





Project : Houses #1, 7616NB  
Re : Business Plan - Draft, Confidential  
Date : 12.22.2022  
To : Team Internal

### **Executive Summary**

The proposed project is a sustainable construction development of a 117 Acre property located in Red Hook, New York. The proposed development will consist of both residential and commercial buildings.

Residential buildings	High-market homes Mid-market homes Affordable/starter homes
Commercial buildings	Community Center Office

The existing 117 acre property contains existing buildings, 50 acres of farm lands, a 7.5 acre (3 hectare) freshwater pond, and 50 acres of rolling forested hills.

Most points of the property are within a 5 minute walk and/or bike ride from the town of Red Hook, a village in Dutchess County. Rhinebeck (oft referred to as the Hamptons of the North) is a 10 minute drive from the town of Red Hook. Bard College (enrollment 2,500), one of the Northeast's premier educational institutions, is a 5 minute drive away.

The proposed buildings will be constructed of fully sustainable mass timber materials; heat and cooling sources will be geothermal; energy harvesting and energy back up storage will be solar.

The burgeoning mass timber industry in North America continues to provide opportunities of integrating this sustainable material more deeply into the construction industry.

In conjunction with sophisticated prefabrication methods the project is expected to be delivered for less cost than traditional construction methods and at greater speed.

As such, our approach is modular, fully systems integrated, and projected as a phased build in 18-24 months, beginning in 2024. A marketable prototype will be built in mid 2023.

Market research indicates that we will be able to market our high market homes in the \$1.3-1.4mil range and our mid level homes in the \$650k - \$750k range.

Our potential buyers range from second homes for young families moving to the area, local and returning families, college students, and retirees.

This fully sustainable green community is proximate to the town and will have over 5 miles of bike and walking paths set in the natural beauty of surrounding farmland and town.

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## **Business Description and Structure**

Construction development of modular sustainable energy efficient homes optimized for mass timber.

### Integrated Project Delivery

The project will be built employing an integrated project delivery method with full participation of all design and construction teams from evaluation and planning through construction administration. Integrated project delivery minimizes coordination conflict and permits a far greater level of value engineering - hence lower construction costs - than traditional design-bid-build methods.

The horizontally integrated team consists of fully participating architects, engineers, mass timber fabricators, forestry experts, site and construction crews.

### Modular Design Flexibility/Mass customization

The modular nature of the proposed designs (1,200SF, 1,600SF, and 2,400SF) allow for mass customized building system solutions that are simple, constructible and implementable.

Within each proposed design type simple 90 degree rotations of program and structure yield customization and aesthetic variability across the development. This variation is achieved without a revision of construction material elements or engineering.

### Circular Built Economies and Material Lifecycle

Buildings are designed for end of life disassembly and reintegration into the economic material stream, adding 16-18% residue value to building materials. Building materials are registered for redeployment in anticipation of end of life reuse, minimizing waste and optimizing for sustainability.

All components of construction have capacity for disassembly and reintegration into the material stream, providing flexibility for additions and/or maintenance and responsible end of life material re-use. Circularity in the built environment adds market value through sustainability and actual material value to the homes..

### Prefabrication

Available prefabrication / off site assembly is optimized for production. Typical prefabrication shifts 75% of construction to off site with 25% on site. Prefabricated building elements include windows and doors, fittings for electricity, piping and other services, sanitary and kitchen units.

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## Mass Timber

Beyond the essential sustainable nature of the material, mass timber has structural and thermodynamic capacity that, when exposed at the interior, is sophisticated, tactile and beautiful. The full integration of fabrication capacities and transport logistics allows mass timber to be an immediately scalable building element. The intelligent design and implementation of mass timber reduces construction time to a fraction of traditional wood frame construction and individual homes are expected to be erected within 7-10 days.

## Energetically Efficient - Net Positive

Energetically efficient (high performance) envelopes in conjunction with geothermal heating and cooling and solar harvesting and storage will yield net positive buildings. Due to state and federal incentives the sustainable energy systems can be built for less than traditional systems. In addition to cost savings that can be passed onto the buyers these systems typically have long life spans, are environmentally sustainable, and are desired systems for potential buyers.

## Community Geothermal System

Community ground loops connected through secondary distribution nodes offer the possibility of a high efficiency community wide distributed energy system that can be installed with a 40% reduction in costs. In this model the developer owns the energy system and charges a monthly fee and \$/BTU utilized to homeowners offering extensive savings to potential buyers and monthly cash flow to the developer.

## Community Solar System and Energy Storage

A community solar system, managed through DERM, offers scale energy harvesting and storage. The site is optimal for solar harvesting and, in conjunction with geothermal, readily yields net positive homes providing cost savings to owners and community wide energy resiliency.

## Distributed Energy Resource Management (DERM)

Development scale energy management systems for geothermal and solar yield energy resiliency and independence. The development electrical microgrid/edge grid will have capacity to effectively and efficiently manage energy collection and distribution from individual solar collection and storage to development scale.

## Optimization for Industry 4.0

Alongside Industry 4.0, mass timber manufacturing provides the opportunity for design and advanced manufacturing coordination that minimizes on site assembly and optimizes production. . Floor, wall and roof panels including connections can all be detailed prior to manufacture and, with the help of CAM (Computer Aided Manufacturing), CAD (Computer Aided Design) and CNC (Computer Numerical Control) fabrication tools, can be optimized for automated fabrication and efficient construction.

Plumbing, Mechanical, and Electrical systems can be fully integrated in the planning and fabrication stages, minimizing the required sub-trade time on site to further optimize efficiency.

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### Value Proposition

- Low Cost Construction
- Rapid Deployment
- Optimization for production
- Sustainability
- Scalable for future projects

### Bottlenecks/Identifiable Problems

- Acquisition of Land (availability and cost)
- Location (site should have access to towns, transportation and/or vehicles)
- Approvals by Authorities having Jurisdiction, Nimbyism
- At scale implementation, hedged through prototype
- Sources of funding for Phase 2 (if affordable, veteran, domestic abuse sources) there will be multiple directives, planning requirements (Cit. The Way Los Angeles is Trying to...)

### Strategic Relationships

- Mass Timber Manufacturers
- Clemson University Wood Utilization + Design Institute
- APA - Engineered Wood Association
- Environmental Protection Agency
- New York State Department of Energy Conservation
- Simpson Strong Tie, Mass Timber Connectors
- Red Hook Town and Village Buildings and Planning Department
- GATE Global Association for Transition Engineering

### Construction Phases

We anticipate the following development phases:

Phase 0	Winter 2022	Land Acquisition/Planning/Financing/Design	
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This first phase will consist of land acquisition, project planning and financing rounds. Evaluation and planning will include coordination with town authorities, building departments, and financing teams. Internal planning and design is scheduled for the engineering teams (Structural, HVAC, Geothermal, Solar) during this phase. Additional coordination with fabrication and manufacturing teams will take place. The prototype design is scheduled to be completed by the Spring of 2023.

Phase 1	Summer 2023	Prototype House	1,200SF
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This phase will consist of a 1,200SF house located in the eastern end of the property. The prototype will include a 2 car garage, geothermal heat pump cooling and heating, solar energy harvesting and solar energy storage. The scheduled prototype will function as a marketing/sales opportunity but also as an internal mechanism to identify critical points/paths for scaling to Phase 2.

Phase 2	Spring 2024	Mid-Market Homes	1,200SF & 1,600SF
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This phase will consist of four(4) 1,200SF and four(4) 1,600SF homes in the eastern end of the property. Homes will include 2 car garages, geothermal heat pump cooling and heating, solar energy harvesting and solar energy storage. Access roads and driveways in addition to ca. 10,000LF of bike and walking paths will be built during this phase.

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Phase 3a	2025	High-Market Homes	2,400SF
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This phase will consist of four(4) 2,400SF homes in the western edge of the freshwater pond. Homes will include 2 car garages, geothermal heat pump cooling and heating, solar energy harvesting and solar energy storage. Additional access roads, driveways, and bike and walking paths will be built during this phase

Phase 3b	2025	Mid-Market Homes	1,200SF & 1,600SF
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This phase will consist of additional four(4) 1,200SF and four(4) 1,600SF homes in the eastern end of the property. Homes will include 2 car garages, geothermal heat pump cooling and heating, solar energy harvesting and solar energy storage. The remainder of bike and walking paths will be built during this phase.

Phase 4a	2026	Affordable/Starter Homes	1BR & 2 BR
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This phase will consist of additional thirty-two (32) 1 bedroom and 2 bedroom affordable/veterans homes at the eastern edge of the property. Homes will include parking, storage, geothermal heat pump cooling and heating, solar energy harvesting and solar energy storage.

Phase 4b	2026	Community Center	4,000SF
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This phase will consist of a community center connected to the existing landmarked barn on the southwestern edge of the property. The community center will have an adjoining geothermal heat pump cooling and heating, solar energy harvesting and solar energy storage.

*Note to Phases : Phase distribution will be re-evaluated in the Spring and Summer of 2023 in anticipation of additional housing and construction data. The current phase distribution can be adjusted as needed to optimize sales and construction for the entire project.*

## **Market Research**

### **Freddie Mac Housing Sentiments, Q4 2022 Research Brief**

#### Market Confidence

34% are confident the housing market will remain strong over the next year. This is down 12 percentage points from last quarter.

#### Housing Affordability

57% of renters and 25% of homeowners spend more than 30% of their monthly income on housing. This is down 3 percentage points and up 1 percentage point, respectively, from last quarter.

#### Payment Concerns

57% of consumers are concerned about making housing payments, with concern increasing among both renters and owners since last quarter. 70% of renters (an 8-percentage point increase from last quarter) and 44% of homeowners (a 7-percentage point increase from last quarter) are concerned about making housing payments.

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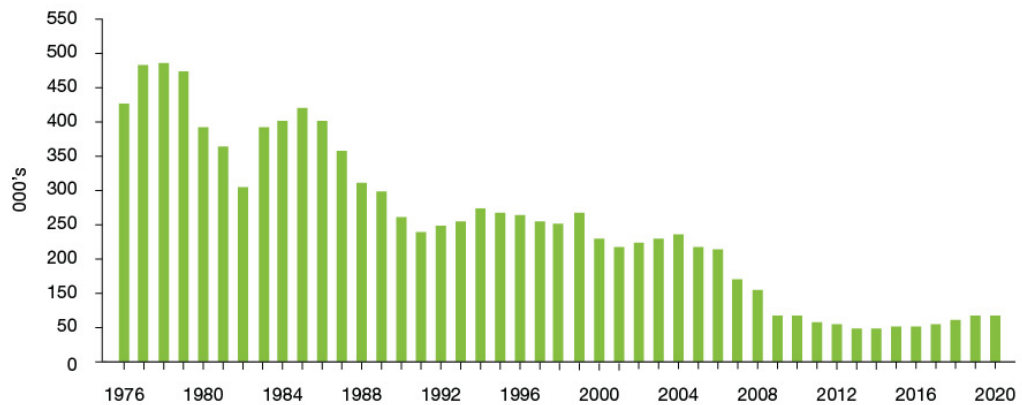
*Exhibit 2*

2020 75k new homes below 1,400SF (down from 418k in 1976)

EXHIBIT 2

**Number of new homes constructed below 1,400 square feet**

Entry-Level home construction collapsed after the Great Recession and never recovered



Source: U.S. Census Bureau.

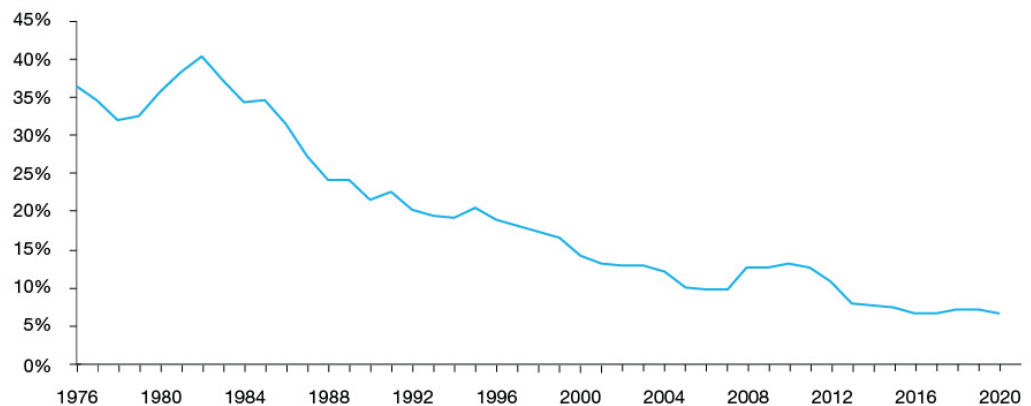
*Exhibit 3*

2020 10% new homes below 1,400SF (down from 35% in 1976)

EXHIBIT 3

**Percent of new homes below 1,400 square feet**

Entry-Level home construction consistently declined as a share of new construction and is at near a 50-Year Low



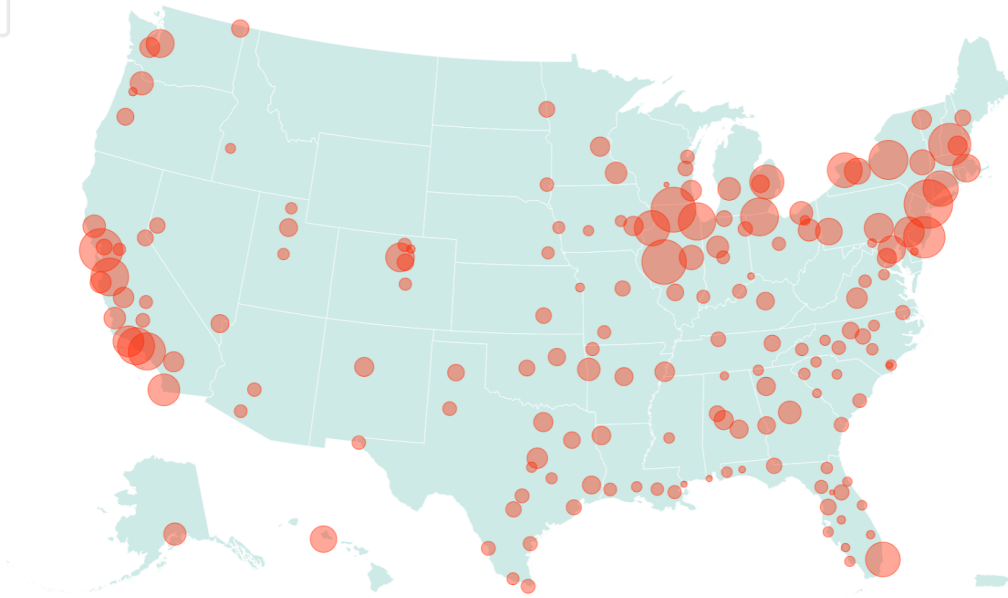
Source: U.S. Census Bureau.

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Source: National Association of Realtors



✱ A Flourish map

Citation : Housing Shortage is worst in these Cities, 10-21-22

## Competitors

There are multiple companies working in the modular home sector across the world. Some of them utilize prefabrication techniques while others do not. There are a handful of larger developers working with mass timber across commercial and industrial applications.

There are no direct competitors in the mass timber mid-market and high-market residential sectors.

## **Market Strategy, Competitive Sales Advantage**

Mid-market homes priced at \$650k - \$750k on larger lots (.75 - 1 acre) than competitors priced similarly.

High-market homes priced at \$1,200k - \$1,500k on 4 acre lots.

Affordable homes priced at \$250k - \$350k, multifamily.

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Competitive sales advantage through design, sustainability, energy efficiency, and community engagement. Distribution sensitivity of architecture types and potential buyers across the entire project.

96.2% of land is green space consisting of farmland, parks, and yards.

Wide range of potential buyers from new families (e.g. first time buyers), retirees, veterans, second homebuyers and wealthy homebuyers.

The project is at the forefront of resiliency, sustainability and building technologies.

#### Sustainable Land Use

Total Land	117	Acres
High Market	16	Acres
Mid Market	12	Acres
Affordable/Starter Homes	5	Acres
Ex. Commercial	2.5	Acres
Community Center	1.5	Acres
Roads/Parking	3	Acres
Total Sold Dev	40	Acres
Reserved Ponds, Farms, Parks	77	Acres
% of Lands Sold	34%	
% of Lands Preserved	66%	
SF Built Res and Comm	64,800	SF
SF Built Civil	130,000	SF
Total SF Built	194,800	SF
Total Open Space	5,096,520	SF
% Open Space	96.2%	

#### Site Development

See the enclosed site plan drawings detailing preserved land, green space, lots, buildings, and survey.

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**Financial Structure**

(a) Acquisition	\$2,400,000	
(b) Construction Costs		
Phase 0	\$450,000	Evaluation and Planning Design Environmental
Phase 1	\$640,000	1 Prototype @ 1,200SF @ \$400/SF
Phase 2	\$1,400,000	4 @ 1,200SF @ \$300/SF
	\$1,920,000	4 @ 1,600SF @ \$300/SF
Phase 3a	\$3,840,000	4 @ 2,400SF @ \$400/SF
Phase 3b	\$1,400,000	4 @ 1,200SF @ \$300/SF
	\$1,920,000	4 @ 1,600SF @ \$300/SF
Phase 4a	\$7,200,00	32 @ 900SF @ \$250/SF
Phase 4b	\$800,000	1 @ 4,000SF @ \$200/SF
Total Construction	\$19,570,000	
(c) Soft Costs		
Due Diligence	\$75,000	
Architecture	\$975,000	
Engineering	\$250,000	
Environmental	\$75,000	
Legal	\$400,000	
Marketing	\$250,000	
Total Soft Costs	\$2,025,000	
(a) Acquisition	\$2,400,000	
(b) Total Construction Costs	\$19,570,000	
(c) Total Soft Costs	\$2,025,000	
Total Dev Cost	<b>\$23,995,000</b>	

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Cost of Construction and Sales Strategy

(Mid @ \$300/SF; High at \$400/SF)

SF	Type	Cost	Sale	Net
1,200SF	Mid Market	\$360,000	\$685,000	\$325,000
1,600SF	Mid Market	\$480,000	\$795,000	\$315,000
2,400SF	High Market	\$960,000	\$1,350,000	\$390,000
900SF	Aff Market	\$225,000	\$300,000	\$75,000
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(8) 1,200SF	Mid Market	\$2,880,000	\$5,480,000	<b>\$2,600,000</b>
(8) 1,600SF	Mid Market	\$3,840,000	\$6,360,000	<b>\$2,520,000</b>
(4) 2,400SF	High Market	\$3,840,000	\$5,400,000	<b>\$1,560,000</b>
(32) 900SF	Aff	\$7,200,000	\$9,600,000	<b>\$2,400,000</b>
Total	All	\$17,760,000	\$26,840,000	<b>\$9,080,000</b>
Total	All	\$17,760,000	\$26,840,000	<b>\$9,080,000</b>
	Acquisition			<b>(\$2,400,000)</b>
	Fees			<b>(\$2,025,000)</b>
	Prototype			<b>(\$640,000)</b>
	Net Profit			<b>\$4,015,000</b>
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Project Return on Investment				
	10% ROI			\$2,159,500
	15% ROI			\$3,239,250
	20% ROI			\$4,319,000

**Management and Personnel**

LWH Architecture, Lloyd Huber  
 Christopher Brown - Legal and Management  
 Audra Tuskes, Design Strategy  
 Martin Willms - Structural Engineering/Mechanical Engineering  
 O'Farrell Earthworks - Site Work  
 Aztech Geothermal - Geothermal Engineering  
 Lighthouse Solar - Solar Harvesting and Solar Storage  
 National Renewable Energy Laboratory (NREL)  
 Stephanie Reese - APA Wood  
 Patricia Layton - Clemson University  
 Director of Wood Utilization and Design Institute  
 Sterling Structural (mass timber supplier)

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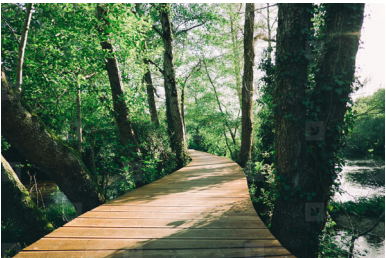
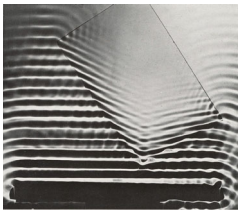
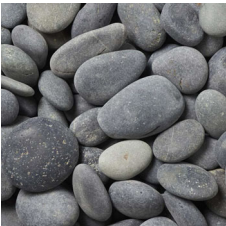
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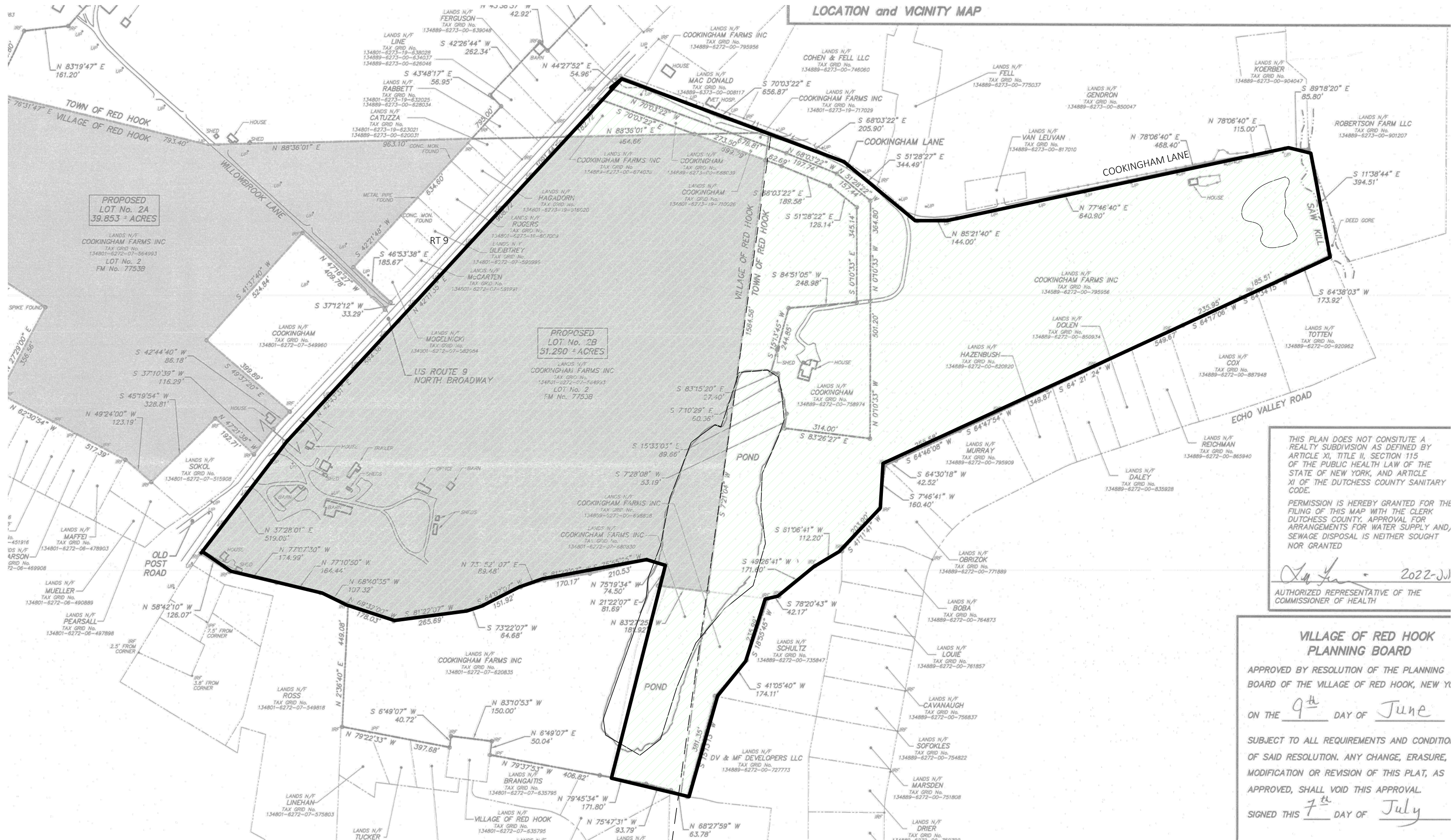
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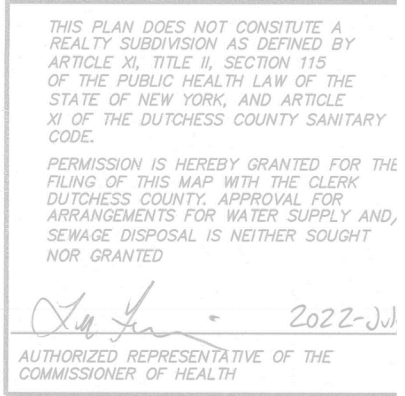
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[Wigo](#)  
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[Toyota Home](#)











VILLAGE OF RED HOOK  
PLANNING BOARD

APPROVED BY RESOLUTION OF THE PLANNING  
BOARD OF THE VILLAGE OF RED HOOK, NEW YORK

ON THE 9<sup>th</sup> DAY OF June

SUBJECT TO ALL REQUIREMENTS AND CONDITIONS  
OF SAID RESOLUTION. ANY CHANGE, ERASURE,  
MODIFICATION OR REVISION OF THIS PLAT, AS  
APPROVED, SHALL VOID THIS APPROVAL.

SIGNED THIS 7<sup>th</sup> DAY OF July



