

Neighbors of the proposed HHOC Sunrise Road development have compiled the following list of questions which we would like HHOC to answer during the Feb 2 meeting. The neighbors understand that a portion of the meeting will be devoted to a presentation by HHOC of their new Concept Plan, but we request that sufficient time be allocated for full response and discussion of the questions below. We appreciate this opportunity to present our concerns, and hope that this format will lead to a more effective exchange of ideas and information about this important project.

HHOC appreciates an opportunity to provide information to those interested in the Sunrise Ridge Concept Plan. The responses below are provided as requested as a follow up to the information session that was held at Carol Woods on February 2, 2006. (The information session was videotaped by Steve Herman of the Sunrise Coalition.)

I. Duplexes versus single-family homes

HHOC's initial plan contained a mixture of single-family houses, duplexes and triplexes. From the start the neighbors have requested that the development consist solely of single-family units in order to maintain the character of the surrounding neighborhood and to avoid potential complications associated with multi-family units. We are disappointed that the new plan replaces all single-family units with duplexes.

Questions:

a) How do costs compare for building two single-family dwellings compared with a duplex of equivalent floor area?

Costs should be approximately equivalent depending on the final style and design of the construction. (HHOC will be working with architects to determine the actual design of the units.) The Design Team concept of these buildings is "attached single family home"...two homes in design and function that touch each other on a common wall. This choice of format is intended to support the design by providing consistency and equivalency in the amenities provided for each community household, provide both an interior and exterior space for each household, and to support the design of a well functioning, quality overall neighborhood layout.

b) When two families share ownership of a duplex, how do they divide responsibility for maintenance and repairs on the structure and lot? How is the yard area divided up between the two families?

This is a Concept Plan. The ownership form for the homes has not been chosen. These homes may be created as condominiums or town houses with a joint HOA fund responsible for all exterior repairs, or there may simply be a joint maintenance agreement/covenant between each pair of adjoining owners which addresses the few amenities not owned separately (owners of attached units do not typically co-own any part of the structure). These are both standard formats for a very typical type of residential construction that can be found in any number of neighborhoods in Chapel Hill. HHOC will choose a format which best supports the needs of this neighborhood and the quality of the community as a whole.

c) Does HHOC have any experience building and maintaining duplexes on its properties?

The expertise in residential home construction that HHOC has developed over the last twenty years is significant, and applies to the construction of single-family attached homes as well as to detached homes. In all of our work, HHOC utilizes not only the expertise of its staff but also the knowledge and experience of a broad range of professional resources from throughout the community and beyond, including other Habitat affiliates. We will continue to do so as we develop quality designs for the homes we will build in Sunrise Ridge. Additionally, this is a very typical design for a neighborhood in this community and its general character is well understood by local professionals, the residential building community, and by Town Officials.

While HHOC provides in-depth training and mentoring to its homeowners, a fundamental part of its mission is to provide OWNERSHIP to those whom it serves. As such, these owners will have the same responsibilities as any other home-owning member of the community and they will be responsible for maintaining their homes and their neighborhood. HHOC DOES provide mentoring to individual homeowners as well as to HOA's created in "Habitat" neighborhoods. Additionally, HHOC, as mortgage holder on each property, has certain powers to protect its investment in these homes. HHOC also budgets funds each year for a zero interest revolving loan fund to assist homeowners with emergency repairs.

d) Does HHOC plan to establish a budget to assist families in maintenance costs for their homes and the community recreation area?

All anticipated common costs will be carefully determined by HHOC and budgeted into the structure of the HOA in the form of HOA dues. Dues will be collected and escrowed by HHOC (as are taxes and insurance) as a part of the monthly mortgage payment. Costs to maintain individual homes are the explicit responsibility of the owner. However, prior to purchasing their home, all HHOC homeowners are required to attend individual budget counseling sessions, as well as workshops on home maintenance and repair. Habitat homeowners have the added advantage of having participated in the construction of their homes and other Habitat homes, and thus have the opportunity to learn skills that are extremely useful in maintaining one's home. They also work alongside their future neighbors, building their homes together, and thus develop relationships and establish lines of communication with one another prior to moving in. HHOC also provides a network of support and advice, both to owners and to HOA leadership.

II. Project size & density

From the start the neighbors have objected to the large number of housing units proposed for this project, given the small amount of build-able acreage. The surrounding neighborhood is designated "Low-density", and consists of single-family homes on wooded lots of one quarter- to several acres. The neighbors have maintained that any new development should be consistent with this standard. They have also been concerned that the proposed development represents a departure from the tried-and-true Habitat model, and seek assurance that this "experiment" has been realistically thought out and will be successful.

It is important to note that in modern planning design, and in the Town's LUMO, the meaning of "buildable area" is fundamentally different than what would be understood from a lay-persons' experience living in, say, a 1970's or 1980's "subdivision". In these older design frameworks, lots are divided up throughout a sector of land. Portions of lots that do not land on streams, steep slopes, or other physically incompatible features become the defacto building sites, or "buildable area" of each lot. Because each lot is only a small portion of the greater parcel, site selection options on each lot are limited. Optimizing site selection on each individual lot does not optimize site selection on the parcel as a whole.

In more modern land planning, site constraints are identified across the entire parcel. These may include physically limiting characteristics of the land, but also include regulatory constraints and goals used to advance community wide benefits (such as required stream buffers and open spaces) as well as limits which support the program goals of the type of construction (for instance passive-solar design). These "constraints" set design standards far beyond the generic meaning of "buildable area". In this way the best areas for building are actively identified and separated out from places best preserved for their existing character or for other uses. The ensuing design for this type of neighborhood can and should then use "the best of all worlds", by utilizing the consistently superior quality of the "buildable area" for the built features of the design, and by interfacing with the "unbuilt" areas to provide an over all result richer in natural amenities, and also more effective in protecting those natural features. It is important to understand in this approach that while these "unbuilt" areas may be protected from construction, they are vital and functional parts of the design and serve many of the needs of the neighborhood as a whole.

LUMO and HHOC's design philosophy for the Sunrise Ridge neighborhood are both fundamentally rooted in this approach to design. HHOC finds this type of approach to design to be the most productive, rational and responsible, and this philosophy will continue to guide the design process.

We openly acknowledge that the nature of this process creates a finished neighborhood design with many features that are not identical to the older "1980's subdivision" style. We are sensitive to issues of compatibility with the existing community. We feel that quality is paramount to achieving this compatibility and are optimistic that this process of design will yield excellent results.

Questions:

(We assume that you will be presenting details of the plan including lot size, distance from street, distance between houses, distance from houses to Ginger Rd and to adjacent property lines, house design features, etc.)

a) How do the lot sizes in the plan compare with lot sizes in your other HHOC developments—both current and projected?

Please see the accompanying table provided by the Project Engineer for setback information.

"Lot size" is not a simple concept in a clustered design. The current plan includes 50 homes on 20 acres.

Rusch Hollow, our most recent development within the Chapel Hill planning jurisdiction and OWASA's urban services boundary, has 17 units on 3.2 acres, with an average lot size of about 5,000 sq. ft. and an overall density of 5.3 units/acre.

b) What evidence do you have that a large-scale neighborhood of closely-spaced low income housing units will remain a positive and self-sustaining environment for future residents?

The design presented in the Concept Plan is similar in many ways to existing neighborhoods all over Chapel Hill, except that the homes are affordable to buyers who could not otherwise afford to live in Chapel Hill. It is equivalent to, and in most cases smaller than, many "average" Chapel Hill neighborhoods that have great track records of strong community identity.

All of HHOC's homeowners, regardless of the size of their lots, go through an extensive process to qualify to purchase a home, and must meet strict guidelines that determine their ability to pay for their mortgage and associated costs of homeownership. They are hardworking members of our community who provide essential services to all who live here, and as parents, they are motivated to create positive environments for their children to grow up in. They want to live close to their jobs, and they want their children to attend the excellent schools that Chapel Hill offers. (Also, see answers above regarding HOA support and the "duplex" design issue.)

c) What has been the experience over time with large Habitat developments of this type in other areas of the state, the southeast, the country? Have there been any social problems encountered? We want to hear about specific examples, including the bad outcomes (if any) as well as the good (if any).

The Habitat model is fundamentally rooted in creating home ownership opportunities for the families we serve. While the over all HHOC program includes key components and services which support the success of each owner and the neighborhood as a whole, we believe that "good design is good design". In this sense, we do not hold this to be a "Habitat" neighborhood, but rather a good neighborhood that serves the needs of those who choose to live in it.

It is also important to emphasize that each new resident in Sunrise Ridge is a member of the greater Chapel Hill community and answers to his or her neighborhood and community as any other resident does. Their rights are not measured by any other standard, including HHOC policy, nor are they indemnified from these greater responsibilities.

d) We understand that HHOC found it necessary to have the Dispute Settlement Center conduct a conflict resolution workshop for homeowners in the Efland Habitat neighborhood. Without violating the privacy of individuals, can you explain the circumstances that made this necessary? Can you provide follow-up information on the consequences?

HHOC received a grant from the Bank of America and raised matching funds to collaborate with DSC to provide training to the HOA of the Richmond Hills neighborhood. We consider this a program that all HOA's in Orange County, not just Habitat HOA's, could benefit from, as it is designed to improve communication skills and provide effective tools to deal with the typical issues that arise in any neighborhood. HHOC will continue to take a proactive role in preparing our homeowners for the challenges as well as the joys of homeownership, and will provide support from its resources so long as such effort does not compromise the sovereignty of home ownership upon which the entire success of the Habitat model depends.

III. Socioeconomic diversity

HHOC and the neighbors agree that socioeconomic diversity is a positive factor in promoting neighborhood sustainability.

Questions:

a) Is the Orange County Land Trust signed on as a partner in this development? Will there be a difference between the OCLT structures and the HHOC units? How will the two be distributed within the development?

HHOC is designing and developing Sunrise Ridge. We have included economic diversity as a primary goal for the neighborhood. We believe that OCHLT will be a key partner in reaching that goal. Until we have a firm design and OCHLT can develop an accurate economic model for the sale of the homes, plans to work with OCHLT will remain conceptual.

Currently, the design emphasizes similarity in the size and character of living units. We currently expect that "OCHLT" units will be quite similar to "HHOC" units, will be distributed throughout the plan, and will be included in the same HOA.

b) What steps will be taken to "integrate" the development with the proposed upscale Bradley Green neighborhood?

It is unclear exactly what is being asked in this question. HHOC has been in conversation with the developer of Bradley Green, and will continue to coordinate efforts where it makes sense to do so.

IV. Highway noise

From the start, the neighbors pointed to a serious noise pollution problem in the area due to the proximity of I-40 and the topographic features of the HHOC property, and they called for an objective sound engineering analysis of the problem. Neighbors expressed two general concerns: 1) the adverse effects of noise pollution on safety and quality of life *within* the proposed development, and 2) the negative impact of clear-cutting trees on the transmission of I-40 traffic noise to surrounding homes. HHOC initially rejected the idea of a sound study, but were directed to obtain one by the Chapel Hill Town Council.

Questions:

a) Our review of the sound engineer's report finds no data bearing on the effects of clear-cutting and road paving on transmission of highway noise to adjacent properties. Do you agree that this is a legitimate concern, and, if so, why was it not addressed in the report? Would you consider expanding your study to address the neighbors' concerns?

The "core purpose" of the Sound Report was to collect and share real world, on-site testing of sound levels on the site. This testing can be integrated into any discussion of predicted sound patterns in the area and correlated to various models to increase their usefulness and meaningfulness. HHOC expects to make available the author of the report at sometime during the "public process" at which time he can offer his professional opinion in this matter.

(Generally speaking, our consultant's opinion (and that of the profession) is that loosely packed tree cover provides virtually no attenuation for sound.)

As noted by Town Staff, there is no provision in any Town ordinance for a “sound buffer easement” providing one property owner a duty to protect another from sound generated from any third site. That having been noted, HHOC realizes it is perfectly reasonable for adjoining owners to be concerned about sound levels in the area. We do not believe the Sunrise Ridge design will have significant material impact on sound levels originating from I-40 on adjoining properties.

- b) On page 6 of the report it is stated that “Most federal guidelines related to noise are based on the day-night sound level”, yet the projections and conclusions in the report utilize the “projected peak hour average sound level” as the metric of reference. How would your analysis and conclusions differ if the day-night sound level criteria were to be used?

Our analysis is based on the actual sound measures taken on the site. Our conclusions are drawn directly from the analysis, and thus would not change regardless of which model is used to format the results for presentation. Expressing the analysis in terms of a “Peak Hour Average” rather than a DNL average was done for purpose of clarity and meaningfulness.

On this site, the DNL methodology overstates sound levels. By definition, the DNL adds a “night time penalty” of 10 decibels to each of the 12 “night time” hourly averages and then includes these increased averages in a final “total” average of all the 24-hour averages. The methodology is “blind” to the underlying nature of the source of the sound.

We know from the on-site testing that the DNL levels are over stated, being higher than the actual average sound level during even the single loudest hour of the day (The Peak Hour Average). We believe that the intended rationale for using a DNL model would be to keep night time “quiet” hours from masking or diluting higher day time averages, but in these circumstances using the Peak Hour Average is clearly a more meaningful and accurate description. It is, by definition, the loudest hour of the day, and using it as a “sound boundary” establishes a robust and intuitive upper measure of conditions on the site.

- c) The discussion on p.6 further states that the Federal sound attenuation standards for single -family homes are more stringent than those for “multifamily homes with no significant outdoor amenities”. When identifying habitable areas the former take into account outdoor as well as indoor sound levels while the latter focus only on levels inside the home. In which category do you consider your duplexes to fall, and why?

We believe HUD would categorize “duplexes” as single-family residences were they to come under their purview. Generally, we are concerned with both indoor and outdoor sound levels and have studied and considered them in this design.

- d) The conclusions of the sound report focus on reducing indoor noise levels below a certain criterion level, and in doing so there is an assumption of “closed windows”. Do you believe this assumption is appropriate in the present case, where homeowners with very limited financial resources may find it necessary to rely more on open windows for indoor ventilation and climate control?

All HHOC homes are built to Energy Star standards. This is an excellent benefit to the homeowners, generally, and specifically in this case, we believe that: 1.) The homes are affordable to condition, and that 2.) the superior energy insulation and construction of the homes will provide an additional added improvement to indoor sound levels beyond those predicted for “typical new construction” in the assumptions referenced above.

- e) The report calls for homes “nearest the highway” to be “designed so that outdoor decks or porches are shielded from the highway on the side away from the highway”. How would this be done, and how much attenuation would be expected? What about the houses across the street that are not closest to the highway—are the expected sound levels there low enough there that no attenuation is needed? (In other words, how much difference is there in the outdoor sound level 400ft from the centerline compared with 335ft?)

These are the general comments of the Acoustical Consultant as provided in his report. HHOC's general goal was to establish an acceptable "sound boundary" that ALL the living units would remain behind. We will continue to study the nuances/opportunities intimated in this question, but, generally, attenuation was NOT viewed as a primary method of meeting the agreed upon quality standards for this design.

f) Using the HUD noise model currently in place, does the highway sound problem on the property disqualify you from receiving HUD funding or financing? If so, please describe the implications for the project.

Since it will, quite literally, take an Act of Congress to address the flaws in HUD's methodologies for sound measurement, we would not anticipate using HUD funding for infrastructure or house construction on the site. HHOC will rely on sources of funds that are not constrained by HUD's regulations regarding sound. As with all affordable housing developments, putting together the financial pieces is a challenge, but not an insurmountable one.

V. Road & Traffic issues

The neighbors have been concerned from the start about traffic safety on Sunrise Rd due to the prevalence of speeding on this rural road, its use by runners from ECHS sports teams, and the presence of line-of-sight limitations due to a highway overpass and roadway curve in the vicinity of the originally-proposed access.

Questions:

a) What do you project as the required width of Sunrise Road to accommodate the 400 trips per day generated by the proposed 50 units? Is the existing Ginger Rd right of way wide enough to permit paving to state standards without the necessity of additional land acquisition from adjacent neighbors?

These questions are best asked of Town Staff who establish and monitor these types of standards. (We believe the Sunrise Ridge design will create very limited incremental impact in these areas.)

b) The existing road to the YMCA daycare center intersects Sunrise Rd very close to--but not opposite--the intersection with Ginger Rd. Planners consider such a configuration a potential safety hazard, and ordinarily would either line the two roads line up to create a single intersection or provide sufficient distance between them to create two clearly distinct intersections. Has a traffic study been conducted yet??

We believe the question describes a reasonable "ideal". We do not have reason to believe that the absence of the ideal will mean an absence of quality in the traffic design. We will work with the appropriate resources to ensure a quality design in these regards. Per the standard application process, all traffic studies will be conducted for the benefit of The Town under its supervision.

c) Widening the narrow gravel path that is Ginger Road will have significant negative impact on several homes currently bordering the road, as the easement comes very close to these homes. Have you considered options for moving Ginger Road to the north?

No. The existing access is and has been a public right of way of record since prior to the creation of the adjoining homes to the south. The adjoining properties are privately owned and HHOC has no authority to move the right of way.

VI. Environmental impact

The neighbors have consistently called for full compliance to both the letter and the spirit of the law with regard to all relevant environmental regulations. We have placed at HHOC's disposal our collective practical and technical experience with the land in question, in an effort to promote compliance with LUMO and other good land development practices.

Questions:

a) How will building so many homes on such a small foot print impact impermeable surface limits and storm water runoff?

The amount of "built" areas on the parcel are significantly REDUCED by the "small foot print" (as described in this question). (Also, see the discussion of "Buildable Area" above.) All storm water in the site must and will be managed to the Town's high standards, a goal that HHOC openly supports.

b) Has your work on this project caused you to ask the Town of Chapel Hill, either formally or informally, for variances from LUMO? Do you anticipate doing so?

No.

c) Do you have on hand--or are you planning to obtain--soil analyses for the proposed building sites to assess suitability for home construction

HHOC's project engineer contracted with a geotechnical firm to conduct preliminary soils testing of the site and found acceptable soil conditions, based on the original concept plan. We will update the soil analyses as needed for the current concept plan.

VII. Financial considerations

Because a large portion of this project is financed by public money the neighbors have pressed HHOC to provide full financial transparency and accountability. HHOC has justified key features of its design on the basis of financial feasibility. The neighbors have made repeated efforts to secure specific cost details in order to understand the financial realities involved and evaluate the appropriateness of the conclusions HHOC has maintained.

Questions:

a) How much will HHOC spend to acquire the needed property on Ginger Rd. and what will be the source of funds? Do you anticipate acquiring additional tracts for this project?

HHOC is not currently pursuing additional tracts, nor have we determined the source of funds for the purchase. If public funds are sought for the purchase of the Ginger Road property, then the price and sources of funds will become public record.

b) Other than for land purchase, has HHOC used any Town, County, or Federal funds for development of the concept plan filed with the Town?

HHOC intends to use Chapel Hill Housing Trust funds that were approved for predevelopment costs, as well as HOME funds that were approved for the same purpose.

c) How much infrastructure expense will be saved by not building a long entrance road, a sewer line down Sunrise Rd, and a pump station? If those savings were allocated toward reducing the number of units built on the property, how many units could be eliminated?

In general the cost savings as described above are being "invested" in the additional parcel of land on Ginger Rd. This land, in turn, is being invested in the changes in the Concept that HHOC holds to be improvements. Since the number of homes in the overall project has not been increased (actually decreased), this additional land is also being invested in reducing the over all density of the project.

The quality of this and the previous Concept Plans has always been the criteria for discussing the inclusion or removal of living units. HHOC is committed to openly exploring the quality of the current Concept and is prepared to make amendments in pursuit of that quality. It is important to note, however, that reducing the number of homes created in an otherwise quality design would be counter to logic and to HHOC's mission.

To: Members of the Community Design Commission
Re; Proposed Sunrise Ridge Development (Habitat for Humanity)

A schedule conflict may make it impossible for our family to attend tonight's meeting where you will consider the latest, new Habitat proposal for Sunrise Road. Habitat's original plans met with many obstacles including I-40 noise problems. Habitat has purchased another single family lot and proposes to fit 9 of their 25 duplex units on this lot which is as far as they can get from the noise pollution.

The net result is that 18 families would then be living on a property which is now occupied by a single family. We believe Habitat's plans have digressed from bad to worse. The question of sustainability continues to plague these proposals. The Habitat tradition of creating "pride of ownership" in a single family home in an existing neighborhood is lost. At best, Habitat's clients would have a 50% "pride of ownership" in a high-density, low income housing project. Home maintenance is difficult enough, but under this model it may be impossible. No clear lines of responsibility will exist. Who maintains the roof or the yard? What if you don't like the neighbor on the other side of the "party" wall?

Several neighborhoods in town have asked for protection from duplexes being injected into their areas. Sunrise Road neighbors are asking for the same protection for our properties. We believe such units are even more out of character with the surrounding neighborhoods here.

As you know, this would be Habitat of Orange County's largest single development in their history. They are quick to point out that other Habitat organizations have done this, but when the national organization is contacted, their firm position is that Habitat for Humanity of Orange County is a "local" entity. The national organization bears no responsibility for Habitat of Orange County activities; legally, financially or otherwise.

Habitat has many other options for this property which could be supported by neighbors. Using the same footprint for single-family homes would not draw nearly the criticism - although it would still be very dense for low-income housing. Habitat could build a mix of market homes and traditional Habitat dwellings and make a profit for use elsewhere. Habitat often plays the financial card but just recently they indicated they didn't even need to meet HUD requirements for financing because they could just finance it on their own.

We urge you to treat this developer the same as any other. We urge you not to try to solve all of Chapel Hill's affordable housing problems with this one development. We believe the new Habitat proposal is not on the right track.

The Smythe Family
3820 Sweeten Creek Road

Steve Herman -
CDC statement 2/15/06
Statement on Sound Study CDC 2/15/06

From day one we've maintained that the excessive highway noise on Habitat's Sunrise Rd property is incompatible with residential development. We also believe that clear cutting on this site would result in more I-40 noise penetrating into adjoining neighborhoods. We asked that a sound study be conducted prior to any planning. Habitat rejected this idea, and convinced the Town Council to remove it from the list of 17 Guiding Principles. We continued to call for an objective sound study, and your committee was the first to recognize the need. Upon your good advice the Town Council reversed their position and instructed Habitat to conduct a sound survey. Unfortunately, Habitat refused to let us help plan this survey, stating we could "go hire our own consultant"

The noise level measurements were completed a year ago, in February, 2005 but Habitat withheld the results until last month, when they released the sound report along with the revised concept plan. Please note that the study and the resulting project redesign were carried out with no input whatsoever from local residents.

We have serious concerns about the methods and conclusions of this study. Although none of us are acoustical experts, we've learned much from our Carol Woods neighbor, Seymour Freed, a civil engineer who has been studying I-40 noise in the Sunrise Rd area since the 90's. Mr Freed has informed you of the gross errors he found in the report by Stewart Associates. We urge you to read Mr Freed's analysis carefully, for it makes a compelling case that this report should not be accepted at face value but rather cries out for revision by an independent noise expert who is not in the employ of the developer.

Our concerns are as follows:

- 1) The Stewart report did not use the Day-Night Level (DNL), which is the most accepted measure for evaluating residential noise. The DNL recognizes the greater aversiveness of traffic noise occurring at night, when people expect and need a quieter environment. Everyone agrees that I-40 carries significant nighttime traffic, much of it from 18-wheelers. It is exactly such situations that the DNL was designed to address; there is no justification for substituting any other measure. When asked why they did not use the DNL, Habitat responded that their measurements suggest that the DNL methodology "overstates sound levels". Well in a sense that is exactly what it's supposed to do! To a measuring device, all noise is the same, but to a human being a given level of noise at night is more disruptive than the same noise during the day, and thus a correction factor is added to actual nighttime sound levels to arrive at the DNL. The DNL does lead to more of the property being identified as unbuildable, but that should not be a reason to substitute a different measure.
- 2) The Stewart report ignores HUD noise thresholds, which are the gold standard for determining how much noise is too much for residential uses. HUD defines too much as a Day-Night noise level of 65dB or above. Furthermore, in statements made elsewhere (documented in Mr Freed's report), Mr. Stewart HIMSELF points out that in non-urban North Carolina settings even the range between 55 and 65dB is only marginally appropriate for homesites. So it's not clear why the HUD standards are passed over in favor of a more permissive 67dB level taken from DOT studies conducted for a different purpose. Habitat describes the HUD model as inaccurate and outdated, and for that reason they substituted more sophisticated computer models for generating sound contours. We have no problem with this, as long as the newer method is correctly applied. But the HUD calculation model and the HUD definitions of acceptable noise levels are two different things—it is the calculation model that everybody agrees is outdated, not the acceptability thresholds. There is no appropriate alternative to HUD's three zones of

Acceptable (below 65dB), normally Unacceptable (65 to 75dB), and Unacceptable (over 75dB), and we feel these standards should be maintained.

- 3) Predicting future noise levels is critical since we one of the fastest growing regions of the country with a growing volume of traffic. When building homes to be lived in for decades it makes sense to predict as far ahead as accuracy permits. DOT estimates of I-40 traffic levels for 2020 are given in the Stewart report, yet in the calculations these were interpolated back to 2015 without explanation. Furthermore, I-40 is slated to expand from 4 lanes to 6—and eventually two HOV lanes will be added that will move the roadway even closer to the housing site. These are not included in the projections, but they should be.

Traffic speed is another factor that has been fudged in the report. Higher speeds produce more noise. The report used 65 as the average I-40 speed, but if you drive 65 you better stay in the slow lane. The actual speed is more like 70 to 75. With a computer model the results are only as accurate as the data fed into it.

- 4) The Stewart report proposes to keep the indoor noise level in the acceptable range, but assumes that windows will be kept closed. This is a totally unreasonable condition to impose, when you consider that our mild climate permits us to enjoy the pleasures of open windows for much of the year. Furthermore, open windows are a good way for folks with limited income to keep utility bills low. Why should houses be sited where it's too noisy to open the windows? The same could be asked about outdoor settings. Life in a semi-rural area like ours is lived to a good extent outdoors. The Stewart report calls for noise attenuation measures for porches and decks. Can we really expect homeowners and their children to restrict outdoor activities to areas that are sound-sheltered? Habitat seems willing to accept noise levels that are more appropriate for apartment buildings in urban settings, where people expect to keep their windows closed and have no yards to recreate in.
- 5) Finally, we are disappointed that the report made only passing mention of how tree removal will affect transmission of noise to the surrounding neighborhood. This concern was clearly communicated and should have been formally addressed. Habitat has told us they believe trees contribute almost nothing to sound attenuation, which many of us who live with it daily have a hard time accepting given the obvious difference in how the highway sounds with and without leaves on the trees.

In summary, we are glad that objective sound data is now available. The real challenge, however, is to use the data to generate accurate noise level predictions and then let these determine what sections of the property are habitable. The proposal in the Stewart report would place about half of the dwellings where they would fail to meet federal noise standards. This is clearly not acceptable, and to say that it's good enough for affordable housing is an argument that should not be suffered. Affordable housing does not mean substandard housing.

We urge you to recommend that the Town conduct an independent analysis of the sound data, one based on an absolute MINIMUM 65dB Day-Night level projected at least to 2020. Please insist that the appropriate HUD standards be met or exceeded, even if HHOC intends to forgo federal assistance. These guidelines are our best assurance that the resulting homes will be suitable and sustainable.

Finally, we ask that you recommend the neighbors be included in any further evaluation of the sound issues. Had this been done the first time we would not be standing here contesting this report--the issues would have been resolved before the work was undertaken, and we'd be united with Habitat in backing the findings.

Sunrise Coalition - Summary and Recommendations

Alan A. Lucier, 4719 Oak Hill Road

In closing, we respectfully request that the CDC consider the Sunrise Coalition's views on "what we know" and "what we need to know" about the developer's concept plan.

First and foremost, we know that the developer's plan is fatally flawed.

1. A project comprising 50 units in duplexes is incompatible with (and destructive of) the character of the existing neighborhood.
2. Impacts of the concept plan on the project's immediate neighbors bordering Ginger Road are severe and unacceptable.
3. Highway noise levels for many of the proposed duplexes are unacceptable by HUD standards. Developer's disregard for HUD standards is troubling.

Second, we know that neighbors had no role whatsoever in preparing the developer's concept plan. The developer insists it has no obligation to include neighbors in its planning process even though acquisition of developer's property on Sunrise Road was financed with public funds. Developer's attitude is troubling.

Finally, we know that Sunrise Coalition represents many neighbors and strongly opposes the developer's concept plan.

What we know about the developer's plan is sufficient to recommend rejection by the Town Council. Nevertheless, there are other important issues that merit the CDC's attention. We need to know:

1. The location of the proposed duplex units relative to intermittent streams and wet soils on the east end of developer's property.
2. Impacts of storm water runoff on streams and wetlands.
3. Magnitude and impacts of increases in traffic.
4. Developer's capacity to manage 50 units in duplexes.
5. Potential liability of Town and County for enabling development in an area that HUD considers unsuitable for residential development.

Finally, the Sunrise Coalition offers the following recommendations to the CDC and the developer.

1. Find a "win-win" solution that protects the environment and conserves neighborhood character. The key design concept, in our view, is a reasonable number of single family houses.
2. Hold the developer to HUD standards regarding noise.
3. Address environmental, traffic, and sustainability issues before presenting concept plan to Town Council.
4. Consider public acquisition of acres not suitable for development for open space / greenway.
5. Encourage much greater transparency and neighborhood involvement in preparing concept plans for affordable housing.

My name is Danny Benjamin; I live at 7609 Justin Place.
The density proposed by this developer is a fatal flaw in the concept plan.

Slide 1

Just as a reminder, the North side of Ginger Road has 3 single family homes; the south side has 6 single family homes. Here is a picture of the property in question upon which the developer proposes to shoe horn 16 units in the form of 8 units on Ginger Road. This density is not double nor even triple the current density, but rather, this developer will increase by 16-fold the density in this neighborhood.

Slide 2:

Here is the aneal property; it is on the north side of Ginger road, to the east of the property in question; the survey marker is at very edge of this photo

Slide 3

Here is the King property; it is on the north side of Ginger road, to the west of the property in question; note again, the survey marker

Slide 4

This aerial photo is taken from 2750 ft. courtesy of Google Earth: note I-40, Sunrise road to the west, the King property, and property in question. Ginger Road is 11 feet here. Note how difficult it is to discern Ginger Road. Here is the property in question.

Slide 5

Here is what the developer proposes to do. Note I-40 and Sunrise again. The blue house is the size of the house on the Property in question. The yellow markings are an expanded Ginger Road and Access to the Property. Outlined in white are the King, Aneal, Benjamin, McNulty, and Davis houses. In teal and orange are the proposed duplexes by the developer. We don't know the precise configuration of the proposed duplexes (the developer has not given us that level of detail in this concept plan), but the footprints are consistent with measurements the developer has provided.

Slide 6

Just to emphasize, the developer proposes to change this, to this.
This plan is unacceptable to the neighbors.

CDC – February 15 Doug Schworer

My name is Doug Schworer. I live at 7614 Amesbury Drive in Chandler's Green. My neighbors and I have been wrestling with this project since Nov 2002. At a Town Council meeting in November 2002 a petition was signed by over 250 people asking the council not to provide funds for this development until the developer completed due diligence. The Town lent the money. Today, we know a majority of the original property is uninhabitable according to HUD noise standards, the property has a perennial stream, an intermittent stream, wet lands, and no safe egress point.

This is the second time this developer has designed their project without neighborhood involvement. The developer has now created a "new" concept plan one THAT TRADES OLD PROBLEMS FOR NEW ONES. WHILE REDUCING DENSITY SOMEWHAT ON THE ORIGINAL PORTION AND CREATING HIGHER DENSITY ON THE NEW LAND. MUCH OF THE ORIGINAL LAND is still in environmentally problematic areas (eastern area), AND THE SOUND PROBLEM WE IDENTIFIED IS STILL AN ISSUE. THE PROPOSED egress ON GINGER ROAD PRESENTS A NEW PROBLEM (Carol Woods entrance), and the NEW design is EVEN MORE out of character with the neighborhood (16 dwellings units - duplexes) between 2 single family homes.

Several years ago, a council member approached me and said, "The difficulty with this project is that it pits two key themes of the comprehensive plan and values of the Town against each other." **She was right.**

"Affordable Housing" and "Neighborhood Protection"! In both the 2003 and 2005 elections, we heard candidates talk about "affordable housing" and "neighborhood protection". Over the last year we have seen ~~the Town~~ many existing neighborhoods petition to become conservation districts in order to ward off inappropriate development. We ask ourselves: If this development was in a conservation district would this design be allowed? I think the residents of Morgan Creek, Greenwood, Booker Creek and the others petitioning for a conservation district would not allow a design LIKE THIS BE BUILT IN THEIR NEIGHBORHOOD. Should all neighborhoods in Chapel Hill file for Conservation Districts to prevent a design such as this concept plan from moving forward? Must all neighborhoods in Chapel Hill file for to become a Conservation District in order to prevent a design such as this from being imposed on them?

It is not necessary for affordable housing designs to conflict with neighborhood conservation goals. The conflict over the Sunrise Road project exists because the developer has lost sight of the need for balance and has taken an extremist position. This may have occurred because none of the HHOC folks engaged in designing the Sunrise Road project are from the Sunrise Road neighborhood.

In contrast, Sunrise Coalition accepts the need for affordable housing and has consistently taken the position that it could support a reasonable number of single family homes in a design that is compatible with the existing neighborhood.

25

Tonight, you are being asked to review a concept plan that proposes to build affordable housing units that would impact the surrounding neighborhood in many negative ways.

We believe you will objectively review and comment on this concept plan on its own merit, without regard to the developer's esteemed reputation in our community. We believe you will review this development in terms of impact on the surrounding community including quality of life, traffic, safety, environmental impact, and sustainability. We believe you will cut no slack for this development just because it is an affordable housing community but will hold it to the same high design standards that have kept Chapel Hill neighborhoods such an exceptional place to live.

Let me start by showing you what our neighborhood looks like now. (video here)

February 15, 2006

0215A06HUD

To: Chair & Members, Community Design Commission
Re: Oral Statement Regarding SAC Plan for Habitat for Humanity Site near I-40

The Stewart Acoustical Consultants (SAC) **Plan for Development** states in its **Introduction** that: "A study has been conducted to provide guidance to HHOC in establishing acceptable acoustical livability criteria for a proposed neighborhood near I-40." It fails to do this. The SAC Report is most remarkable not for what it says, but for all the factors it does not discuss, the evidence it does not present, and the incorrect criterion used to evaluate noise impact. This document fails to provide the balanced discussion needed to allow an informed decision. It is written so that even someone familiar with such documents has trouble figuring out exactly what is happening.

In order to fill the information void, I have opened my paper with a chart "THE SCHULTZ CURVE." Its foremost significance is that it has been and still is the basis for HUD regulations concerning acoustic livability since 1978 (page 8). It consists of a plot of percentage of community residents highly annoyed with noise against day-night average sound level (DNL) - the standard measure used by Schultz in establishing HUD noise standards.

Appendix A, pages 8-12 is a discussion by Dr. Stewart of the Schultz curve and its history. It is to be noted that on page 12, he states that in a 1998 study of the Schultz curve "higher percentages of people were highly annoyed. The data results in a conclusion that is actually an average more representative of road traffic." This Miedema and Vos study found the following percentages of highly annoyed residents:
DNL 55: 7.8%; DNL 60: 13.3% ; DNL 65: 20.2%.

By extrapolating, this indicates that 27.1% of the residents at the "magic line" 335 feet from I-40 would be highly annoyed by noise in 2015. As standard, all the data used is DNL.

Appendix B contains excerpts from Environmental Protection Agency "Levels Document." This explains EPA's findings about levels of environmental noise that protect health and welfare. It also states that Day-Night Sound Level but not Equivalent Sound Level should be used to determine values that protect public health and safety in residential areas.

I have quoted extensively from Dr, Stewart in my paper. The Stewart Report fails to::

- acknowledge or utilize vast acoustical livability literature.
- provide acceptable acoustical livability criteria by misusing sound rather than noise as a measure.
- consider time variation of sound, and time of day when it occurs. Night-time noise is ignored.
- comply with 1974 EPA "Levels Document" which states: Equivalent Sound Level is used when only the durations and levels of sound, and not their times of occurrence are relevant.
- consider sleep disturbance caused by extremely high percentage of nighttime heavy trucks.
- use the only existing federal criterion for housing noise- the day-night level for its Plan.
- indicate half of the planned units are Normally Unacceptable by HUD standards.
- mention all actions which must be taken in order to receive HUD design and funding approval.
- mention that by recommending an unapproved and substandard plan, all federal funding for HHOC and for mortgages for home purchasers will be at risk.
- indicate location of any relevant noise contours between DNL 69.3 and 55.
- mention that probable construction of HOV lanes will move traffic about 40-feet closer.

Seymour Freed, PE Inactive; 750 Weaver Dairy Road #234.

February 15, 2006

021506HUD

To: Chair and Members
Community Design Commission

Re: SOUND / NOISE / ACCEPTABLE ACOUSTIC LIVABILITY:
Traffic Sound Levels at Habitat for Humanity Site near Interstate 40,
and Plan for Development by Stewart Acoustical Consultants (SAC)

"THE SCHULTZ CURVE

Predictability of annoyance from exposure levels

Schultz (1978) has rendered a major service by synthesizing a general relationship between noise exposure and annoyance from the data of large-scale social surveys undertaken in different countries and for different purposes. Figure 10.3 displays this relationship. The metric of the abscissa

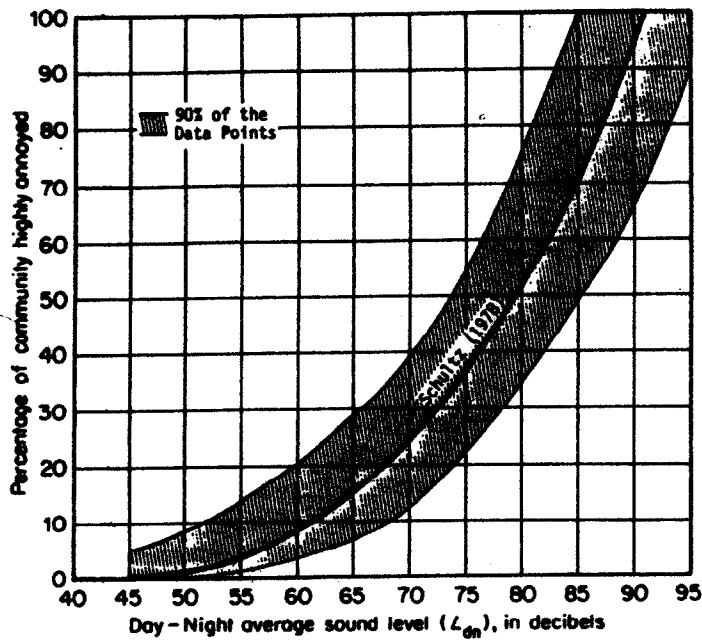


Figure 10.3 Dosage-response curve synthesized from major social surveys of noise-induced annoyance (after Schultz, 1978)

“is the day/night average sound level (L_{dn}) a measure of noise exposure from all sources computed as the energy mean of integrated A-weighted sound pressure level measurements over 24-hour periods, with special treatment accorded to night-time levels.”

From page 258, Noise and Society Ed. By D.M. Jones and A.J.Chapman, John Wiley & Sons, 1984.

"The basic difference between sound and noise, (is) that noise is simply unwanted sound."..Noral D. Stewart

To the Chair and Members Community Design Commission:

I have reviewed the captioned acoustic report as a citizen concerned with the impact on the quality of life in the project due to its proximity to I-40. I am an inactive professional engineer with Bachelor and Master of Civil Engineering degrees. Since 1999, I have extensively researched and investigated highway traffic noise in general, and Chapel Hill I-40 traffic noise in particular.

I have great respect for Dr. Stewart, having been his satisfied client on a Carol Woods I-40 acoustic study. The referenced Stewart Acoustical Consultants (SAC) report is most remarkable not for what it says, but for all the factors it does not discuss, the evidence it does not present, and the incorrect criterion used to evaluate noise impact. This document fails to provide the balanced discussion needed to allow an informed decision. It is written so that even someone familiar with such documents has trouble figuring out exactly what is happening.

HHOC is to be commended for selecting SAC to prepare data and calculations for the noise analysis. This firm and its principal have a distinguished record. The current study is not representative of the thorough and balanced analysis they can provide.

Report Failures

The report specifically:

- Fails to acknowledge or utilize the vast literature, (including that by Dr. Noral D. Stewart) which reviews criteria for measurement of acceptable acoustic livability, almost all of which use day-night sound level exclusively as a criterion.
- Fails to provide acceptable acoustical livability criteria in the Plan for Development by misusing sound rather than noise as a measure of livability. In so doing SAC has simplistically rejected 35 years of extensive and complex research.
- Fails to utilize in the Plan time variation of the sound, and the time of day when the sound occurs. Greater annoyance by night-time noise is ignored.
- Fails to comply with the 1974 EPA "Levels Document" recommendations which state: Equivalent Sound Level is used when only the durations and levels of sound, and not their times of occurrence (day or night), are relevant. Fails to comply with the 1974 EPA "Levels Document" which specifically recommends that day-night sound level be used and that equivalent sound level not be used for housing site suitability.
- Fails to consider the sleep disturbance caused by the impulsive and intermittent diesel noise from 17% average heavy trucks; the higher than average percentage of heavy

trucks from 10 pm to 7 am; and the gear downshifting (eastbound) and downshifting (westbound) caused by the 2 per cent grade.

● Fails to use the only existing federal criterion for housing noise- the day-night level for its conclusions. Dr. Stewart has either made a basic misinterpretation of 24 CFR 51- HUD Environmental Criteria and Standards or else has overlooked the acceptable acoustic livability criterion for housing near highways he has previously endorsed.

● Fails to indicate that half of the planned units in the Plan for Development are Normally Unacceptable by HUD standards for potential HUD urban housing sites. (Eight of these are closer to I-40 than the nearest Carol Woods unit, 166. All Normally Unacceptable units are closer than Carol Woods unit 170.)

● Fails to recommend all detailed specific actions which must be taken in order to mitigate noise and to receive design and funding approval from HUD for the project. In other words, the Plan does not recommend that HHOC even attempt to comply with HUD minimum standards.

● Fails to mention that by recommending an unapproved and substandard plan, all federal funding will be in jeopardy. Consequently, individual home purchasers may find it difficult, if not impossible, to obtain FHA mortgages.

● Fails to indicate location of any relevant noise contours between DNL 69.3 and 55 within the proposed zone of construction. Specifically, Dr, Stewart omitted in his calculations, the contours he considers essential for the review of quality of life- the distance from I-40 to DNL 65, DNL 60, and DNL 55.

● Fails to mention that probable construction of HOV lanes will move I-40 traffic approximately 40 feet closer to the houses.

HUD Noise Requirements

24 CFR 51.101 states:

(a) It is HUD's general policy to provide minimum national standards applicable to HUD programs to protect citizens against excessive noise in their communities and places of residence.

24 CFR 51.103 Criteria and Standards states:

These standards apply to all programs as indicated in §§51.101.

(a) Measure of external noise environments. The magnitude of the external noise environment at a site is determined by the value of the day-night average sound level produced as the result of the accumulation of noise from all sources contributing to the noise environment at the site...

(c) Exterior standards. (1) The degree of acceptability of the noise environment at a site is determined by the sound levels external to buildings...

SITE ACCEPTABILITY STANDARDS

Normally Unacceptable... Above 65 dB but not exceeding 75 dB...

24 CFR 51.106 Implementation (a) states:

... (2) Sites in the vicinity of highways. Highway projects receiving Federal aid are subject to noise analysis under the procedures of the Federal Highway Administration (FHA). Where such analyses are available, they may be used to assess sites subject to the requirements of this standard. The FHA employs two alternate sound level descriptors: (1) The A-weighted sound level not exceeded more than 10 percent of the time for the highway design hour traffic flow, symbolized as L10; or the equivalent sound level for the design hour, symbolized as Leq. The day-night average sound level may be estimated from the design hour L10 or Leq values by the following relationships, provided heavy trucks do not exceed 10 percent of the traffic flow in vehicles per 24 hours....:

$DNL = L10 \text{ (design hour)} - 3 \text{ decibels}$

$DNL = Leq \text{ (design hour) decibels}$

The Basic Error

The use of the equivalent sound level of 67 dBA instead of the DNL of 69.3 dBA in the Plan for Development is a basic serious error. It is not in conformance with Dr. Stewart's year 2000 statement that "... (DNL) has its shortcomings. However, overall it is the best method now widely available for evaluating the acoustical climate of a community exposed to noise that does not vary widely..." (See below). The use of the equivalent sound level of 67 dBA is not in conformance with current standards, nor with federal law.

Dr. Stewart used a Leq of 67 at 335 feet from the center line of I-40 for the magic line between acceptable and unacceptable housing. Dr. Stewart's report stated that the percentage of heavy trucks was 17% in 1996 and will be 17% in 2020 (page 1). This high heavy truck percentage (exceeding the allowable 10%) correctly precludes the use of the $DNL = Leq$ relationship of 24 CFR 51.106(2). Dr. Stewart had measured 2005 Leq and DNL and found that $Leq + 2.3 = DNL$. He correctly stated the DNL value at 335 feet as 69.3 dBA. He incorrectly ignored this value.

After determining that the magic line was 67 dBA at 335 feet, this was considered an acceptable figure by Dr. Stewart. For arguments sake, even if the magic figure was 67 (and not the correct 69.3), it would still leave the noise contours between 65 and 67 dBA in the Normally Unacceptable range. This too was ignored.

Dr. Stewart's Views on Use of DNL for Housing

Dr. Stewart has produced a scholarly 17 page, 39 reference research paper quite relevant to the use of DNL for housing. It is titled: "A Review of Problems and Progress in Airport Noise Assessment" by Noral D. Stewart, Ph. D.; Stewart Acoustical Consultants; May 2000.

In it, he stated:

"... First, the development and possible shortcomings of the Day-Night Level (DNL) are discussed...

"... The DNL was defined as the long-term energy-average A-weighted sound level, with a 10 decibel penalty added to sounds from 10:00 p.m. until 7:00 a.m. A major advantage is easy measurement compared with earlier methods. It has its shortcomings. However, overall, it is the best method now widely available for evaluating the acoustical climate of a community exposed to noise that does not vary widely from day to day... " (page 1).

"The energy average is also easily measured. However, it is an energy average, and the ear does not perceive loudness as directly related to energy. The DNL does not compensate for this. This could lead to problems when there are either large changes in sound level or loud sounds identified as individual events...

"The 10 decibel night-time penalty accounts for greater sensitivity to noise at night... The penalty is largely justified by expectations of quieter conditions at night and by sleep interference concerns...

"The 'Levels Document' established DNL 55 dB as an ideal goal for residential area noise to *'protect public health and welfare with an adequate margin of safety.'* The margin of safety was 5 dB. However, the EPA noted that very many people lived in areas of higher noise exposure. A DNL of 55 dB is typical of communities of 2000 people per square mile. This is approximately the density of the 17 largest cities in North Carolina. A DNL of 60 is typical of a population density of 6000 people per square mile. This is the approximate density of most of the 50 largest cities in the U.S. Due to the difficulty of achieving the DNL 55 dB goal in densely populated areas, the Levels Document did not recommend it as a regulatory goal.

"The 'Levels Document' clearly recognized that the DNL does not directly predict community response to noise. A review of 35 case histories showed that community reaction varied widely for any given DNL. However, this variance can be reduced very much by adjusting or 'normalizing' the DNL for various factors. These included corrections for operation only during cold weather, for the outdoor sound level without the intruding noise, for community attitudes and previous exposure to the noise, and for the presence of a pure tone or impulsive sound. For instance, it was proposed that a new DNL 60 dB sound introduced into a quiet suburban community of DNL 50 dB would produce the same reaction as a DNL 70 dB sound introduced into an urban community with a pre-existing DNL of 60 dB. This 'normalization' procedure was not new. It had been use (sic) since at least the mid 1950's. It was part of the first Air Force procedure for evaluating noise impact. It or similar procedures continue to be used by consultants for resolving a wide variety of noise problems even when the DNL is not used. (page 2).

“There has been very little criticism of the resulting HUD criterion for funding of new housing. It has worked well as an indicator of noise acceptance by renters or new purchasers of HUD-funded housing...” (Page 4).

Omission of Noise Contours to DNL 55 dBA

SAC has incorrectly opted not to use the DNL in its Plan for Development. It is interesting to read what Dr. Stewart has previously stated on this issue and the related issue of noise contours to DNL 55 dBA. . He produced a report for the Piedmont Quality of Life Coalition titled: “Noise Analysis of DEIS for Proposed Runway 5L/23R, Proposed New Overnight Express Air Cargo Sorting and Distribution Facility, and Assorted Developments” at the Piedmont Triad Airport in year 2000.

His comments are relevant today:

“... The DNL does provide some useful information, just as annual average temperature provides information about an area. It is most useful in situations where the noise does not vary much from day to day, and in situations where the quantity of noise is changing without a change in the type of noise experienced or patterns of exposure over time. Other than for airports, the very limited uses of DNL today are to evaluate railway noise, noise of some military installation, and the suitability of locations for HUD housing. These are all driven by Federal Regulations.” (NOTE: Underlining added, Noral D. Stewart to FAA, May 23, 2000, p. 5)

“Experience at RDU International Airport has shown the importance of computing out to DNL 55 and the problems that can exist outside the DNL 65 contour.” (NOTE: Underlining added, Ibid, p.7)

“The day-night average sound level is useful... A given DNL that results from widely varying sound levels is very different from the same DNL resulting from an almost steady road noise rather than aircraft noise...” (NOTE: Underlining added, Ibid, p. 13)

“The FAA has defined a DNL of 65 as the threshold of noise compatibility with residential or other noise sensitive land uses. Note that this is just the ‘threshold’ of compatibility. DNL 65 is on the edge of what HUD considers ‘normally unacceptable’ for its subsidized housing programs. It is the kind of noise normally expected in large crowded urban areas of high-rise apartments with 20,000 people per square mile. If a DNL of 65 is normally unacceptable, a DNL approaching that is certainly not highly desirable. Realistically, no magic line exists on one side of which no impact is present and on the other side of which the impact is strong...” (NOTE: Underlining added, Ibid, p. 14)

“As a native North Carolinian with most of my practice in North Carolina, I have come to recognize the differences between our communities and community expectations and those of the more-densely populated areas of our country... North

Carolina communities typically expect a DNL of around 55 dB. The DNL of 65 still espoused by the FAA is that common to a community of 20,000 people per square mile or 30 per acre. Few if any places exist in North Carolina where the inherent noise of the community approaches this. (NOTE: Underlining added, Ibid, p. 15)

“... noise less than DNL 65 can be incompatible with some residential uses. Noise more than 55 DNL can be incompatible with the residential quality and activities expected in some areas...”

“... The national standard on the use of DNL to evaluate (noise) compatibility... recognizes that single-family homes are only marginally compatible in the range of DNL 55-65, and even multi-family housing is only marginally compatible in the range of DNL 60-65... The national standard on the use of DNL to evaluate compatibility... recognizes that single-family homes are only marginally compatible in the range of DNL 60-65...”
(NOTE: Underlining added, Ibid, p. 19)

“... It is important to provide quantitative information over a broad area where the sound will be heard. Though it is not a perfect indicator, the first step should be to show the DNL... out to DNL 55...” (NOTE: Underlining added, Ibid, p. 21).

Accuracy

There has been mention by the HHOC representative that the DNL was not used because of its inaccuracy. The model used by Dr. Stewart to arrive at a DNL of 69.3 was not the HUD model. He used the latest software (TNM) to determine L_{eq} (67) and then correctly added 2.3 dBA. The problem with DNL is not that it is too inaccurate- the problem is that the DNL indicates a serious livability problem..

Minimum Standards

Half the proposed houses do not comply with minimum federal housing noise standards. There are also health problems involving diesel fumes and particulate matter related to this issue. This commission should not knowingly allow any developer, especially Habitat, to design and construct substandard housing in Chapel Hill. The Plan as proposed is not in the best interest of Chapel Hill, Orange County, nor of HHOC. It cries out to be revised to comply with minimum federal standards. The current Plan is Not Acceptable and should be revised so that it complies with minimum federal standards.

Sincerely,

Seymour Freed. PE (Inactive). 750 Weaver Dairy Road #234, Chapel Hill, NC 27514

APPENDIX A

The Schultz Curve as discussed in "A Review of Problems and Progress in Airport Noise Impact Assessment" by Noral D. Stewart, May 2000

"... Next the 1978 annoyance curve of Ted Schultz is discussed. The Schultz research is the basis of current federal criteria. Shortcomings, the misapplications of original intent, and the potential of an urban bias in the setting of this criterion are discussed... (page 1)

"The 1978 Paper of Theodore John Schultz

"The various federal agencies were faced with the problem of establishing regulations based on DNL. Each wanted to keep its methods simple, and minimize the cost to the government. They realized it would be impossible to reach the DNL 55 goal in densely populated areas. Many people accepted higher noise in such areas. HUD had to be able to build housing in densely populated, noisy cities. HUD did not want a complex procedure of evaluating local conditions. HUD took the lead and contracted with Schultz for research on establishing criteria for a 'suitable living environment.' He looked at several noise annoyance surveys conducted around the world. Based on this research, HUD adopted DNL 65 as a limit above which it would not normally fund loans or subsidized housing. This has worked well for that intended purpose..." (Page 3).

"He had two major problems. Most surveys used different ways to measure noise exposure. They had also phrased their questions differently. He had the new tool of DNL. He converted the noise measures in the surveys to approximate DNL. He concluded that the most consistent responses in the surveys would be from those people who were most highly annoyed... Once he had converted the survey results to the DNL, ands 'highly annoyed' format, he then plotted the percentage highly annoyed versus DNL and statistically analyzed the results.

"The result has since become known as the Schultz curve. It shows 4% of those surveyed in DNL 55 dB areas, and 15% of those surveyed in DNL 65 dB areas are highly annoyed. Greater percentages are annoyed to lesser degrees. There was a wide variation in the data. At the DNL 65 dB level, the percent highly annoyed at different locations varied from 5% to 25%. Schultz also developed curves for percentage of people disturbed in communications and sleep as a function of DNL. These indicated around 27% disturbed in communication and 20% disturbed in sleep at a DNL of 65 dB. (Page 3).

"To quote from the 1982 book (Schultz, T.J., Community Noise Rating, Second Edition, Applied Sciences Publishers, NY, 1982, [earlier edition, 1971]) 'Whether or not the survey average curve yields a useful prediction- depends on your purpose.' The purpose of Schultz was to define a 'suitable living environment.' In the 1978 paper, he

plotted other curves as guidance to decision makers. These curves decreased with DNL and intersected the annoyance and disturbance curves. These curves included the percentage of U.S. population and the percentage of potential urban HUD housing sites above given DNL levels. The housing site curve effectively showed percentage of sites that would be 'unacceptable' if the DNL criterion were set at a particular level. The population curve intersected the highly annoyed curve at DNL 65 dB. Only 15% of the population lived in areas of 65 dB or greater, and 15% of those surveyed at DNL 65 were highly annoyed. Of those living above DNL 65 dB, an increasingly higher percentage were highly annoyed. The population curves was provided to Schultz by the government. Its accuracy has been questioned. The population percentage exposed to DNL 65 dB was probably less than 15%. The curve of HUD housing sites intersected the radio/television and speech disturbance curves at approximately DNL 65. Around 29% of the HUD urban sites would be unacceptable if DNL were the criterion. Reducing the criterion to 60 dB would make 60% of the HUD urban sites unacceptable, though two thirds or more of overall population lives at DNL 60 dB or less. The significance of these intersections is not explained. However, they appear to have strongly influenced the selection of DNL 65 dB as the HUD criterion for funding of new housing in noisy areas.

"There has been very little criticism of the resulting HUD criterion for funding of new housing. It has worked well as an indicator of noise acceptance by renters or new purchasers of HUD-funded housing. The problems have resulted from the adoption of the DNL 65 dB limit by other agencies. They use it as a criterion for funding of noise mitigation measures when new or increased noise impacts existing housing. The question is whether the Schultz research was adequate to evaluate annoyance to people with new noise... "

"The 1982 Book of Schultz

"Most of the 1982 Schultz book is a repeat of an earlier 1971 book describing many different ways of measuring and rating community noise. However, it adds the research of the 1970's and indicates the thinking of Schultz. Of special interest are the beginnings of Chapter 3 on common elements in ratings, and parts of both Chapter 4 on 'Social Surveys and Annoyance' and Chapter 5 titled 'Special Matters.' These sections show that Schultz fully understood the problem was more complex than indicated by his curve. However, they also illustrate his failure to explore certain avenues. In Chapter 3, Schultz lists factors affecting annoyance other than the sound level. He lists nine factors in three groups. Some are discussed only briefly, while others are covered more thoroughly in Chapters 4 and 5. (Page 40

"The three most important factors indicated are the frequency content of the sound, time variation of the sound, and the time of day when the sound occurs. Two sounds with the same A-weighted level can elicit different responses if their frequency content is very different. Schultz recognized that the variation of sound with time of day or year when the sound occurs. Two sounds with the same A-weighted level can elicit

different responses if their frequency content is very different. Schultz recognized that the variation of sound with time could be equal to a 10 decibel effect on annoyance. However, he noted a lack of data to evaluate the effect reliably. Consistently greater annoyance to night-time and summer noise was recognized. Schultz presents an extensive summary of a study of the nighttime penalty by him and Sanford Fidell in Section 5.A. They found it was somewhat arbitrary but among other conclusions stated that the penalty 'while undoubtedly not exactly correct, may well be tolerably close to the truth for most purposes.' Seasonal effects are discussed in Section 4.D. The primary evidence is a study in the U.S. showing greater annoyance in summer surveys taken in some cities than winter surveys in other cities. Schultz raises the question whether the relationship for noise and annoyance can be valid for both warm and cold climates. Karl Kryter, in a later book (Kryter, Karl, The Effects of Noise on Man, Second Edition, Academic Press, Orlando, 1985) argues strongly that criteria must be adjusted by 5 dB for warmer climates.

"Socio-economic status, presence of pure tones, and impulsive or intermittent nature were listed as significant factors on the order of 5 decibels. Some data show a difference in response of people in different socio-economic circumstances for moderate noise levels. This difference is reduced at very high and very low noise exposures. In a later section, Fidell is quoted in an opinion that this is instead an effect of background sound level. The argument is that the higher socio-economic families live in areas of lower population density and quieter background sound level. They are more annoyed by transportation noise levels in the range of DNL 55 to 65 dB occurring in areas of quieter background. Section 5.E.3 later discusses the effect of aircraft noise as an intermittent source. An argument is often made that an average level such as DNL disguises the effect of intermittent high levels. Schultz argues that even a single noisy event can raise the DNL...

"... Schultz lists three factors that he identifies as having unknown importance. He appears to have little sympathy for these. He discusses them only briefly, then drops them. They are previous exposure, community sensitivity, and appropriateness... (Page 5)

"Notice that these factors are more relevant for the introduction of new noise into existing communities than for introduction of new housing into existing noise. Schultz, in his work for HUD, was primarily interested in criteria for new housing in noisy areas.

"Just after Schultz published his curve, several papers on annoyance in quiet area were published by others. One of these was co-authored by Sanford Fidell who worked closely with Schultz on several projects. This was the beginning of a new era recognizing substantial annoyance could exist at levels well below that predicted by the Schultz curve. Schultz spent several pages discussing these early papers in Chapter 5 of his book. This work will be discussed later in this paper... " (Page 6).

"An Urban Bias?"

"Ted Schultz was an urban man. He lived in and enjoyed the amenities of densely populated cities. His major work in environmental noise was to establish a criteria for housing primarily in urban, densely populated areas. A major concern of his client (HUD) was that the criterion not overly restrict the ability to find housing in such areas. His primary collaborators in research also appear to have an urban perspective. Their community noise expectations are shown by the way they describe communities of various densities and noise levels. One example was the reference of Schultz to a DNL of 65 dB as reasonably quiet. In 1981, Fidell, et al published a study comparing urban noise in areas of high, moderate and low population density. (Fidell, S., Horonjeff, R., and Green, D.M. 'Statistical Analysis of Urban Noise,' Noise Control Engineering, Vol. 16, page 75, 1981.). Their low density was 5000 people-per-square-mile. Fidell, Schultz, and others provided some material to an ASTM symposium in 1987. (Fidell, S., Green, D.M., Schultz, T.J., and Pearsons, K.S. 'A Strategy for Understanding Noise-Induced Annoyance,' BBN Report No. 6337, BBN Laboratories Inc. Canoga Park, CA, 1988 [Draft of appendices provided to ASTM Symposium in 1987]). In it, the term 'low-density suburban' was used to describe communities of 2500 people-per-square-mile. The 'Levels Document' at least calls 2000 people-per-square-mile 'Normal Suburban Residential.' Fidell and Schultz called communities of 500 people-per-square-mile 'rural' and areas of 100 people-per-square-mile 'sparsely populated.' The 'Level Document' by comparison calls 630 people-per-square-mile 'Quiet Suburban Residential.'

"Most North Carolinians probably would be even farther from the Schultz perception than the 'Level Document.' In this state at that time, 2000 people-per-square-mile was the density of our largest cities. Raleigh and Charlotte are now closer to 3000 people-per-square-mile, and Greensboro is around 2500 people-per-square-mile. This is as 'urban' as North Carolina gets. North Carolina suburbs are more typically 500-600 people-per-square-mile. The North Carolina state demographer William Tilman, has said of the Triangle Area, 'We're a collection of suburbs by the standards of New York.'" The term 'urban' is often used to mean within the limits of an incorporated town. It is very easy to misinterpret and misapply criteria in some documents intended for real 'urban' areas.

"Most of the surveys on which Schultz based his results were conducted in densely populated areas. Thus they are based on responses from people who have chosen to live in noisier communities. These people have accepted a higher degree of noise. In those cases where there were results from quieter communities, it was the noise the people in those communities expected. Most researchers also appear to have the expectation that a DNL of 60 to 65 is normal for residential areas. There is no indication of any intentional bias in research. Recent years have brought a rising awareness of noise problems in quieter communities. Fidell and others have recognized the need to more fully investigate the problem... (Page 7).

“... Updates of the Schultz Curves and Models”

“In 1988, Fidell, Schultz, and Green published ‘A theoretical interpretation of the prevalence rate of noise-induced annoyance in residential populations (Journal of the Acoustical Society of America (JASA), Vol 84, page 2109)...”

“Before his death, Schultz had begun an effort to update his original curve. The intent was to look at all the data generated since then, see if it still fit the curve, and modify the curve, if necessary. This work was completed by Fidell and Barber, and published with Schultz as a co-author in JASA in 1991 (Fidell, S., Barber, D.S, and Schultz, T.J. ‘Updating a Dosage-Effect Relationship for the Prevalence of Annoyance Due to General Transportation Noise,’ JASA, Vol. 89, page 221). With a total of 453 data points, there was a much wider variation in the data. They found that on average, the data still fit the original curve well. They did derive a new curve that showed more annoyance below DNL 74 dB, and less above that. The new curve put 9% highly annoyed at 55 dB DNL, and 20% highly annoyed at 65 dB DNL. (Page 13).”

“In 1998, Miedema and Vos (Miedema, H., and Vos, H. , ‘Exposure-response relationships for transportation noise,’ JASA, Vol 104, page 3432) published a study where they examined the data used in the 1991 study of Fidell, Barber and Schultz. They separated the data by the source of noise, whether aircraft, road, or railroad. They found significant differences. It is interesting to observe how these studies have progressed over the years. Consider the following table comparing the percentages found highly annoyed by the progression of studies.”

		DNL		
	55	60	65	
Schultz 1978	3.9	8.5	15.2	
Fidell, Barber, Schultz 1991	8.3	12.7	20	
Finegold, Harris, von Gierke 1994	3.1	6.1	11.6 (incomplete)	
Miedema, Vos 1998				
Aircraft	9.2	17.8	29.2	
Road	7.8	13.3	20.2	
Railroad	5.1	7.8	10.9	

Except for the 1994 study eliminating some data, higher percentages of people were highly annoyed. The combined data also results in a conclusion that is actually an average more representative of road traffic. Aircraft noise is clearly more annoying, and especially once it reaches a DNL of 60 or higher. (Page 14).”

APPENDIX B

THE LEVELS DOCUMENT

**Title: Protective Noise Levels
Condensed Version of EPA level Document**

Technical Report Data, November 1978
EPA Office of Scientific Assistant to DAA/Noise

Abstract: This publication is intended to promote understanding of EPA's findings about levels of environmental noise that protect public health and welfare. It seeks to clarify the proper use of the 1974 "Levels Document" by interpreting its contents in less technical terms. The manual deals with measurement descriptors of environmental noise. Also addressed are the best understood effects of noise on people (hearing damage, speech interference and annoyance). Protective levels are summarized.

A-Weighted Sound Level

One's ability to hear a sound depends greatly on the frequency composition of the sound. People hear sounds most readily when the predominant sound energy occurs between 1000 and 6000 Hertz (cycles per second). Sounds at frequencies above 10,000 Hertz (such as high-pitched hissing) are much more difficult to hear, as are sounds at frequencies below about 100 Hz (such as a low mumble). To measure sound on a scale that approximates the way it is heard by people, more weight must be given to the frequencies that people hear more easily.

A method for weighting the frequency spectrum to mimic the human ear has been sought for years. Many different scales of sound measurement, including A-weighted sound level... have evolved in this search. A-weighting was recommended by EPA to describe environmental noise because it is convenient to use, accurate for most purposes, and is used extensively throughout the world....

The A-weighting of frequency also is used in the three descriptors described below. When used by itself, an A-weighted decibel value denotes either a sound at a given instant, a maximum level, or a steady-state level. The following three descriptors are used to summarize those levels which vary over time.

Sound Exposure Level

Since the levels of many sounds change from moment to moment, this variation must also be accounted for when measuring environmental noise....

The duration of sounds with levels that vary from moment to moment is more difficult to characterize. One way is to combine the maximum sound level with the

length of time during which the sound level is greater than a certain number of decibels below the maximum level...

Using this procedure one can measure the total energy of the sound by summing the intensity during the exposure duration. This procedure produces the second measurement descriptor, sound exposure level (L_s), referred to in the Levels Document as the single noise exposure level (SENEL).

Equivalent Sound Level

Yet another method of quantifying the noise environment is to determine the value of a steady-state sound which has the same A-weighted sound energy as that contained in the time-varying sound. This is the third measurement descriptor, termed the Equivalent Sound Level (L_{eq}). The Equivalent Sound Level is a single value of sound level for any desired duration, which includes the time-varying sound energy in the measurement period. In Figure 2, for example, the L_{eq} equals about 58 dB, indicating that the amount of sound energy in all the peaks and valleys in the figure is equivalent to the energy in a continuous sound of 58 dB.

The major value of the Equivalent Sound Level is that it correlates reasonably well with the effects of noise on people, even for wide variations in environmental sound levels and time patterns. It is used when only the durations and levels of sound, and not their times of occurrence (day or night), are relevant. It is easily measurable by available equipment. It is also the basis of a fourth and final measurement descriptor of the total outdoor noise environment, the Day-Night Sound Level (L_{dn}).

Day-Night Sound Level

The Day-Night Sound Level is the A-weighted equivalent sound level for a 24-hour period with an additional 10 dB weighting imposed on the equivalent sound levels occurring during nighttime hours (10 pm to 7 am). Hence an environment that has a measured nighttime equivalent sound level of 50 dB, can be said to have a weighted nighttime sound level of 60 dB (50 + 10) and an L_{dn} of 60 dB... Table I summarizes the use of the four sound descriptors used by EPA.

Table I. Description of Sound (in decibels)

TYPICAL USE	NAME OF DESCRIPTOR	NATURE OF DESCRIPTOR
To describe steady airconditioning sound in a room or measure maximum sound level during a vehicle passby with a simple sound level meter.	A-weighted Sound Level	The momentary magnitude of sound weighted to approximate the ear's frequency sensitivity.

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To describe noise from a moving source such as an airplane, train, or truck.	A-weighted Sound Exposure Level	A summation of the energy of the momentary magnitude of sound associated with a single event to measure the total sound energy of the event.
To measure average environmental noise levels to which people are exposed.	Equivalent Sound Level	The A-weighted sound level that is "equivalent" to an actual time varying sound level, in the sense that it has the same total energy for the duration of the sound.
To characterize average sound levels in residential areas throughout the day and night.	Day-Night Sound Level	The A-weighted equivalent sound level for a 24-hour period with 10 decibels added to nighttime sounds (10 pm – 7 am).

Summary

On the basis of its interpretation of available scientific information, EPA has identified a range of yearly Day-Night Sound Levels sufficient to protect public health and welfare from the effects of environmental noise. It is very important that these noise levels, summarized in Table VIII, not be misconstrued. Since the protective levels were derived without concern for technical or economic feasibility, and contain a margin of safety to insure their protective value, they must not be viewed as standards, criteria, regulations, or goals. Rather, they should be viewed as levels below which there is no reason to suspect that the general population will be at risk from any of the identified effects of noise.

Table VIII
Yearly L_{dn} Values That Protect Public Health
And Welfare with a Margin of Safety

EFFECT	LEVEL	AREA
Outdoor activity interference and annoyance.	$L_{dn} \leq 55 \text{ dB}$	Outdoors in residential areas...
	$L_{eq}(24) \leq 55 \text{ dB}$	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{dn} \leq 45 \text{ dB}$	Indoor residential areas.
	$L_{eq}(24) \leq 45 \text{ dB}$	Other indoor areas with human activities such as schools, etc.

(42)

REQUEST FOR REVIEW

OF A PERENNIAL STREAM - OR OTHER CLASSIFICATION
OF ANY STREAMS ON
THE PROPERTY

DATE 3/6/03

NAME SUSAN LEVY, EXEC. DIRECTOR

ADDRESS P.O. Box 459 HILLSBOROUGH, NC 27208

NAME OF FIRM HABITAT FOR HUMANITY, ORANGE CO., NC

PHONE NO. 732-6767 x11

LOCATION SUNRISE ROAD - east side, .4 mi. North of intersection
of Sunrise + Weaver Dairy

TAX MAP 7.17 BLOCK 22 LOT TOPO

MAPS REQUIRED TO MAKE DETERMINATION

PIN # 989 0065926

3 Acres or less - Plat or Tax Map

3 Acres or more - Plat and Topo

ENGINEERING DEPARTMENT USE

DATE OF INSPECTION(S) 3/7/03

WEATHER Plc TEMPERATURE 45°F

INSPECTED BY Fred Fogac, Nancy Ferris

LUMO
COMMENTS

BASED ON MINIMUM CRITERIA, ONE STREAM (WEST) IS
FOUND TO BE INTERMITTENT & ONE STREAM IS
FOUND TO BE PERENNIAL (DISCHARGING UNDER (EAST)
SUNRISE RD.) SEE ATTACHMENTS;
SUPPLEMENTAL FIELD NOTES, MAP

NOTE: LIKELY JURISDICTIONAL WETLANDS EXIST.
US ARMY CORPS NEEDS TO BE CONTACTED
FOR FIELD INSPECTION.

No cover
letter sent
out with
this

* Stream behind Potted Plant parcel on west end of parcel.

(42)
NCDWQ Stream Classification Form

Project Name: HABITAT River Basin: New Hope County: ORANGE Evaluator: Treed Royle

DWQ Project Number: _____ Nearest Named Stream: _____ Latitude: _____ Signature: [Signature]

Date: 3/10/03 USGS QUAD: _____ Longitude: _____ Location/Directions: _____

***PLEASE NOTE:** If evaluator and landowner agree that the feature is a man-made ditch, then use of this form is not necessary. Also, if in the best professional judgement of the evaluator, the feature is a man-made ditch and not a modified natural stream—this rating system should not be used*

Primary Field Indicators: (Circle One Number Per Line)

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	0	(1)	2	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	1	← (2)	3
3) Are Natural Levees Present?	(0)	1	2	3
4) Is The Channel Sinuous?	0	(1)	2	3
5) Is There An Active (Or Relic) Floodplain Present?	(0)	1	2	3
6) Is The Channel Braided?	(0)	1	2	3
7) Are Recent Alluvial Deposits Present?	0	(1)	2	3
8) Is There A Bankfull Bench Present?	0	1	← (2)	3
9) Is a Continuous Bed & Bank Present?	0	1	← (2)	3
<i>(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)</i>				
10) Is a 2 nd Order Or Greater Channel (As Indicated On Topo Map And/Or In Field) Present?	Yes=3	No=0	(0)	

PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 9

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	1	(2)	3

PRIMARY HYDROLOGY INDICATOR POINTS: 2

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	3	2	(1)	0
2) Are Rooted Plants Present In Streambed?	3	(2)	1	0
3) Is Periphyton Present?	0	1	← (2)	3
4) Are Bivalves Present?	(0)	1	2	3

PRIMARY BIOLOGY INDICATOR POINTS: 5

Secondary Field Indicators: (Circle One Number Per Line)

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Head Cut Present In Channel?	(0)	.5	1	1.5
2) Is There A Grade Control Point In Channel?	0	.5	← (1)	1.5
3) Does Topography Indicate A Natural Drainage Way?	0	.5	1	(1.5)

SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 2.5

(16)
18.5

44

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last Year's) Leaf litter Present In Streambed?	1.5	1	.5	0
2) Is Sediment On Plants (Or Debris) Present?	0	.5	1	1.5
3) Are Wrack Lines Present?	0	.5	1	1.5
4) Is Water In Channel And >48 Hrs. Since Last Known Rain? (*NOTE: If Ditch Indicated In #9 Above Skip This Step And #5 Below*)	0	.5	1	1.5
5) Is There Water In Channel During Dry Conditions Or In Growing Season?	0	.5	1	1.5
6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)?		Yes=1.5		No=0
SECONDARY HYDROLOGY INDICATOR POINTS: 5				

III. Biology	Absent	Weak	Moderate	Strong		
1) Are Fish Present?	0	.5	1	1.5		
2) Are Amphibians Present?	0	.5	1	1.5		
3) Are Aquatic Turtles Present?	0	.5	1	1.5		
4) Are Crayfish Present?	0	.5	1	1.5		
5) Are Macrobenthos Present?	0	.5	1	1.5		
6) Are Iron Oxidizing Bacteria/Fungus Present?	0	.5	1	1.5		
7) Is Filamentous Algae Present?	0	.5	1	1.5		
8) Are Wetland Plants In Streambed?	SAV 2	Mostly OBL 1	Mostly FACW .75	Mostly FAC .5	Mostly FACU 0	Mostly UPL 0
(* NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*)						
SECONDARY BIOLOGY INDICATOR POINTS: 1.5						

TOTAL POINTS (Primary + Secondary) = 25 (If Greater Than Or Equal To 19 Points The Stream Is At Least Intermittent)

Notes: STREAM APPEARS TO BE A PART OF A RELIC MAN-MADE DITCH OR MODIFIED STREAM FOR AG. DRAINAGE. Perched groundwater provides hydrology. Linear seep is dominant most. Origin is located where the channel is naturalized ie: (recovering, modified natural channel) & exhibits the necessary minimum criteria as a natural stream. (See location map for approximate location). Blue Flagging is tied to tree at intermittent origin. APPROX 150' FROM I-40 ROW. * WETLAND SOILS (HYDRIC) PERSIST IN THIS AREA.

SUNRISE RD

OGCE LN

(45)

Possible Intermittent Wetland Area (Low Power Easement)

APPROX. BOW/SEEP AREA

PERENNIAL STREAM

H-40

APPROX. INTERMITTENT STREAM ORIGIN

7510

PERENNIAL ORIGIN

APPROX. ORIGIN OF SEEP

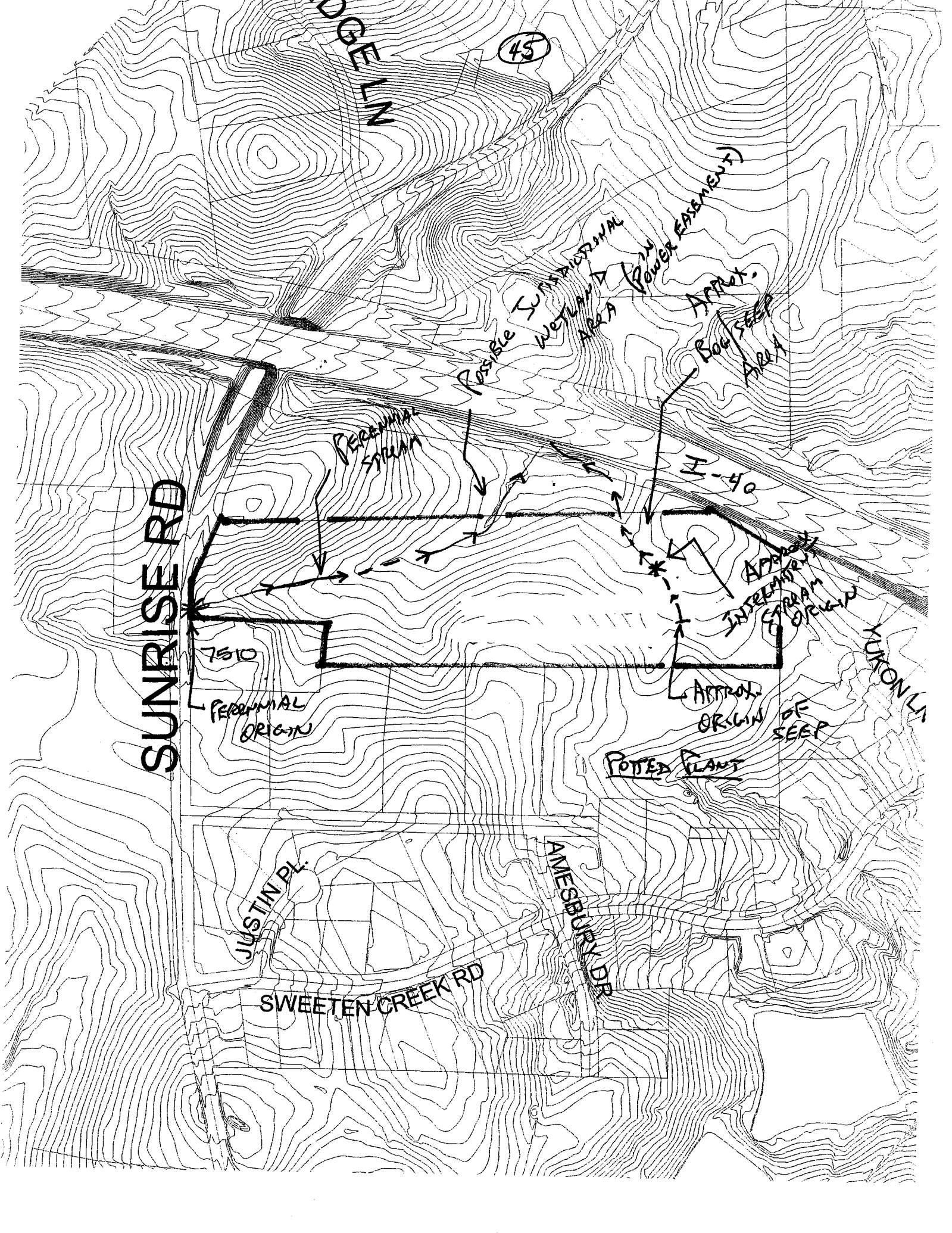
POTENTIAL

YUKON LN

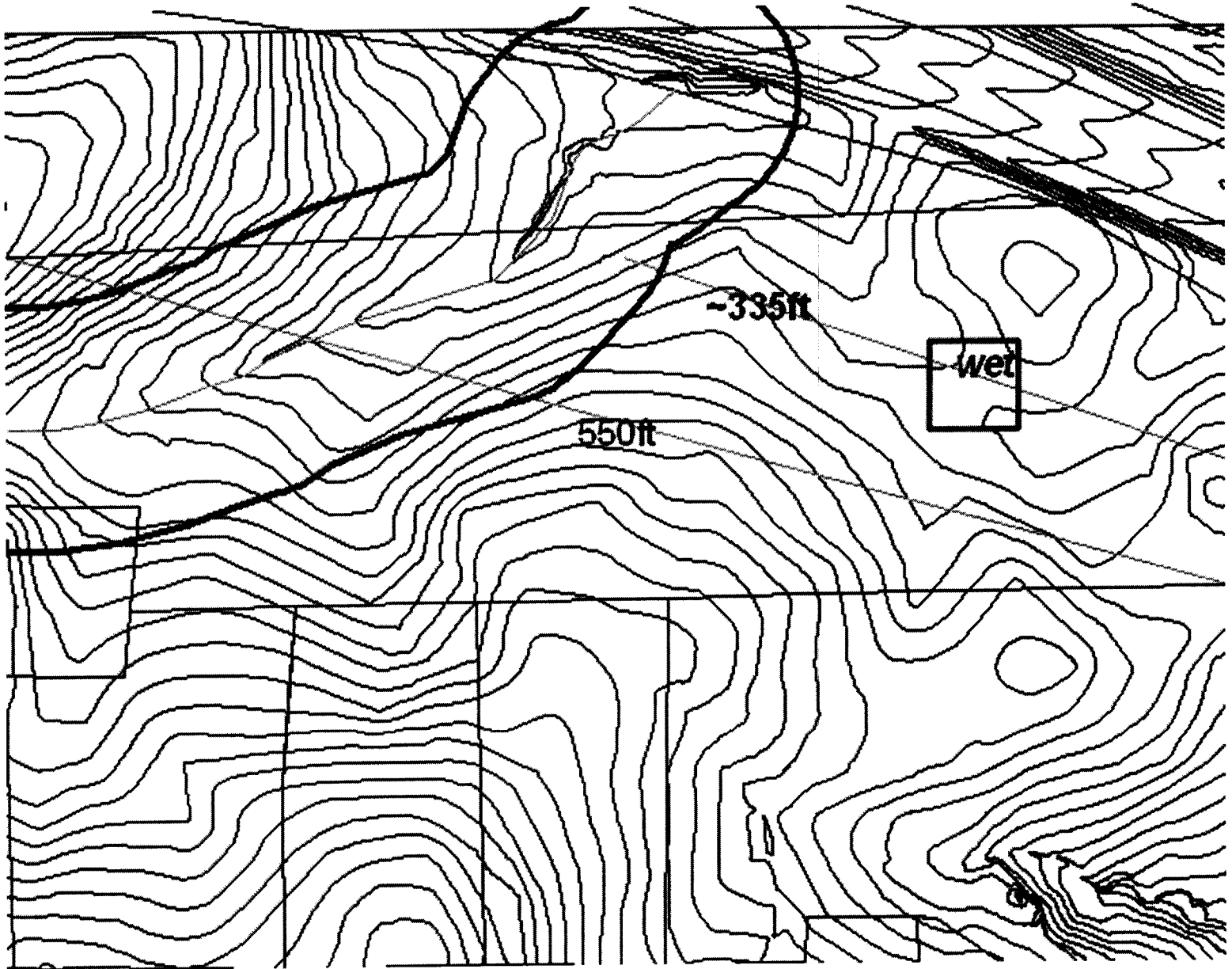
JUSTIN PL.

AMESBURY DR

SWEETEN CREEK RD



46



SUNRISE COALITION DRAWING