIUM SAND 5% COBBLES, SINGLE GRAINED, LOOSE
56" – 126"	10YR 5/4 YELLOWISH BROWN MEDIUM SAND & COBBLES (60%), SINGLE GRAINED, LOOSE

TEST PIT B3

Date:	12/6/17
Logged by:	DOUGLAS LAROSA, SD#849
Witnessed by:	DENNIS PLANTE
ESHWT:	**NONE**
Observed H20:	NONE
Restrictive layer:	NONE
REFUSAL:	**NONE**
Percolation rate:	2 MIN/IN
Roots:	50"

DEPTH	DESCRIPTION
0" – 12"	10YR 3/3 DARK BROWN FINE LOAMY SAND, SINGLE GRAINED, LOOSE
12" – 36"	10YR 3/3 DARK BROWN GRAVELLY SAND (30% GRAVEL), SINGLE GRAINED, LOOSE
36" – 60"	10YR 5/4 YELLOWISH BROWN MEDIUM SAND & 60% COBBLES , SINGLE GRAINED, LOOSE
60" – 144"	10YR 5/4 YELLOWISH BROWN MEDIUM SAND & 30% GRAVEL, SINGLE GRAINED, LOOSE

TEST PIT B4

Date:	12/6/17
Logged by:	DOUGLAS LAROSA, SD#849
Witnessed by:	DENNIS PLANTE
ESHWT:	**NONE**
Observed H20:	NONE
Restrictive layer:	NONE
REFUSAL:	**NONE**
Percolation rate:	2 MIN/IN
Roots:	NONE OBSERVED

DEPTH	DESCRIPTION
0" – 0"	DUFF
0" – 14"	10YR 3/3 DARK BROWN LOAMY SAND, SINGLE GRAINED, LOOSE
14" – 64"	10YR 5/4 YELLOWISH BROWN MEDIUM SAND 20% COBBLES, MASSIVE, FRIABLE
64" – 120"	10YR 6/4 LIGHT YELLOWISH BROWN MEDIUM SAND & 40% COBBLES, MASSIVE, FRIABLE

TEST PIT B5

Date: 12/6/17
Logged by: DOUGLAS LAROSA, SD#849
Witnessed by: DENNIS PLANTE
ESHWT: **NONE**
Observed H20: NONE
Restrictive layer: NONE
REFUSAL: **NONE**
Percolation rate: 2 MIN/IN
Roots:

DEPTH	DESCRIPTION
0" – 12"	10YR 4/4 DARK YELLOWISH BROWN FINE SANDY LOAM, MASSIVE, FRIABLE
12" – 132"	10YR 4/3 DARK YELLOWISH BROWN MEDIUM SAND 60% COBBLES, SINGLE GRAINED, LOOSE

TEST PIT B6

Date: 12/6/17
Logged by: DOUGLAS LAROSA, SD#849
Witnessed by: DENNIS PLANTE
ESHWT: NONE
Observed H20: NONE
Restrictive layer: NONE
REFUSAL: NONE
Percolation rate: 2 MIN/IN
Roots:

DEPTH	DESCRIPTION
0" – 126"	10YR 3/3 DARK BROWN MEDIUM SAND, SINGLE GRAINED, LOOSE

TEST PIT B7

Date: 12/6/17

Logged by: DOUGLAS LAROSA, SD#849

Witnessed by:

ESHWT: **NONE**

Observed H20: NONE

Restrictive layer: NONE

REFUSAL: **NONE**

Percolation rate: 2 MIN/IN

Roots:

DEPTH	DESCRIPTION
0" – 68"	10YR 5/6 YELLOWISH BROWN MEDIUM SAND, SINGLE GRAINED, LOOSE
68" – 120"	10YR 6/4 LIGHT YELLOWISH BROWN MEDIUM SAND, SINGLE GRAINED, LOOSE

TEST PIT B8

Date: 12/6/17

Logged by: DOUGLAS LAROSA, SD#849

Witnessed by:

ESHWT: NONE

Observed H20: NONE

Restrictive layer: NONE

REFUSAL: NONE

Percolation rate: 2 MIN/IN

Roots:

DEPTH	DESCRIPTION
0" – 82"	10YR 5/6 YELLOWISH BROWN MEDIUM SAND, SINGLE GRAINED, LOOSE