

Daylight Analysis and Overshadowing

Knocklyon Rd, Knocklyon, Co. Dublin
26/10/2022





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1. Executive Summary

H3D were engaged to provide a report on the impact of the proposed residential development at Knocklyon Rd Knocklyon, Co. Dublin. H3D were instructed to conduct the following:

- To create a 3D computer analysis model of the scheme based upon planning drawings.
- Conduct a study to investigate if the adjacent amenity areas achieve 2 hours of sunlight on March 21st.
- Conduct a Vertical Sky Component (VSC) analysis on the adjacent windows facing the proposed development.
- Prepare shadow study images to show the existing scenario compared with the proposed scenario.
- Prepare a report setting out the analysis and the findings.

Methodology

The assessment of the proposed development was prepared using the methodology's set out in the British Standard: Lighting for Buildings – Part 2: Code for Practice for Daylighting, BRE 209, 'Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice', Third Edition 2022, by P. J. Littlefair, the Design Standards for New Apartments - Guidelines for Planning Authorities (December 2020).

It is noted that BS 8206-2:2008: Lighting for buildings - Part 2: Code of practice for daylighting was replaced with BS EN 17037:2018 Daylight in Buildings. However, given that the Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities refer to the BS 8206-2:2008 and not to BS EN 17037:2018, BS 8206:2008 has been referenced in the preparation of this report.

BRE Guide and Advisory Note

The numerical guidelines given in these documents are purely advisory. The BRE Guide states that:

"The advice given here is not mandatory and the guide should not be an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design."

"It is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location" (Section 1.6, p1)



Amenity Overshadowing

The BRE guideline requirement for amenity overshadowing is that at least 50% of an amenity area receives two hours on sunlight on March 21st. The analysis shows that both the rear garden areas received required sunlight thus conforming with the BRE guidelines for Amenity Overshadowing.

Vertical Sky Component (VSC)

Vertical Sky Component analysis was performed to investigate if windows of the adjacent dwellings facing the proposed development achieve 27% or failing that, do not reduce by more than 20% of the current value when the proposed development is completed. Of the 33 no. windows analysed all surpass the 27% level thus conforming with the BRE guidelines for Vertical Sky Component.

Overall Conclusion.

After conducting a comprehensive daylight and sunlight assessment of the proposed development using simulation modelling and comparing results achieved against the BRE Guide and BS recommended guidelines, the proposed development would not cause an unacceptable overshadowing impact on the neighbouring rear garden amenity spaces or loss of access to sky for the windows facing the proposed development.

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2. Amenity Overshadowing -

As per section 3.3 of 'Site layout Planning for daylight and Sunlight' by Paul Littlefair it is recommended that at least half of the amenity areas should receive at least two hours of sunlight on March 21st. To investigate this, the area of sunlit amenity space is calculated as a percentage of the total area.

Paragraph 3.3.11 states that if the area is poorly lit and does not achieve the minimum two hours but the value is no less than 0.8 times the current state then further loss of light would not be significant.

An analysis of the neighbouring garden amenity areas was conducted by calculating the area of sunlight that received a minimum of two hours of sunlight on March 21st.

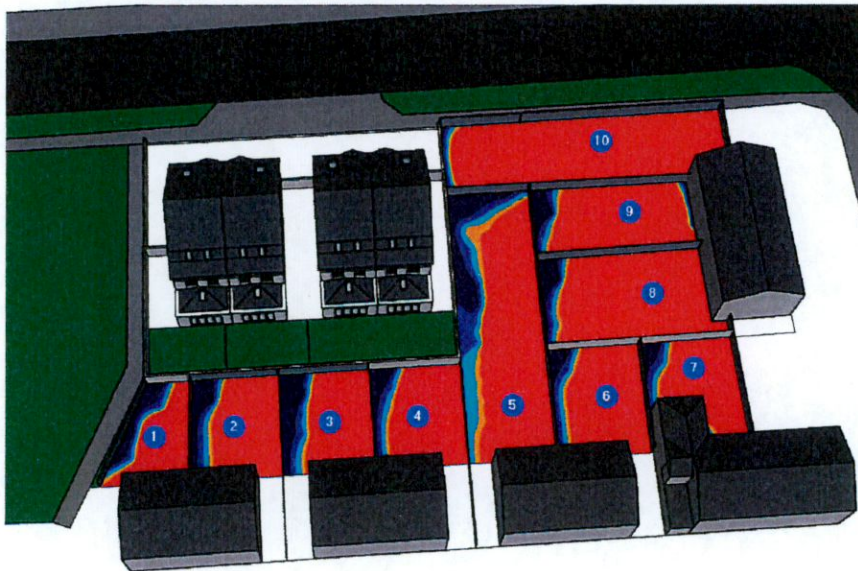


Figure 1: Amenity Overshadowing Garden Key Plan

Amenity Overshadowing							
Garden	Garden Area (m ²)	Area receiving 2 hours of sunlight on March 21 st - Proposed (m ²)	Area receiving 2 hours of sunlight on March 21 st (%)	Minimum area receiving 2 hours of sunlight on March 21 st (%)	Area receiving 2 hours of sunlight on March 21 st - (Existing) (%)	>0.8 times existing	Compliance Demonstrated
1	69	39.92	57.85	50.0%	57.85	N/A	Yes
2	94	75.23	80.03	50.0%	80.03	N/A	Yes
3	94	65.53	69.71	50.0%	79.35	N/A	Yes
4	95	75.32	79.28	50.0%	79.28	N/A	Yes
5	254	177.01	69.69	50.0%	84.40	N/A	Yes
6	106	84.33	79.56	50.0%	79.56	N/A	Yes
7	111	71.54	64.45	50.0%	64.45	N/A	Yes
8	174	155.05	89.11	50.0%	89.11	N/A	Yes
9	135	110.38	81.76	50.0%	81.76	N/A	Yes
10	253	232.13	91.75	50.0%	91.75	N/A	Yes

Table 1: Amenity Overshadowing Results – External to Site

The BRE guideline requirement for amenity overshadowing is that at least 50% of an amenity area receives two hours on sunlight on March 21st. The analysis shows that all rear garden areas analysed received the required sunlight thus conforming with the BRE guidelines for Amenity Overshadowing.

3. Vertical Sky Component (VSC)

The BRE document definition of the Vertical Sky Component (VSC) is: Ratio of the part of illuminance, at a point on a given vertical plane, which is received directly from a CIE standard overcast sky, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Usually the 'given vertical plane' is the outside of a window wall. The VSC does not include reflected light, either from the ground or from other buildings.

The VSC is usually expressed as a percentage and the maximum value for a completely unobstructed window is slightly less than 40%. The recommendations set down in the BRE report, 'Site layout for daylight and sunlight, a guide to good practice,' would indicate, for residential properties, that a VSC value of greater than 27% is acceptable. However, a 20% VSC is good for an urban area.

If a window does not achieve 27% a further investigation should be carried out to calculate the existing VSC. If the value of the predicted VSC is not more than 20% lower than the VSC in the existing scenario the windows pass for VSC according to BRE BR209.

It should be noted that the Guide itself, within the introduction, states that the advice given was not mandatory and the Guide should not be an instrument of planning policy, its aim being to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly.

A VSC Analysis was conducted on the side windows of the property facing the proposed development from the east and north.



Figure 2: VSC Window Key Plan – Neighbouring Properties to the East

Window	Proposed	<27% Yes/No	Existing	Difference	>0.8 Existing	Compliance Demonstrated
1	33.90	Yes	36.25	0.87	Yes	Yes
2	33.55	Yes	36.49	0.88	Yes	Yes
3	30.48	Yes	32.96	0.88	Yes	Yes
4	36.89	Yes	38.34	0.93	Yes	Yes
5	36.69	Yes	38.42	0.92	Yes	Yes
6	32.56	Yes	35.80	0.92	Yes	Yes
7	33.60	Yes	37.31	0.92	Yes	Yes
8	30.94	Yes	33.93	0.90	Yes	Yes
9	29.65	Yes	33.89	0.89	Yes	Yes
10	32.98	Yes	37.47	0.89	Yes	Yes
11	32.85	Yes	37.25	0.95	Yes	Yes
12	35.69	Yes	38.52	0.93	Yes	Yes
13	35.49	Yes	38.54	0.93	Yes	Yes
14	35.40	Yes	38.56	0.92	Yes	Yes
15	35.55	Yes	38.59	0.93	Yes	Yes
16	31.16	Yes	34.58	0.94	Yes	Yes
17	33.17	Yes	37.45	0.95	Yes	Yes
18	31.16	Yes	34.96	0.87	Yes	Yes
19	31.77	Yes	33.41	0.88	Yes	Yes
20	34.71	Yes	37.49	0.88	Yes	Yes
21	34.31	Yes	36.85	0.93	Yes	Yes
22	35.67	Yes	38.62	0.92	Yes	Yes
23	35.82	Yes	38.61	0.92	Yes	Yes
24	36.27	Yes	38.62	0.92	Yes	Yes
25	36.65	Yes	38.62	0.90	Yes	Yes

Table 2: VSC Results – Neighbouring Windows to the East



Figure 3: VSC Window Key Plan – Neighbouring Properties to the North

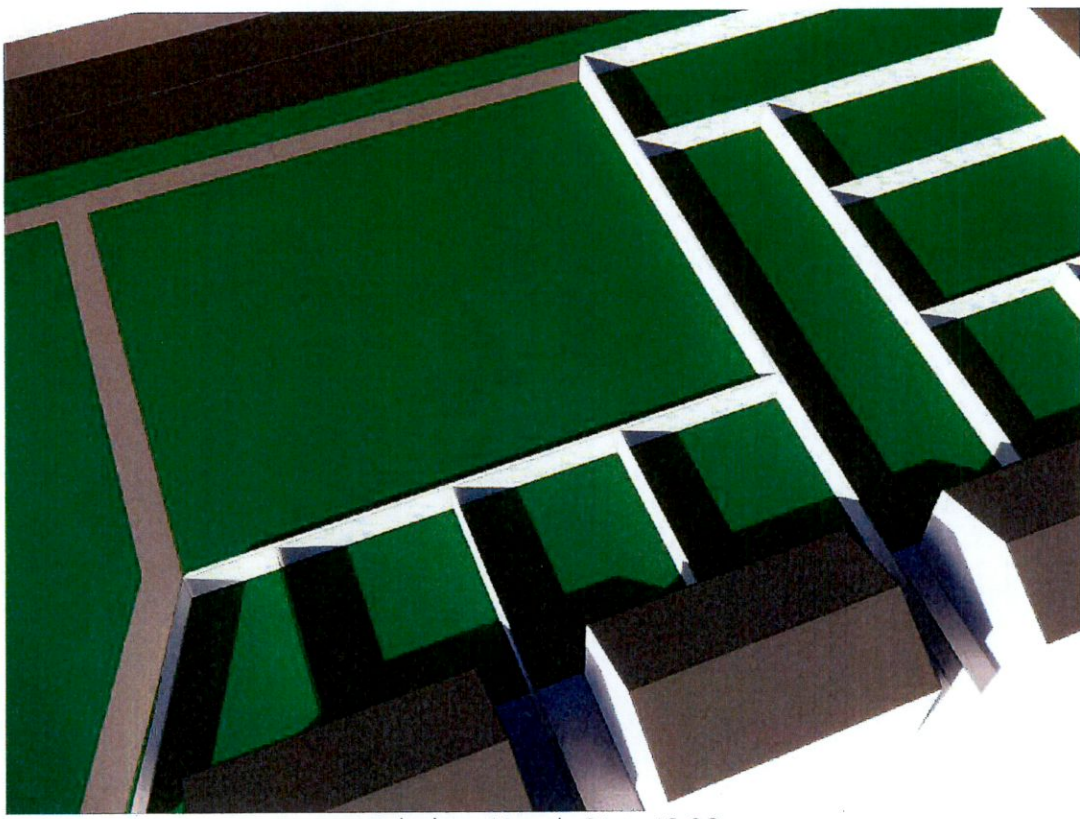
Window	Proposed	<27% Yes/No	Existing	Difference	>0.8 Existing	Compliance Demonstrated
1	36.08	Yes	37.40	0.96	Yes	Yes
2	36.00	Yes	37.34	0.96	Yes	Yes
3	35.51	Yes	36.83	0.96	Yes	Yes
4	34.19	Yes	35.29	0.97	Yes	Yes
5	35.12	Yes	36.26	0.97	Yes	Yes
6	37.45	Yes	38.26	0.98	Yes	Yes
7	37.47	Yes	38.25	0.98	Yes	Yes
8	37.35	Yes	38.16	0.98	Yes	Yes
9	37.25	Yes	38.02	0.98	Yes	Yes
10	37.26	Yes	37.92	0.98	Yes	Yes

Table 3: VSC Results – Neighbouring Windows to the North

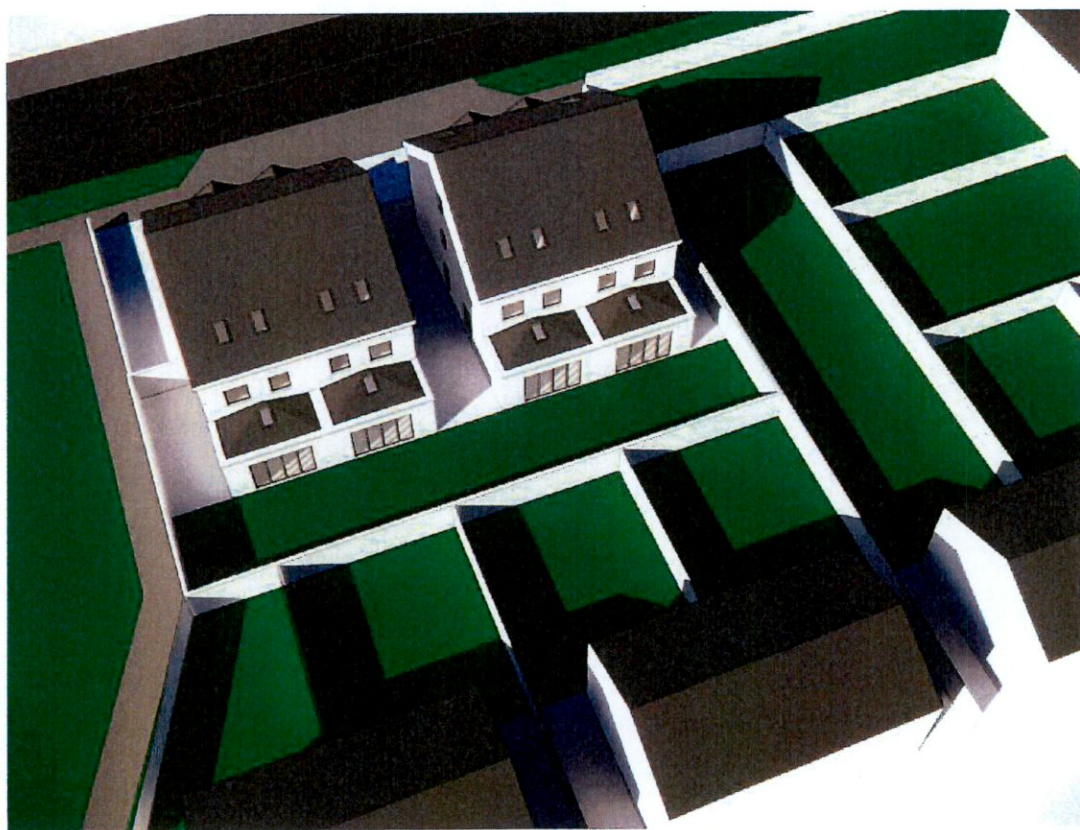
Vertical Sky Component analysis was performed to investigate if windows of the adjacent dwellings facing the proposed development achieve 27% or failing that, do not reduce by more than 20% of the current value when the proposed development is completed. Of the 33 no. windows analysed all surpass the 27% level thus conforming with the BRE guidelines for Vertical Sky Component.

4. Shadow Study

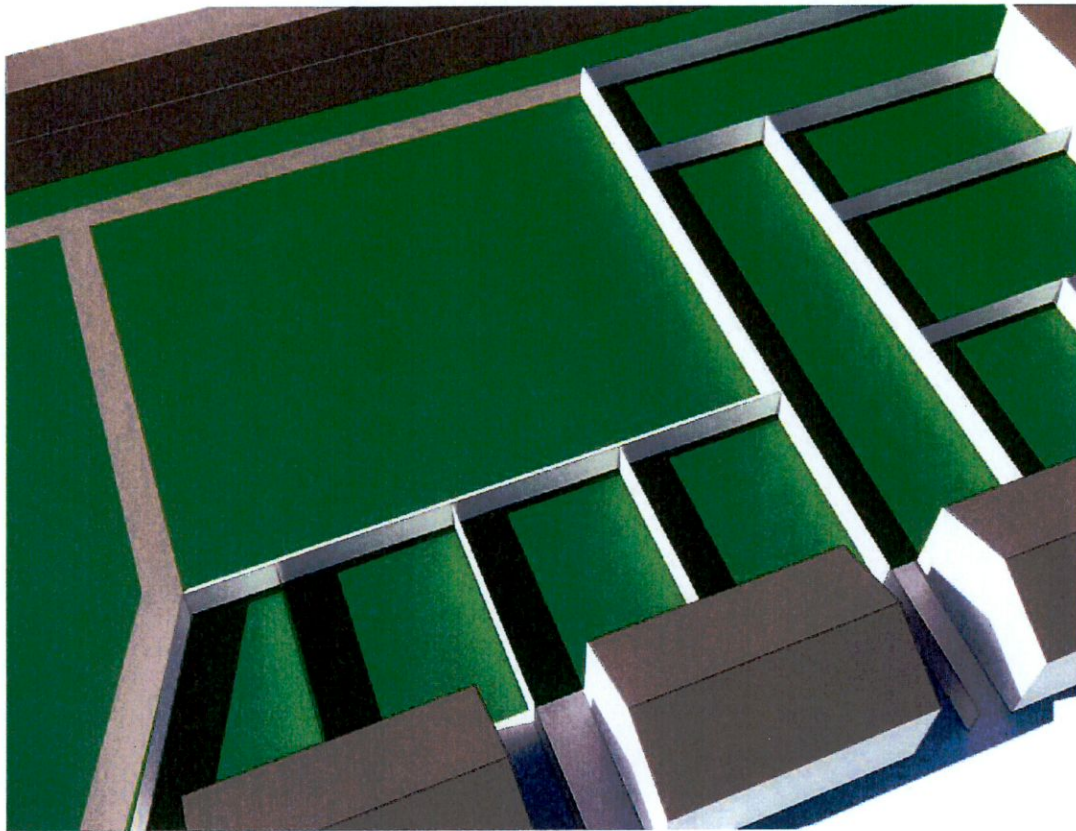
A shadow study was conducted to interrogate the levels of overshadowing affecting the neighbouring properties. The images below show some overshadowing primarily in the days where the sun is at a low height in the sky. The proposed development provides very minor additional overshadowing. However, from Section 2 in this report (Amenity Overshadowing) the analysis found that all neighbouring garden areas would meet the guideline levels set out in BRE BR209 and the windows facing the proposed development would all have adequate access to sky by conforming with the Vertical Sky Component Analysis as is demonstrated in Section 3 of this report.



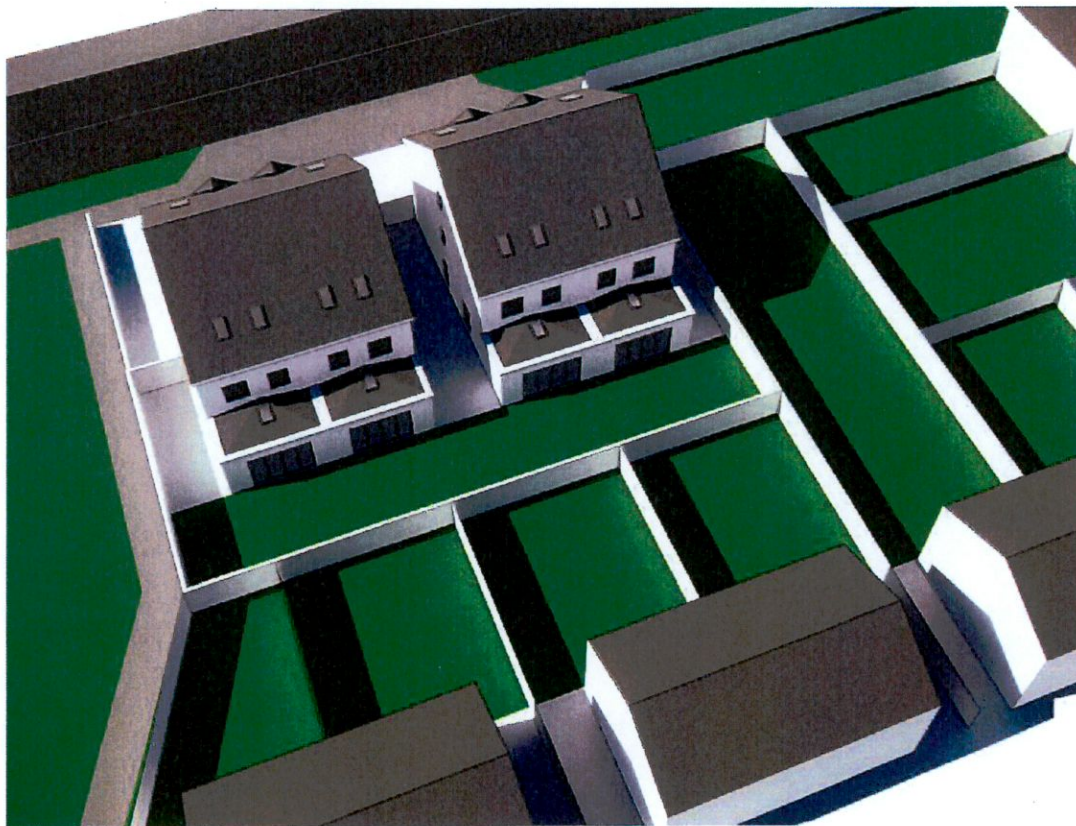
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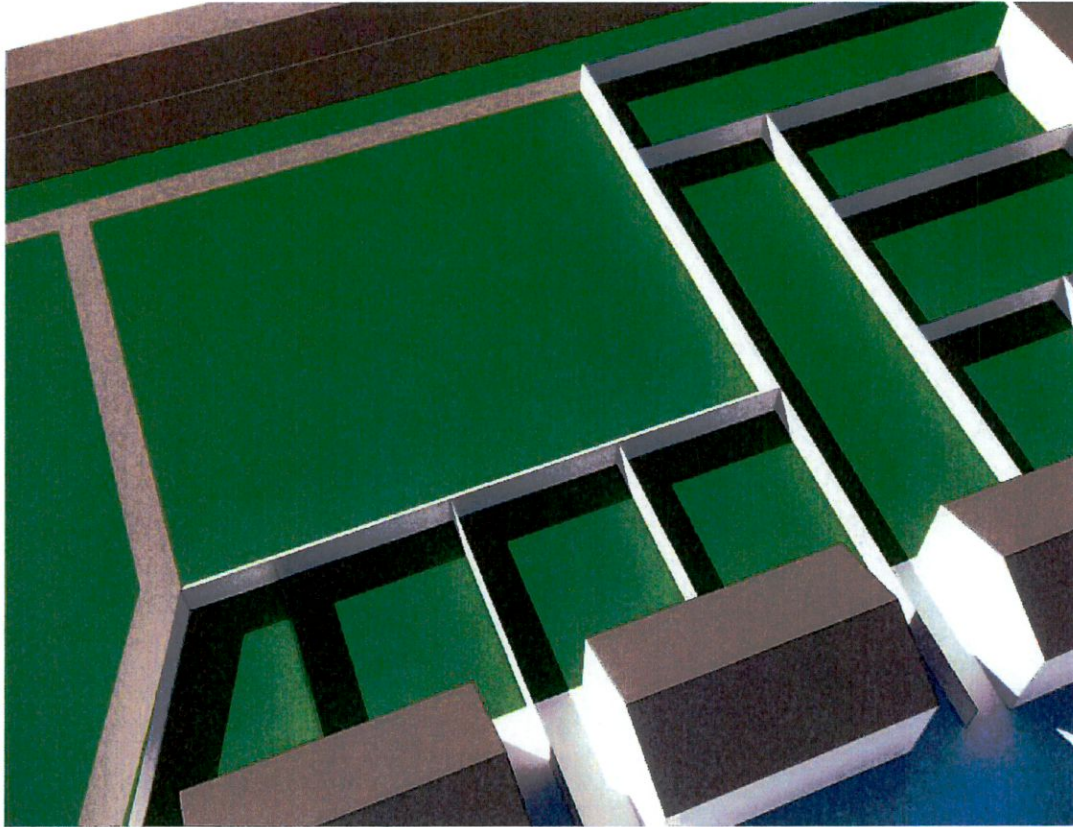
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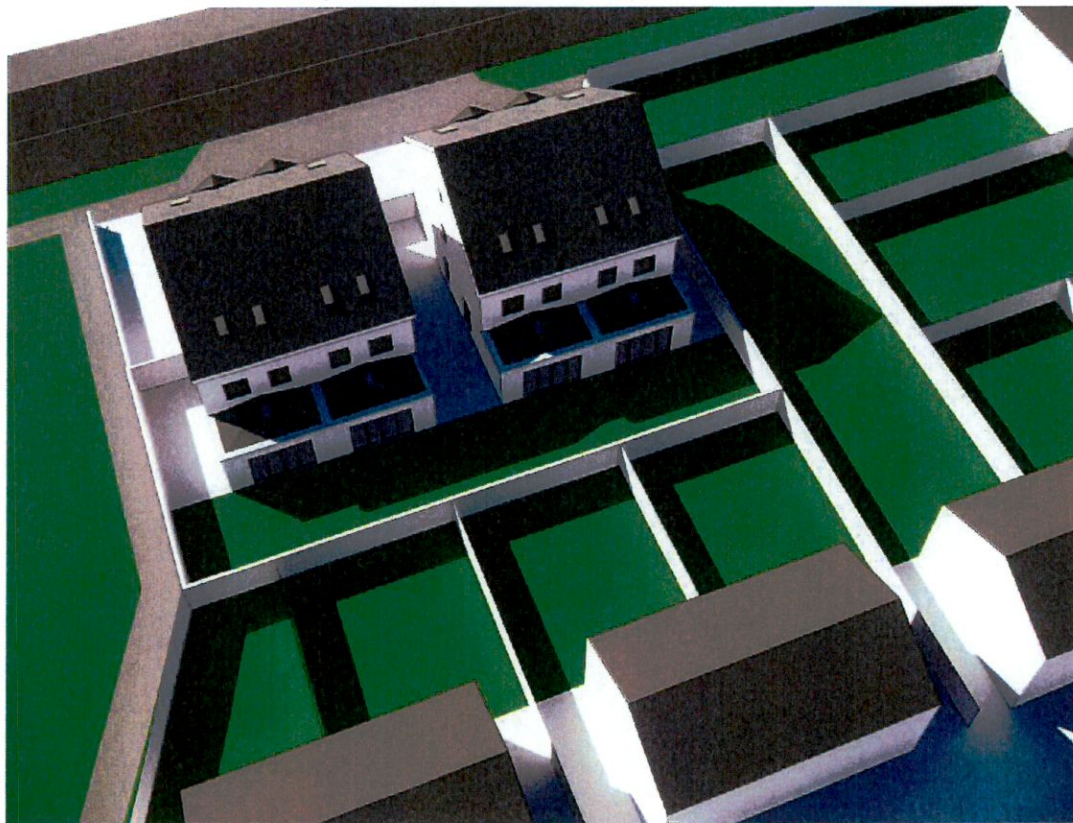
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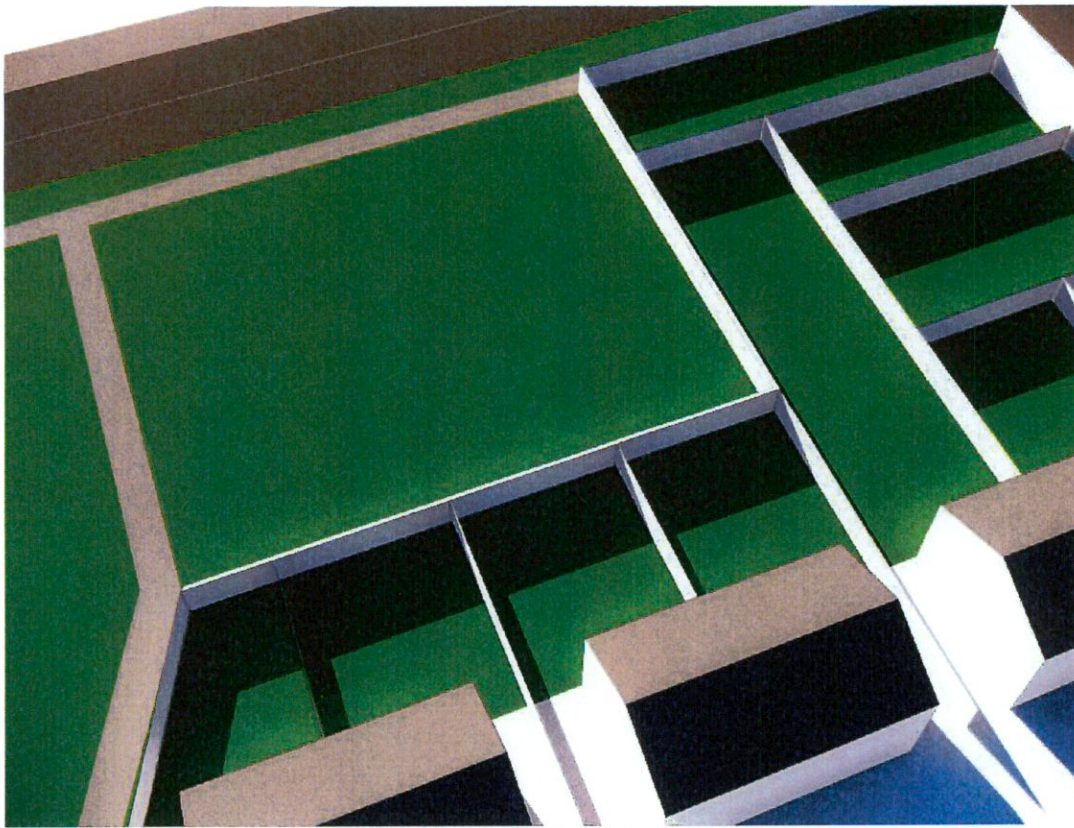
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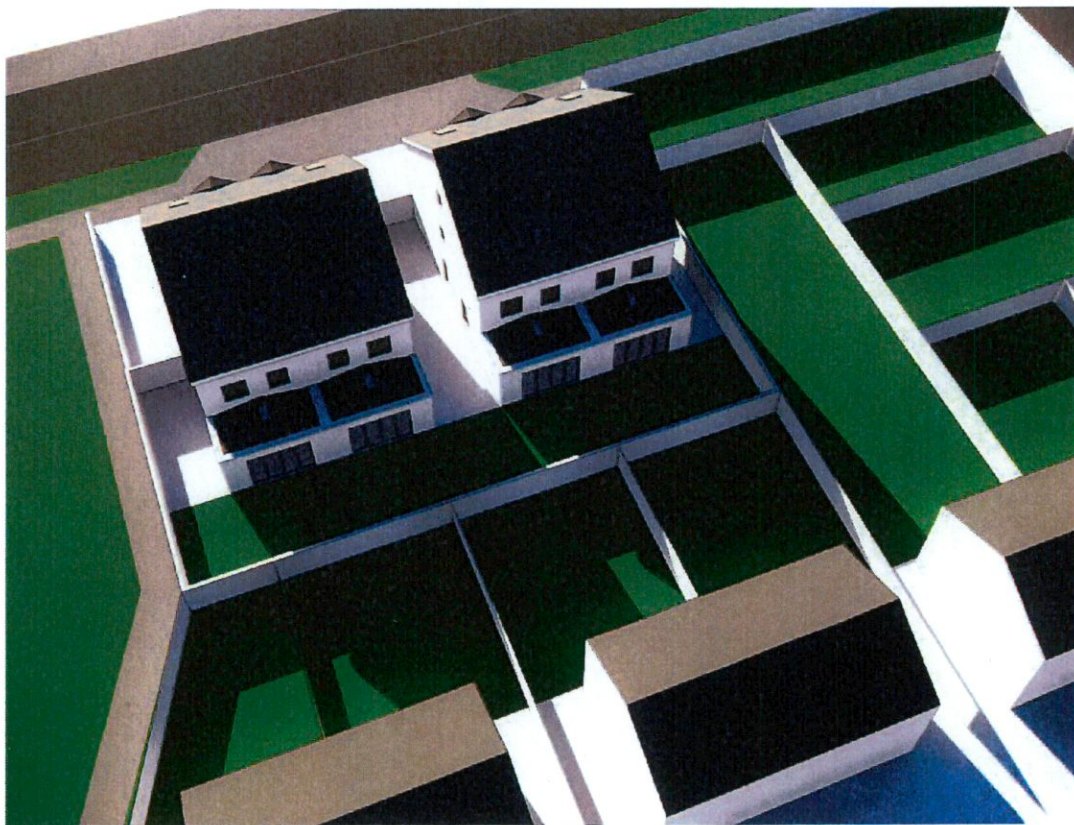
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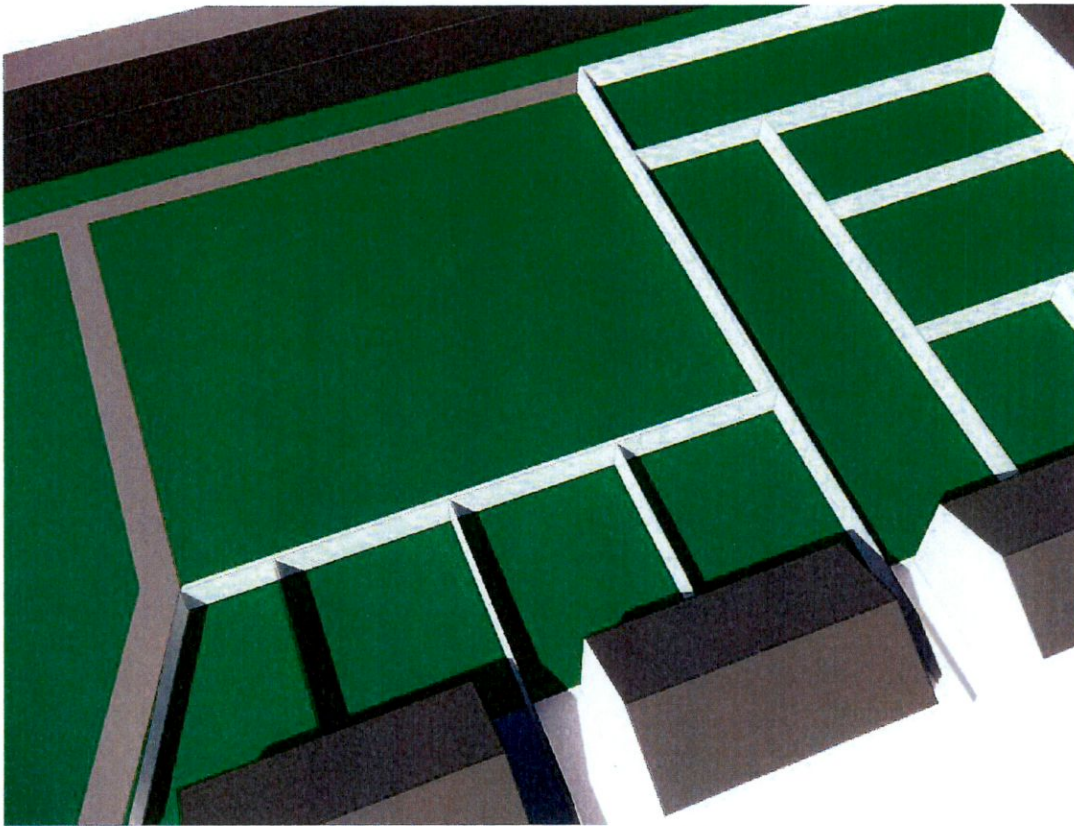
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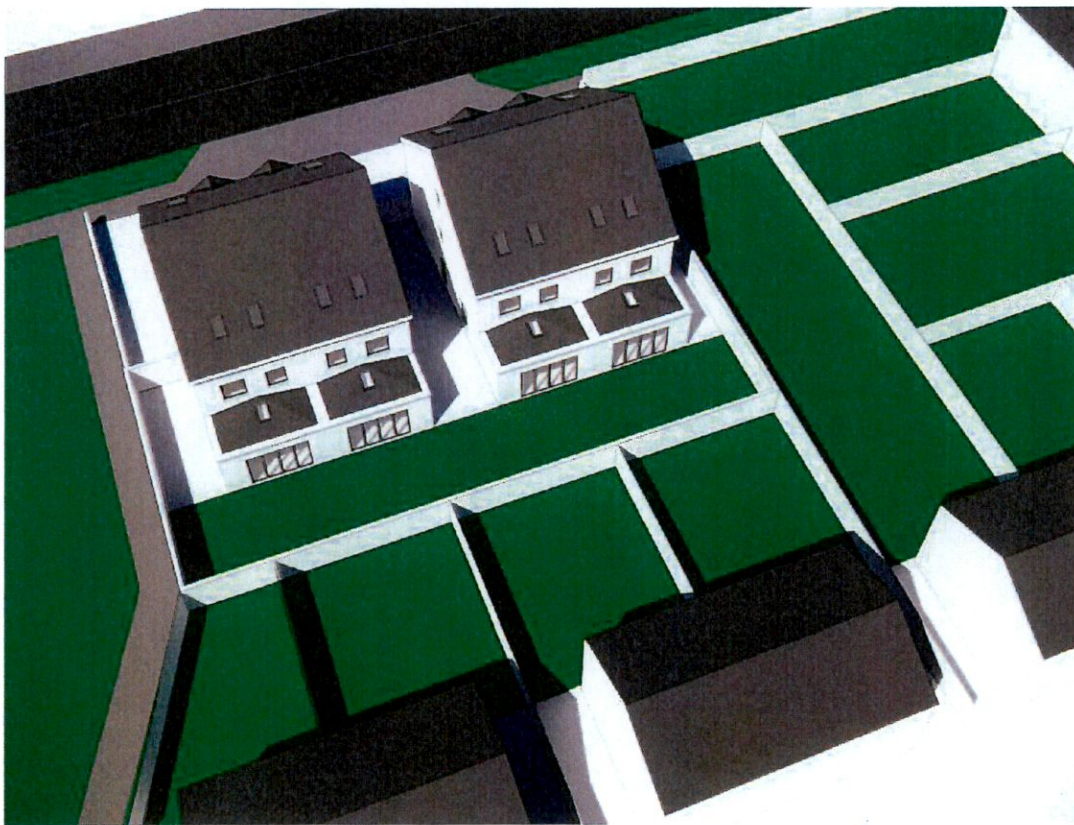
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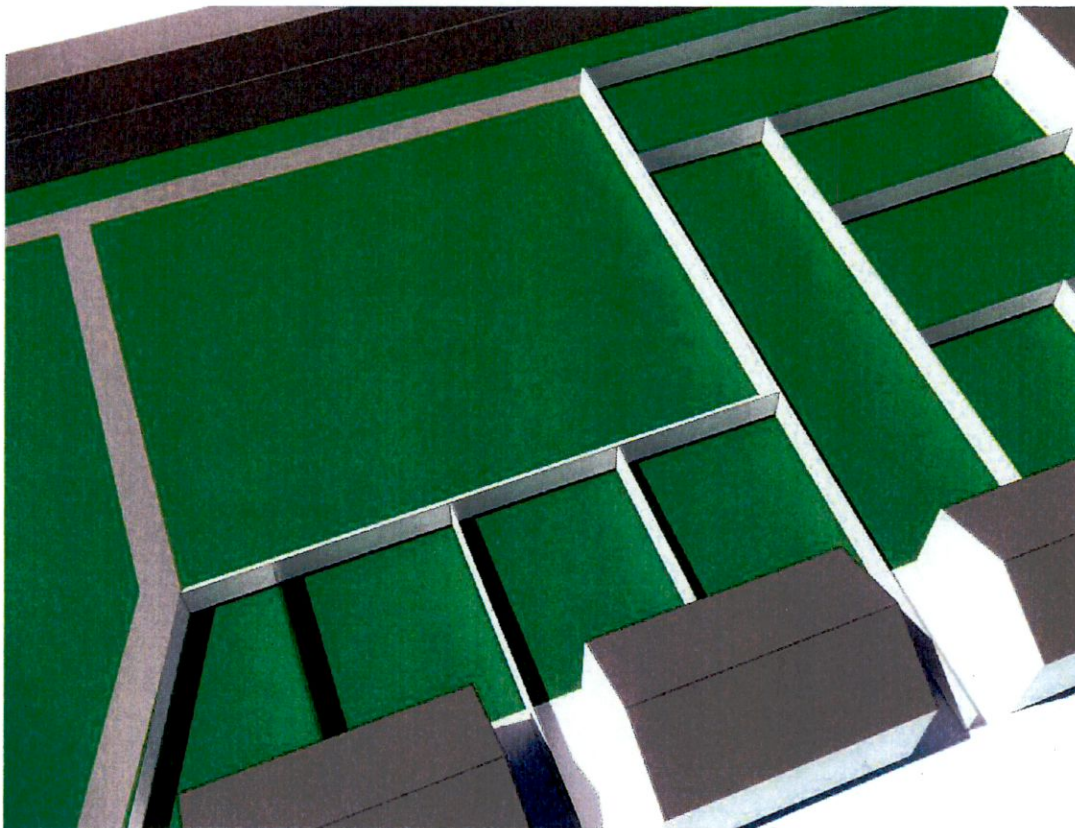
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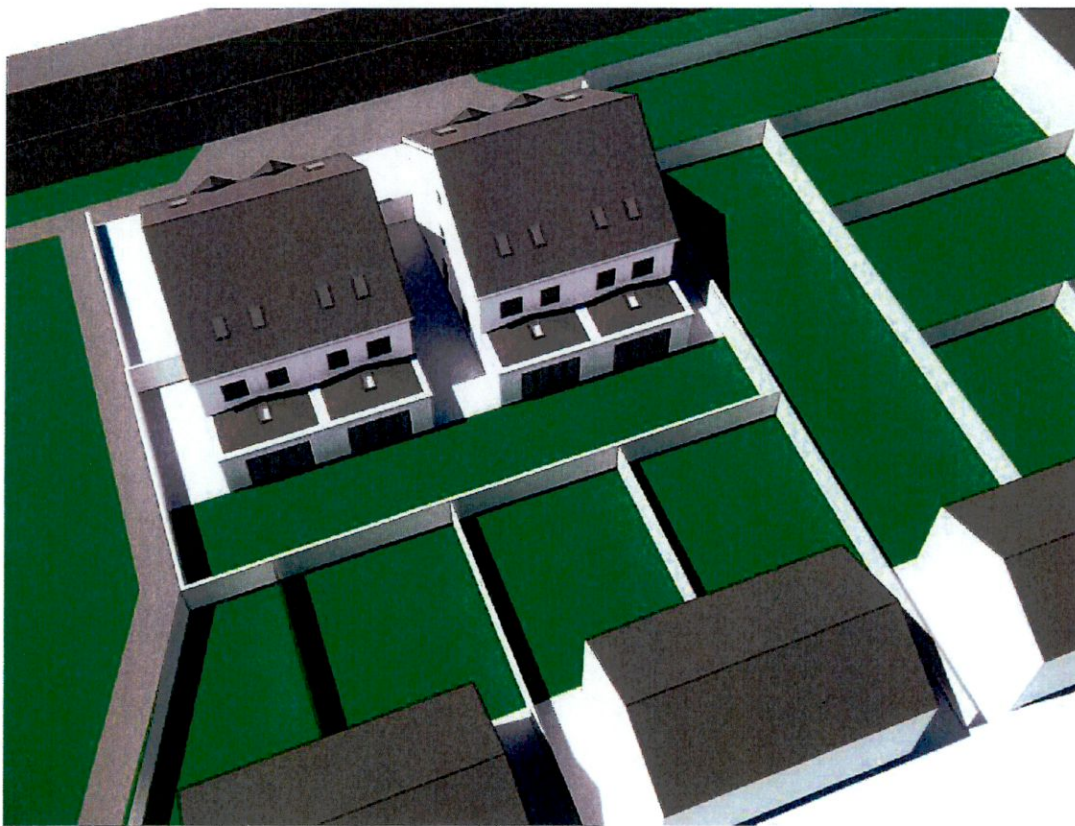
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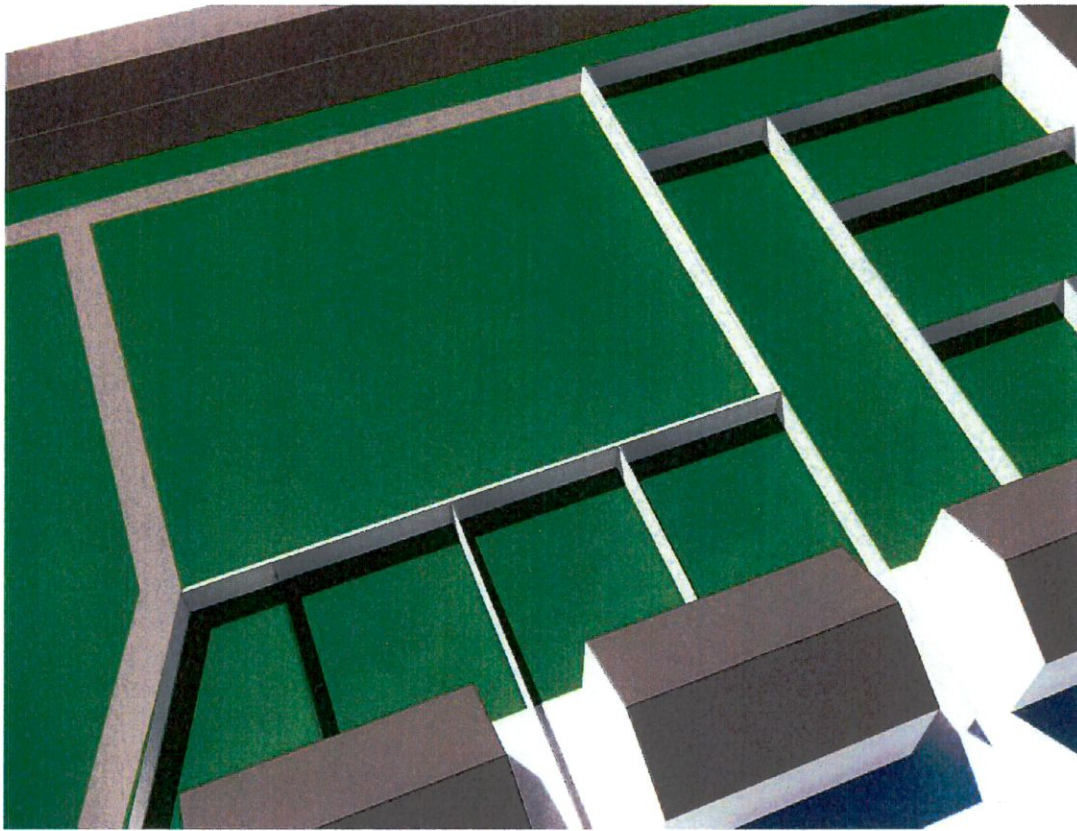
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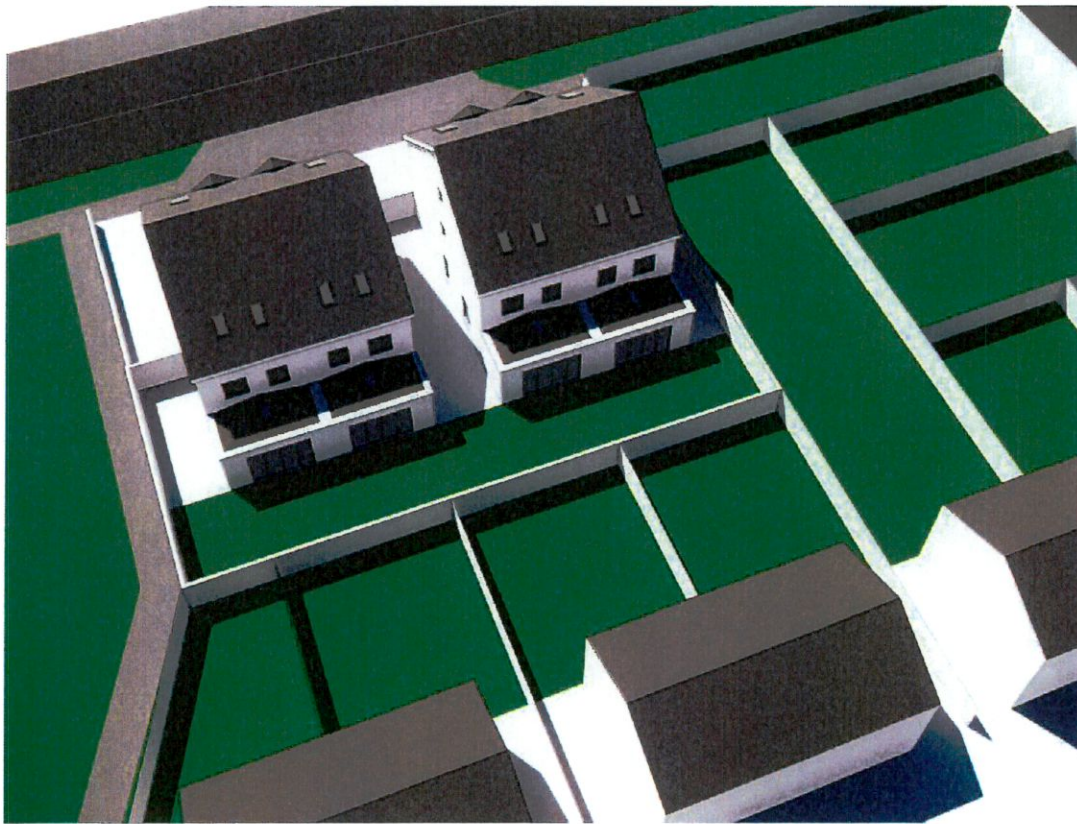
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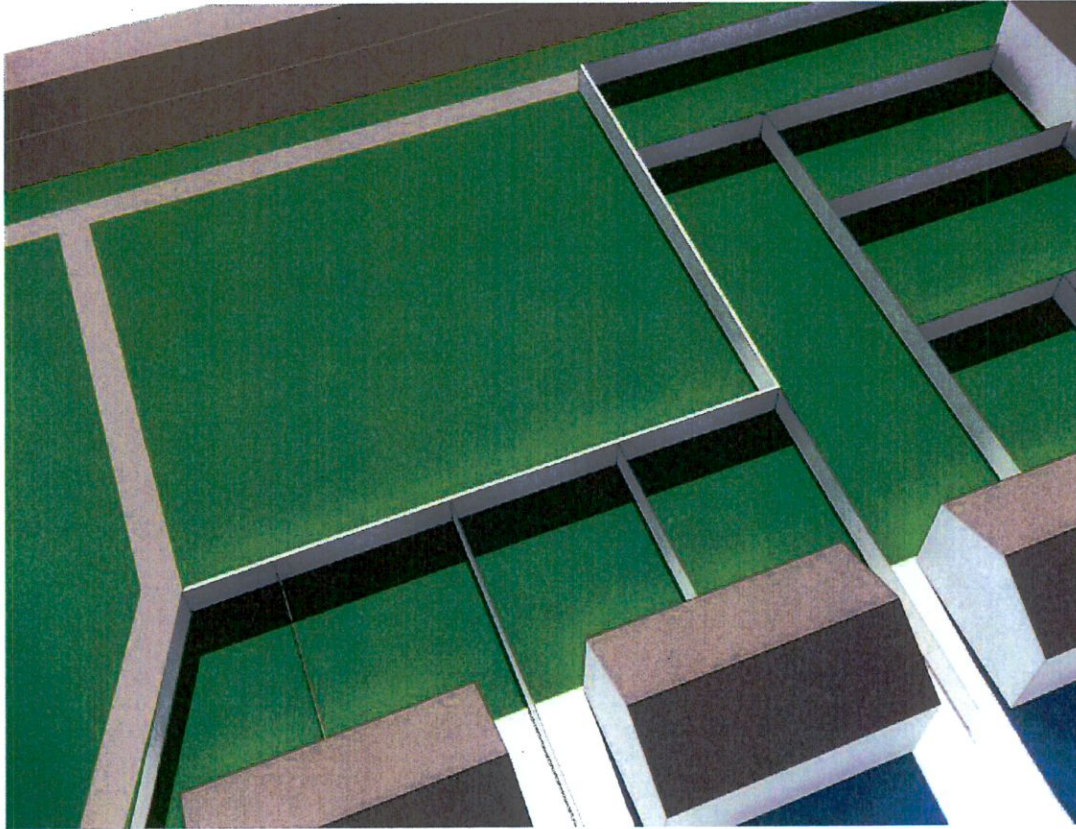
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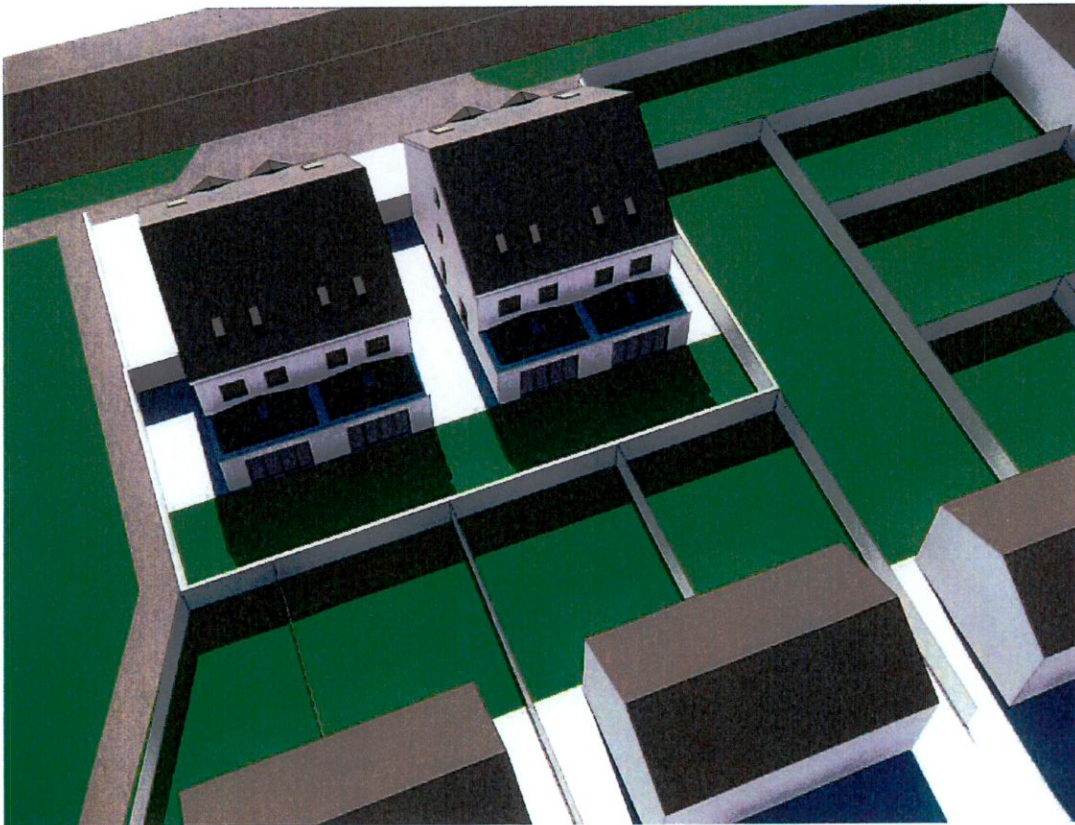
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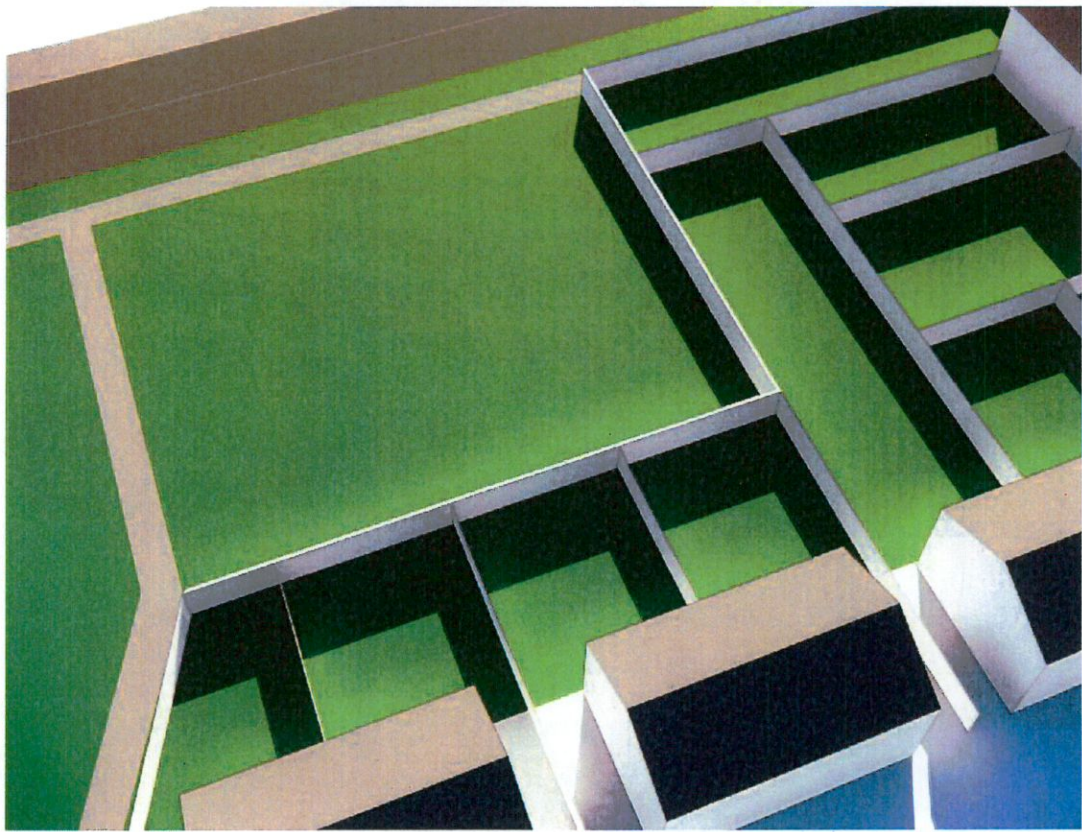
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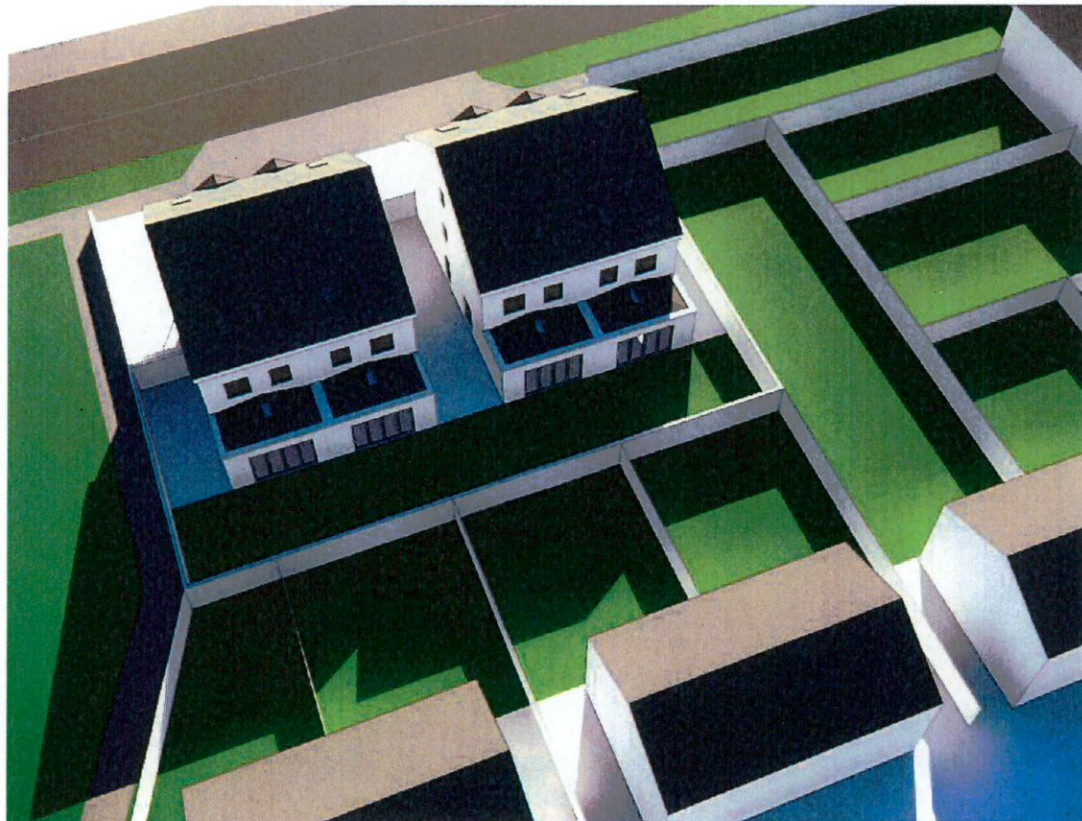
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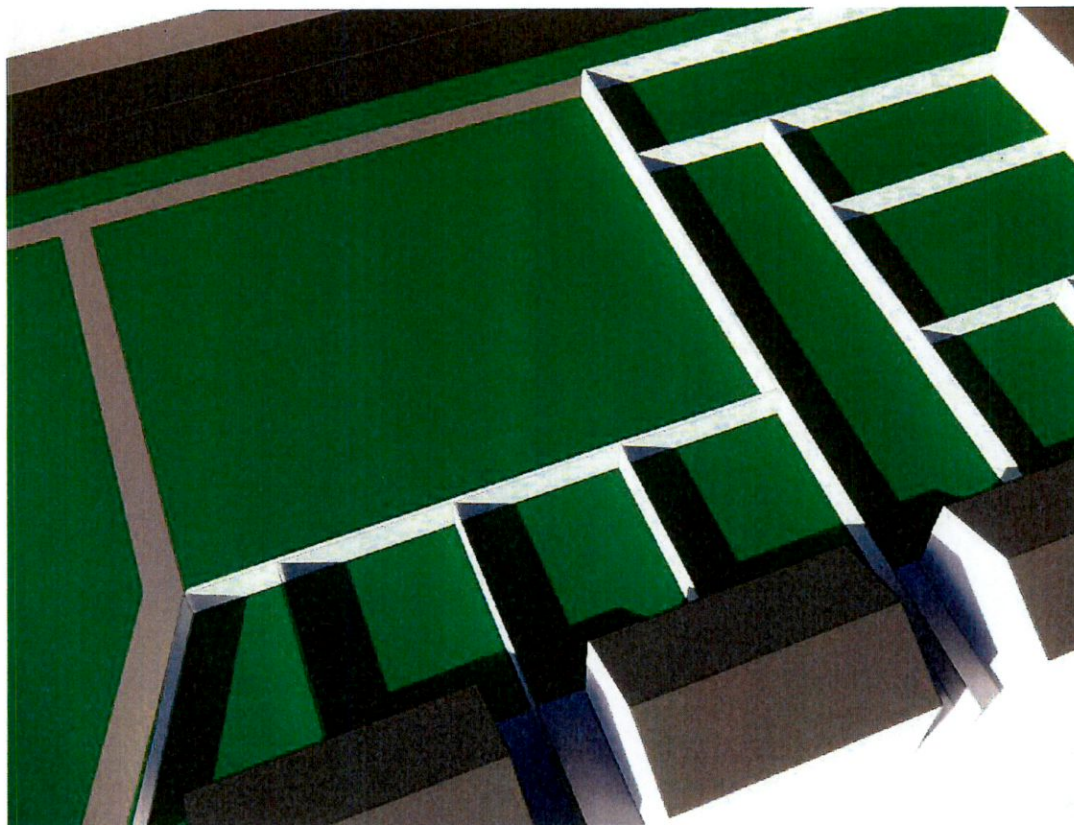
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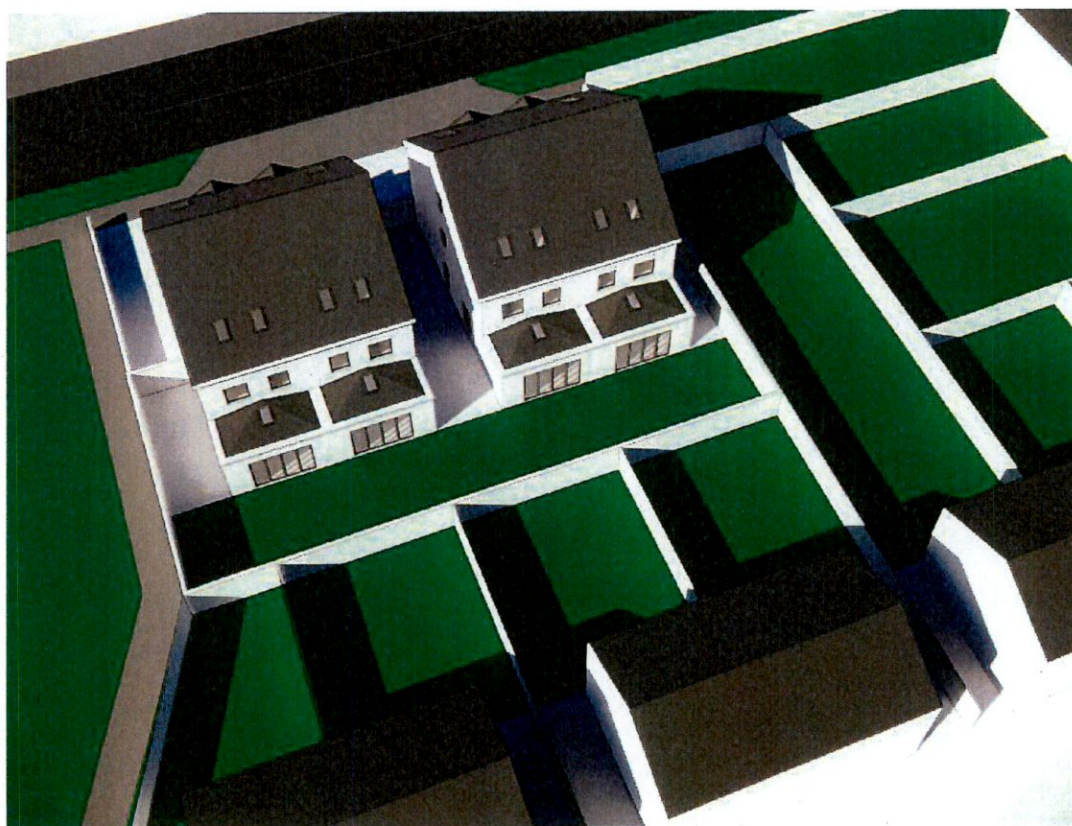
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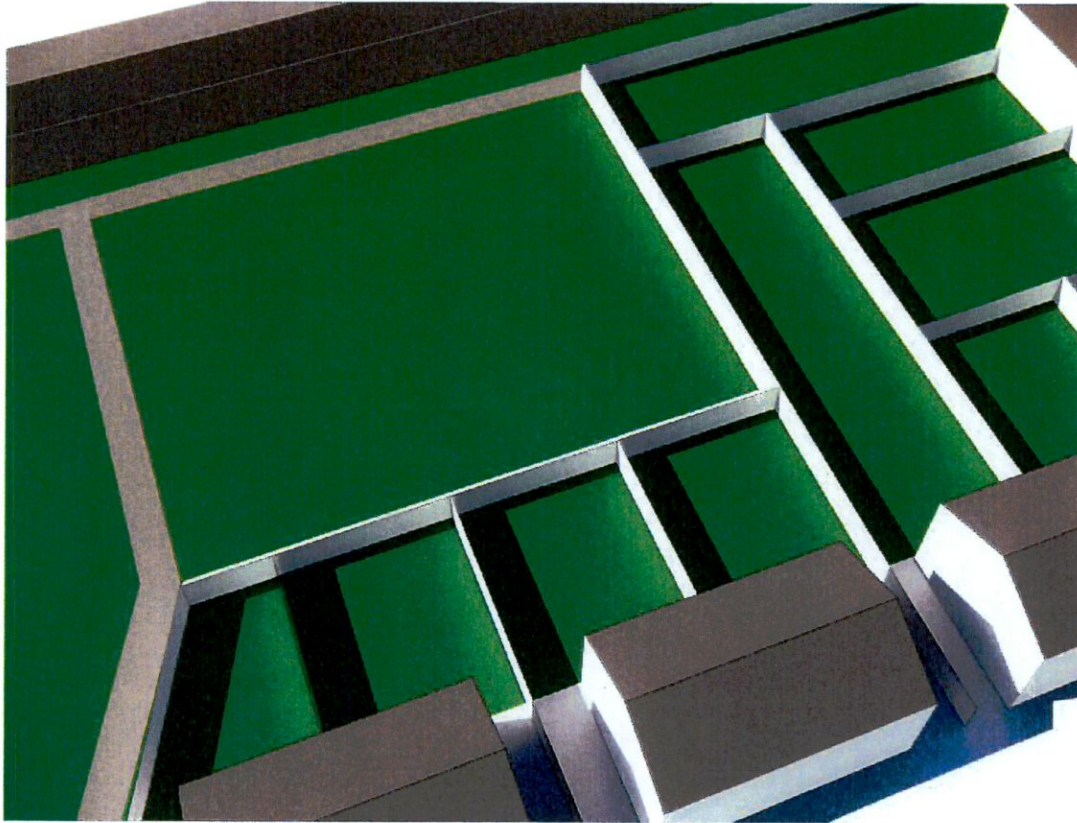
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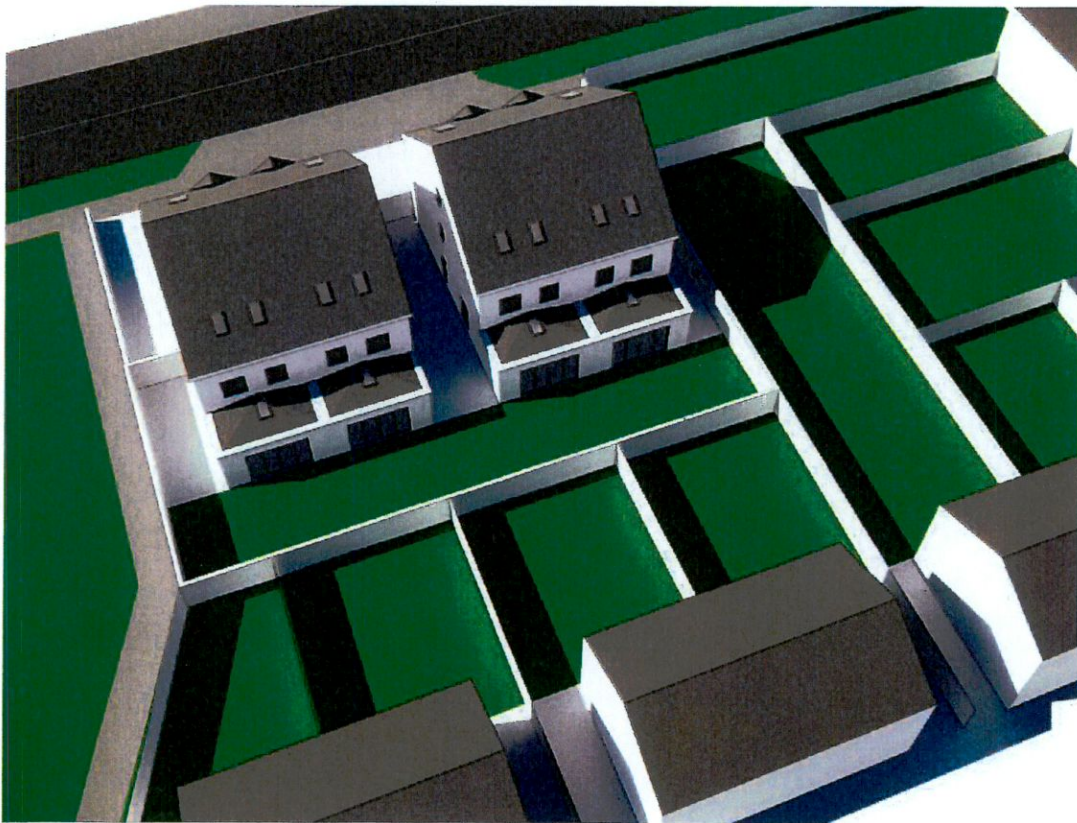
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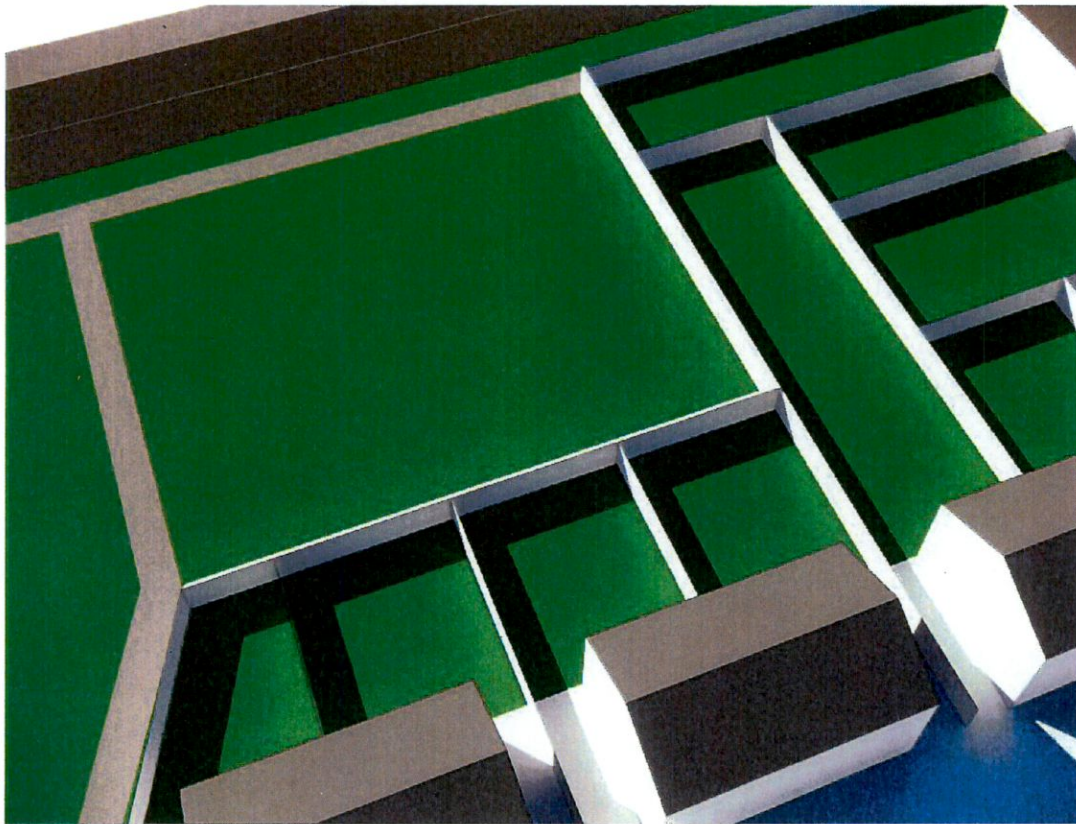
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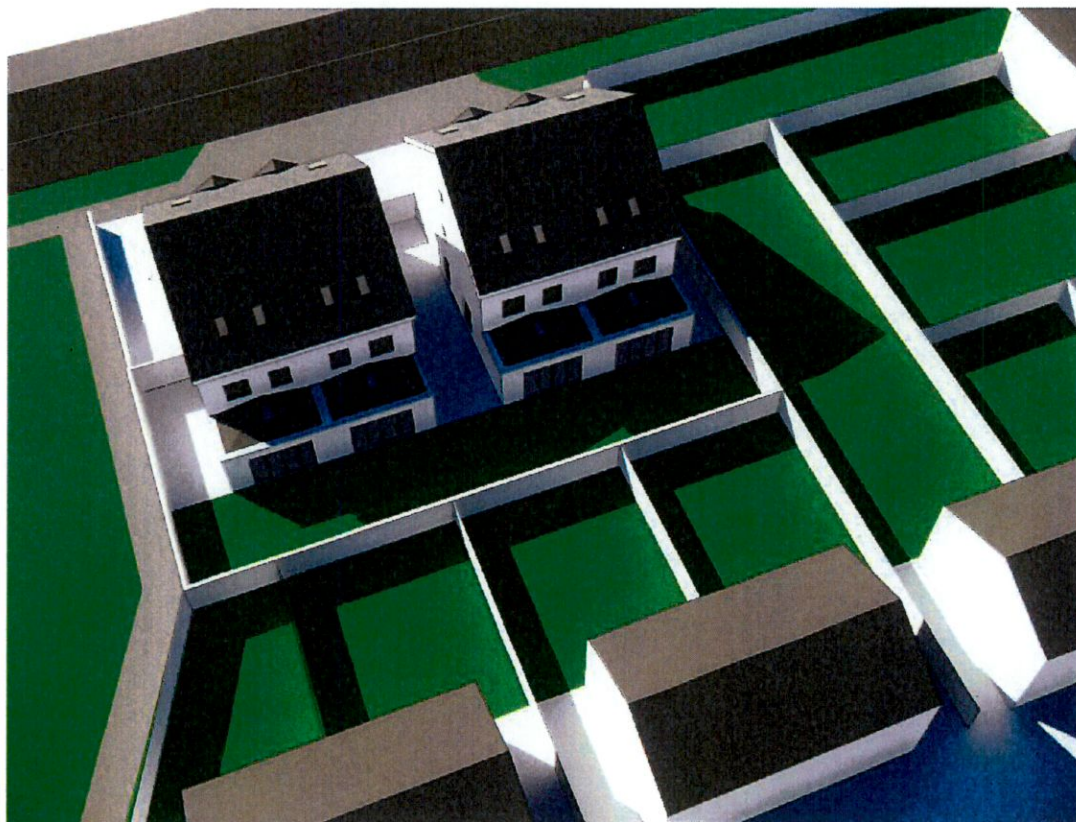
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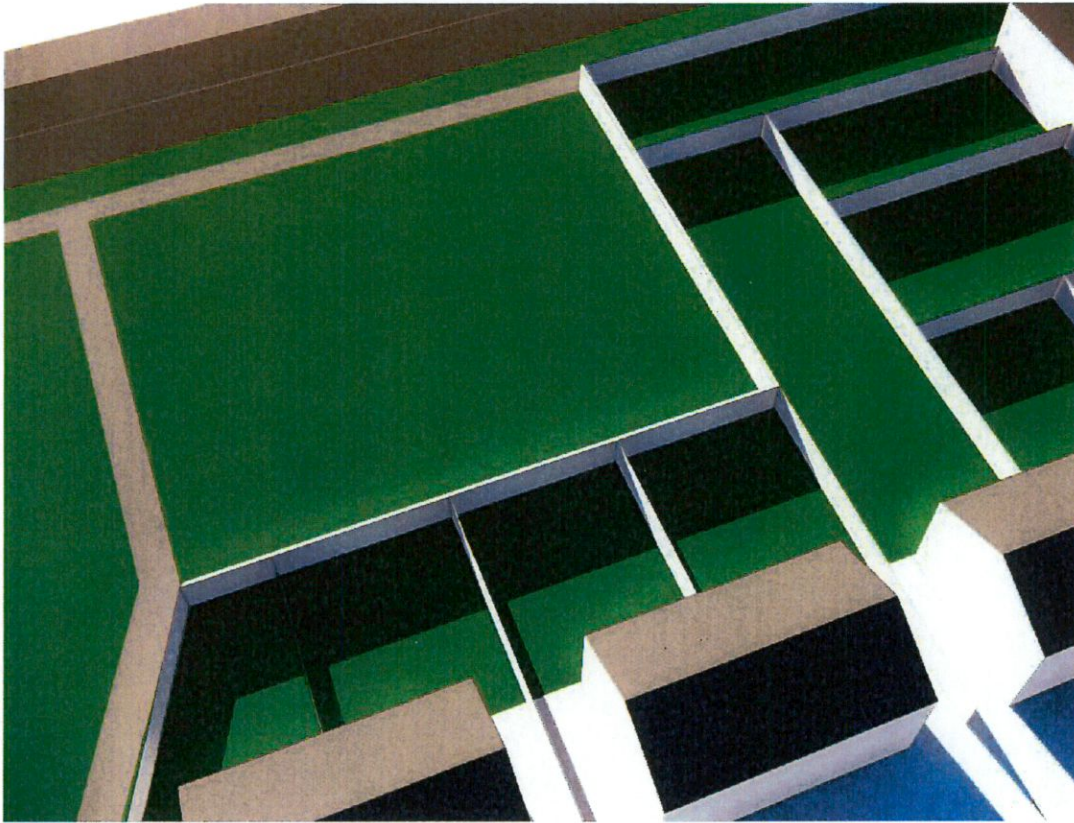
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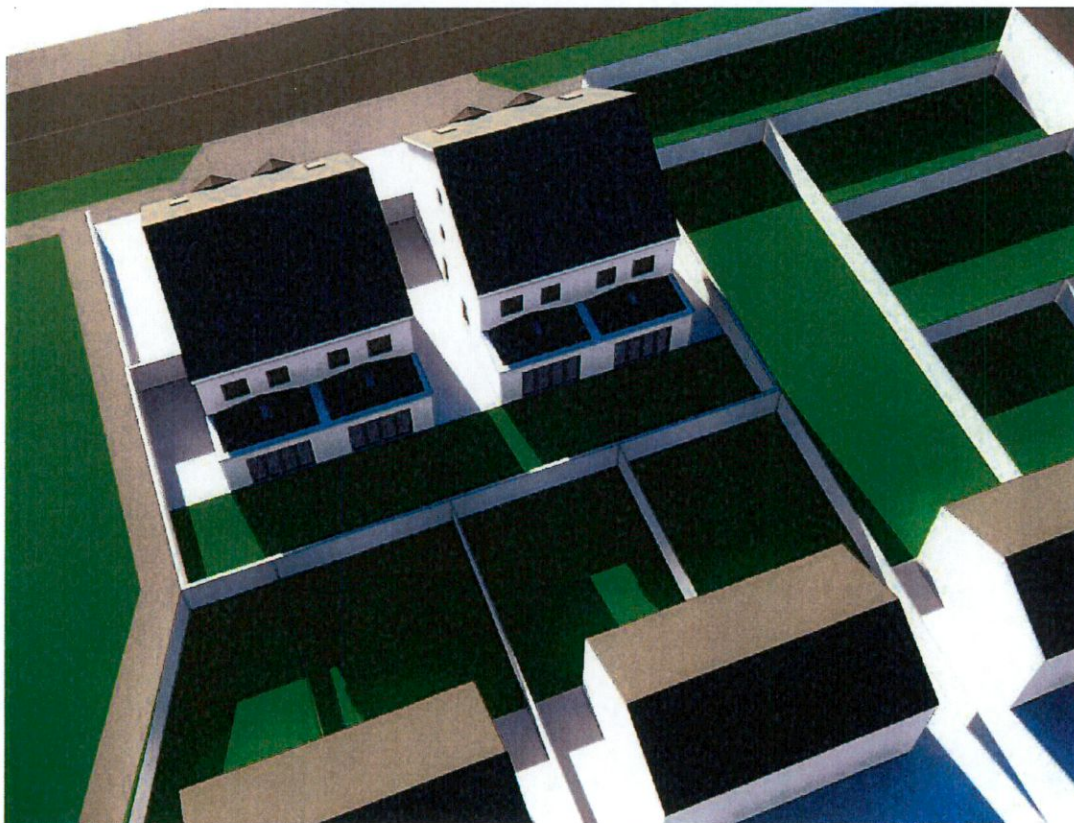
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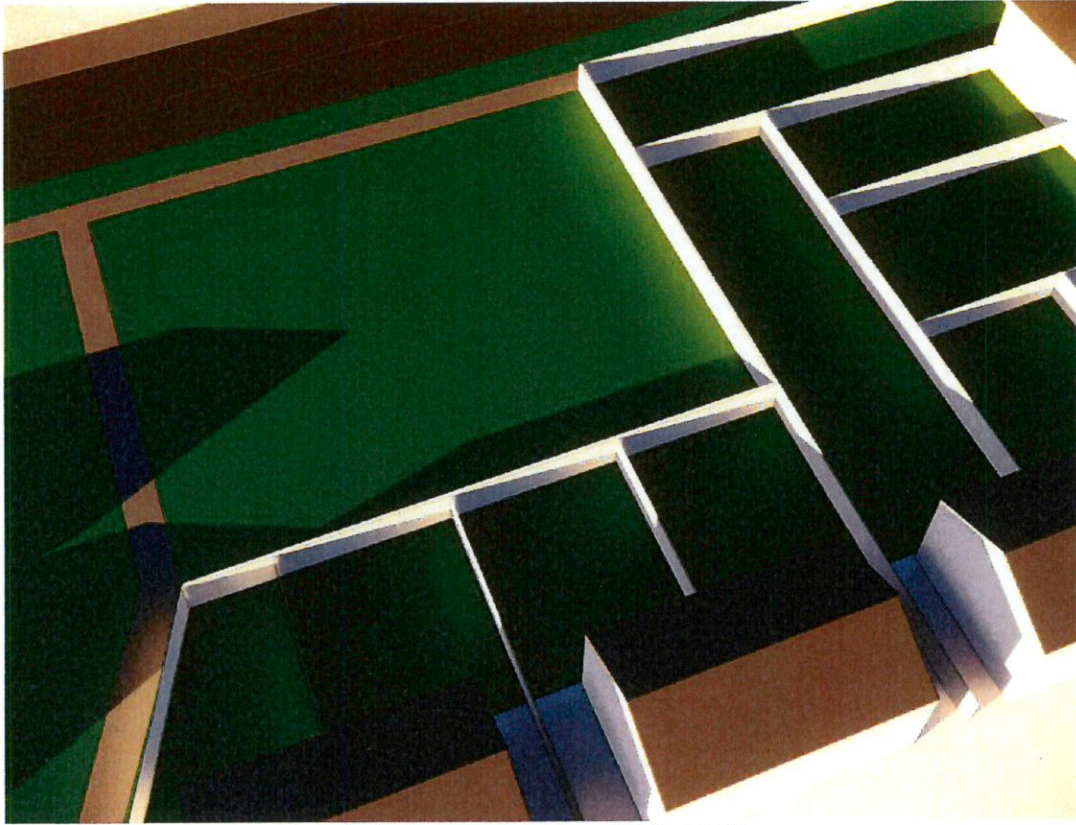
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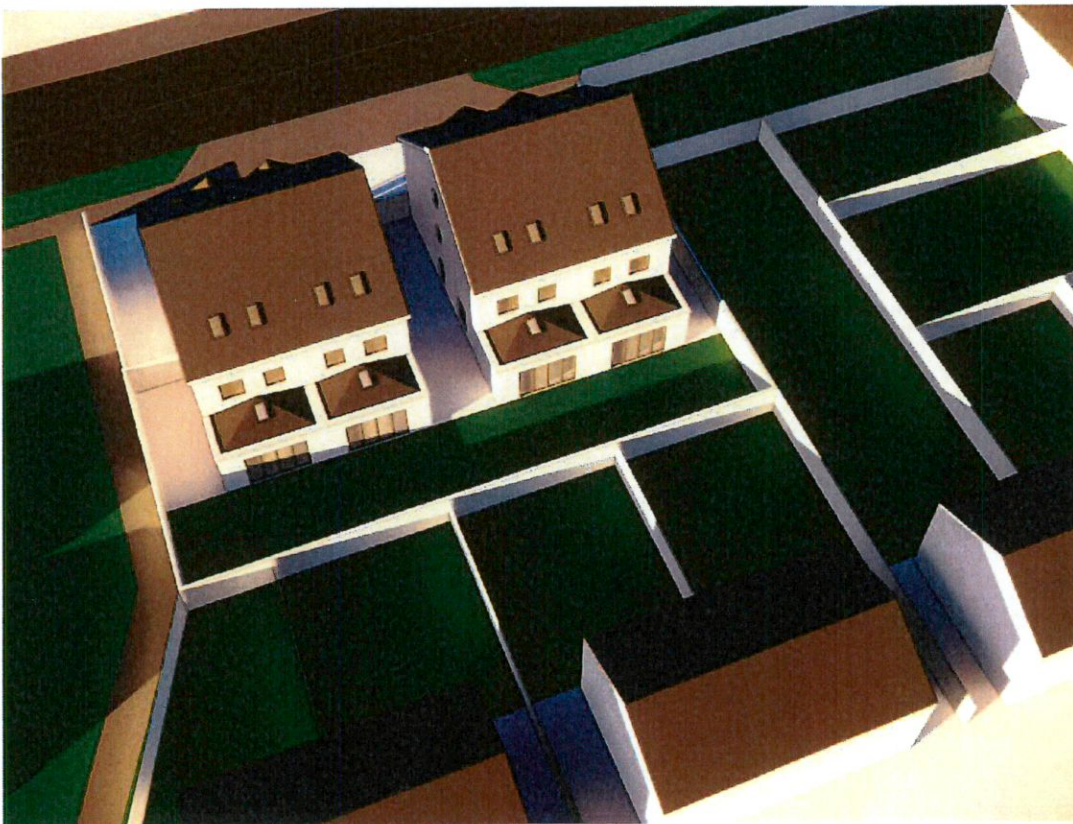
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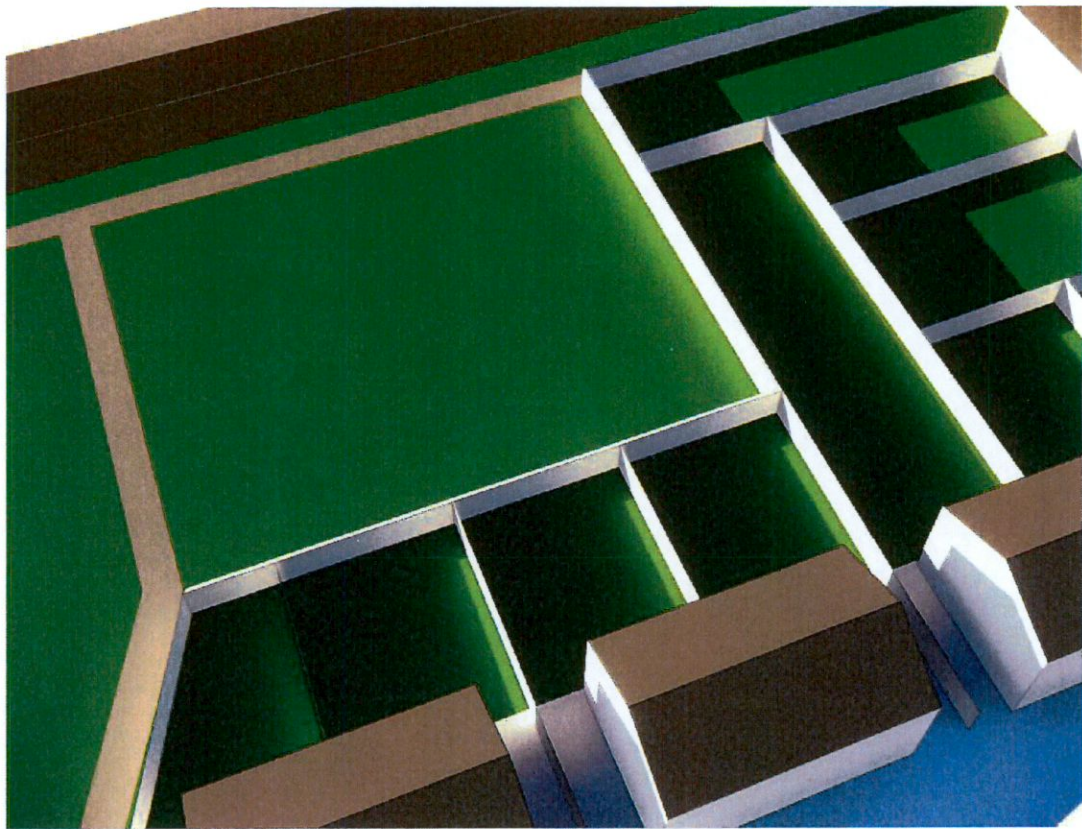
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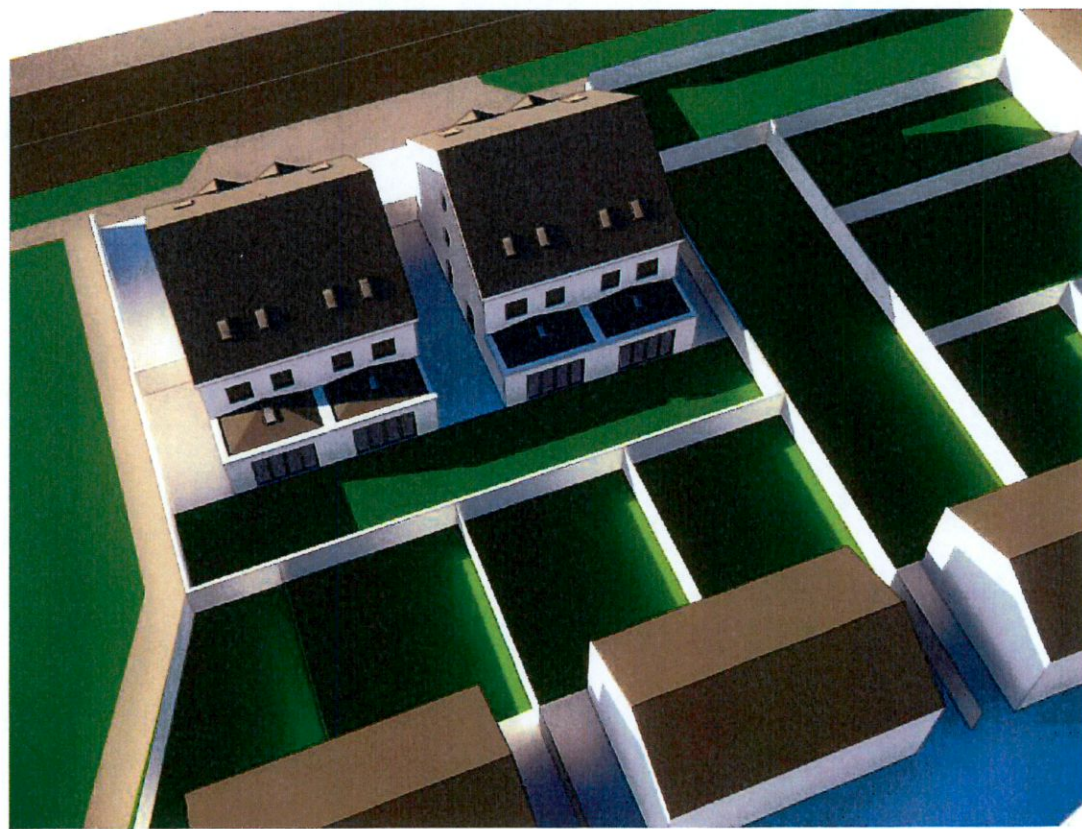
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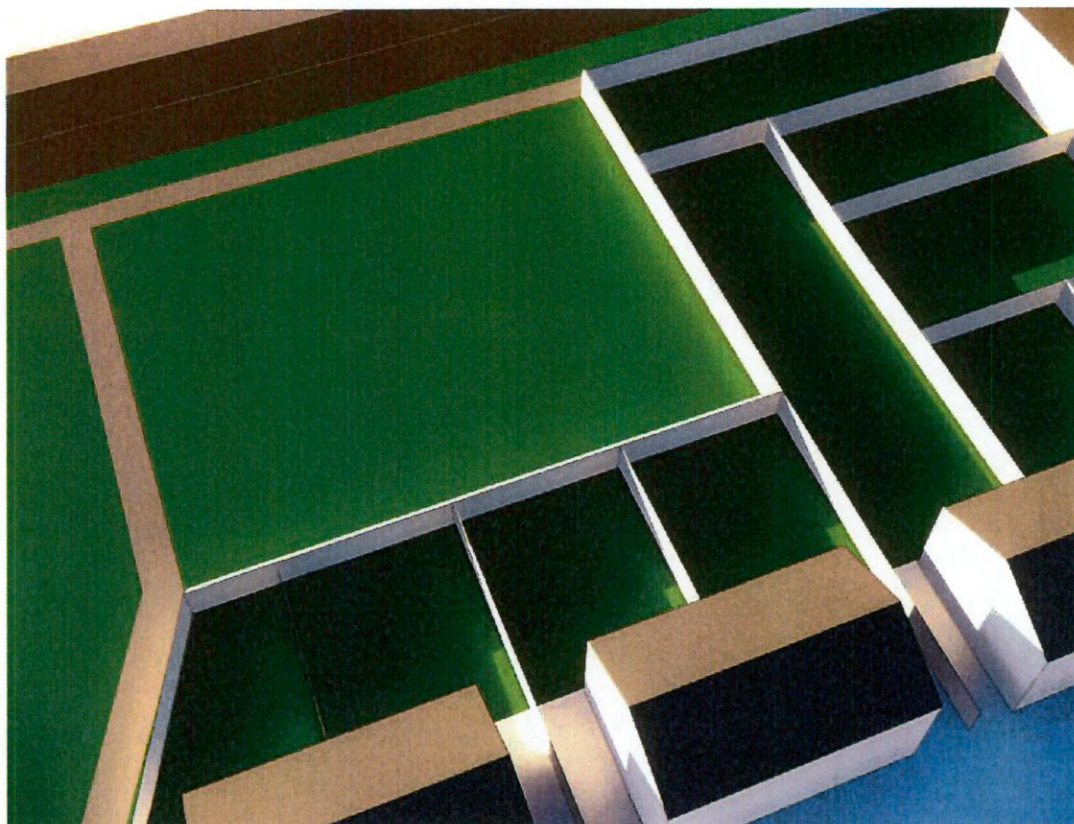
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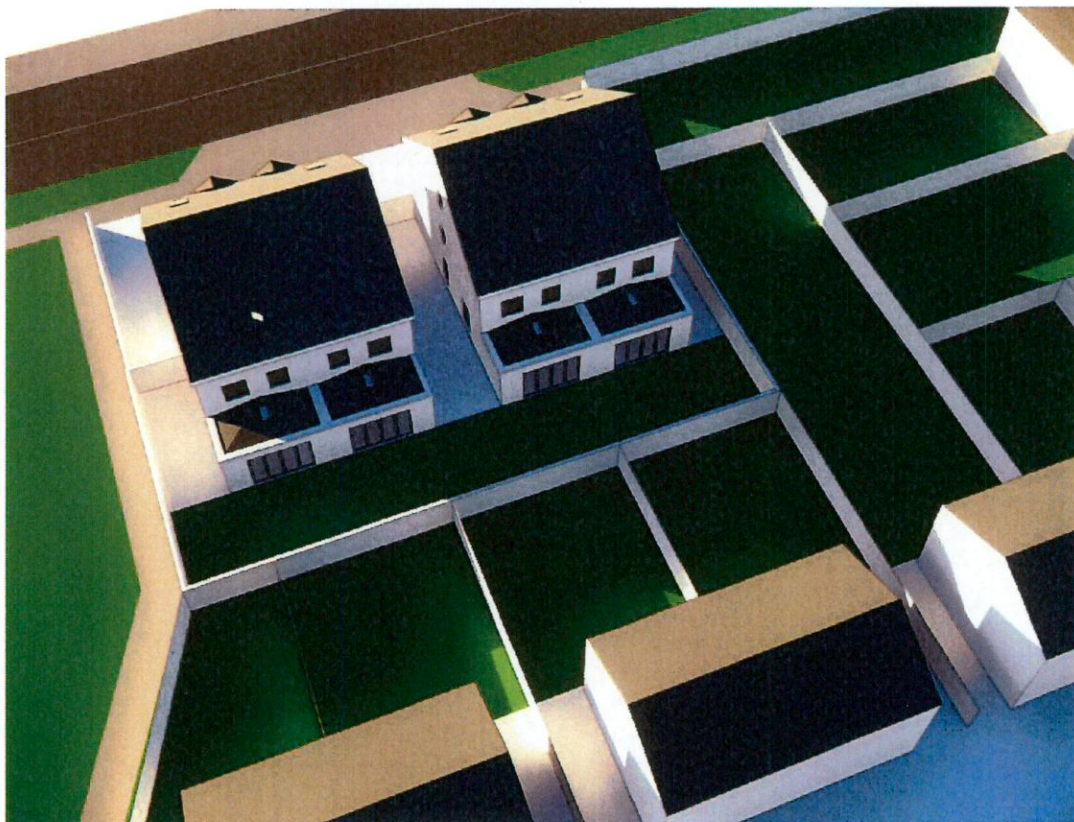
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Proposed: December 21st, 12:00



Existing: December 21st, 14:00



Proposed: December 21st, 14:00

5. Conclusion

Amenity Overshadowing

The BRE guideline requirement for amenity overshadowing is that at least 50% of an amenity area receives two hours on sunlight on March 21st. The analysis shows that all 10 no. rear garden areas analysed received the required level of sunlight thus conforming with the BRE guidelines for Amenity Overshadowing.

Vertical Sky Component (VSC)

Vertical Sky Component analysis was performed to investigate if windows of the adjacent dwellings facing the proposed development achieve 27% or failing that, do not reduce by more than 20% of the current value when the proposed development is completed. Of the 35 no. windows analysed all surpass the 27% level thus conforming with the BRE guidelines for Vertical Sky Component.

Overall Conclusion.

After conducting a comprehensive daylight and sunlight assessment of the proposed development using simulation modelling and comparing results achieved against the BRE Guide and BS recommended guidelines, the proposed development would not cause an unacceptable overshadowing impact on the neighbouring rear garden amenity spaces or loss of access to sky for the windows facing the proposed development.

