Date: 08/05/2025
Premises: 20/21 Hope Street LL11 1BG
Subject: Evaluation of upper floor space when comparing office to residential

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Background:

This report assess the forecasted water usage when considering the usage of the upper floor of 20/21 Hope Street. The report will determine the water calculations at the currently approved office usage & then determine and compare if there is an impact by change of use to residential. The residential occupancy will be based on planning application (1) P/2025/0073 and will see a conversion of the office space into x5 2 bedroom apartments.

Project overview
Location: Wrexham
Total residential units: x5 residential 2 bed apartments.
Estimated occupants x10

Part 1

Current Water demand at office configuration

At current use if refurbished back into usable office space then the potential occupancy level would be 63.

This is calculated through using the HSE guidance for office occupancy where there is a minimum of 11m3 (2) per person is given.

The floor space can be calculated from the architect and the following can be assumed for office space. This is based on the plans generated by the ordinance survey.

Floor	Area m2	Area m3*	Space PP	Total people
1	142.5	342	11	31.09
2*	102.5	246	11	22.36
3	46.2	110.88	11	10.08
Total	291.2	698.88	11	63.53

*Note: On floor 2 there is welfare facilities to include:

1) 4 cubical toilets & 4 basins
2) A kitchenette and break room which is 20m2

*Note: A ceiling height of 2.4m has been assumed to convert into cubic meters

HSE Welfare facility review

There are currently 4 toilets & 4 basins installed on floor 2. For (3) HSE guidance this meets the requirements of providing enough for 51 - 75 employees. When considering gender the toilets can be changed at the time to suit the employees

In order to provide welfare facilities, there is a 20m2 kitchenette and breakroom provisioned for break times, within the kitchenette there is a sink, tap and hot water ern.

From a safety standpoint, to accommodate the 63 people within the upper floors of the facility, there are two staircases. This includes one main one with access from the ground floor and a second one which is a fire escape and as such is only to be used in the event of an emergency.

Water usage calculations

Following industrial standards (4) South Staffs Water guidance, the assumption per person per office is 50 litres per day water usage. With the capacity assumption of 63 people within the office space the following can be calculated:

L/P/D	Occ	Total PD	WD	Total PA
50	63	3150	253	**796950**

Calculation:
South staffs water litres per person per day x occupancy = Total water per day
Total water per day x working days per year = Total water per year

50 litres x 63 people = 3,150 Litres per day

3,150 Litres x 253(5) working days per year = **796,950 litres per year**

Part 2

Residential area - assuming conversion into x5 2 bedroom apartments

The following assumptions are taken from a (6) water calculation used on a commercial to residential development.

From the current office welfare facilities & water calculation assessment the improvements are:

1) To include electric showers which use 6 litres per minute vs pressure showers which use 8-9 litres per minute
2) To upgrade the toilets from an old system which can use 13 litres per flush vs a dual flush which uses 6 litres per flush
3) No baths to be installed

	Unit	Cap./ flow	Use factor	Fixed use	Litres/ person/ day
Toilet - dual flush	Full flush	4	1.46		5.84
	Part flush	2.6	2.96		7.70
Taps (exc. kitchen)	Flow rate	8	1.58	1.58	14.22
Electric shower only	Flow rate	6	7		42.00
Kitchen sink taps	Flow rate	8	0.44	10.36	13.88
Washing machine	Litres	8.17	2.1		17.16
Dishwasher	Litres	1.25	3.6		4.50
				Total PP	Litres
				Per day	105.293
				PA*	**38431.95**

*Note: PA assumes 365 days per year

See table below demand PA for all x5 apartments assuming 2 occupants each

	L/P/D	Res.	x5 Flats day use	x5 Flates PA
Toilet - dual flush	5.84	10	58.4	21316
	7.70	10	76.96	28090.4
Taps (exc. kitchen)	14.22	10	142.2	51903
Electric shower only	42.00	10	420	153300
Kitchen sink taps	13.88	10	138.8	50662
Washing machine	17.16	10	171.57	62623.05
Dishwasher	4.50	10	45	16425
		Total	**1052.93**	**384319**

Part 3
Comparison & summary

Option	Occ.	PA Usage	Max	
Office space	63	796950	796950	
Residential	10	384319	456250	*Max assumes 125 litres/ person/ day
	Saving	412631	340700	

As can be seen above based on comparing industry standards by converting the office space into residential space a water saving can be given. This would support the workstream that NRW is pursuing.

With the current office configuration there is the potential it could generate up to 796,950 litres of waste per year based on South water guidance of 50 litres per person per day & HSE office space allowance which accommodates 63 people.
This is in comparison to 384,319 litres per year which assumes once the space is converted the 5 apartments will accommodate 2 people each. The water calculations are taken from a previous development within Wrexham City centre and use water saving systems where possible.

Forecasted Saving = 412,631 litres PA

As an additional part for the residential calculation, in order to incorporate a worst case scenario and to use recognised industry standard, assuming that the maximum residential amount of 125 litres per person per day is used for building control requirements then 456,250 litres is used. This is still a saving when compared to the office utilization.

Industry recognised saving = 340,700 litres PA

From this report it concludes that the residential option is the leader when considering water consumption at the property.

Part 4
Sources

(1) WCBC Planning portal - application P/2025/0073
    (a) Residential floor plans can be seen within application
    (b) Ordinance survey see attached
(2) HSE office space per person - https://www.hse.gov.uk/contact/faqs/roomspace.htm
(3) HSE welfare requirements - https://www.hse.gov.uk/pubns/indg293.pdf
(4) South staffs water. See attachment - waterusebusiness.pdf
(5) Days worked per year UK - https://timetastic.co.uk/blog/how-many-working-days-are-in-a-year/
(6) PB water calc. See attachment - 58A Hope street Wrexham part G