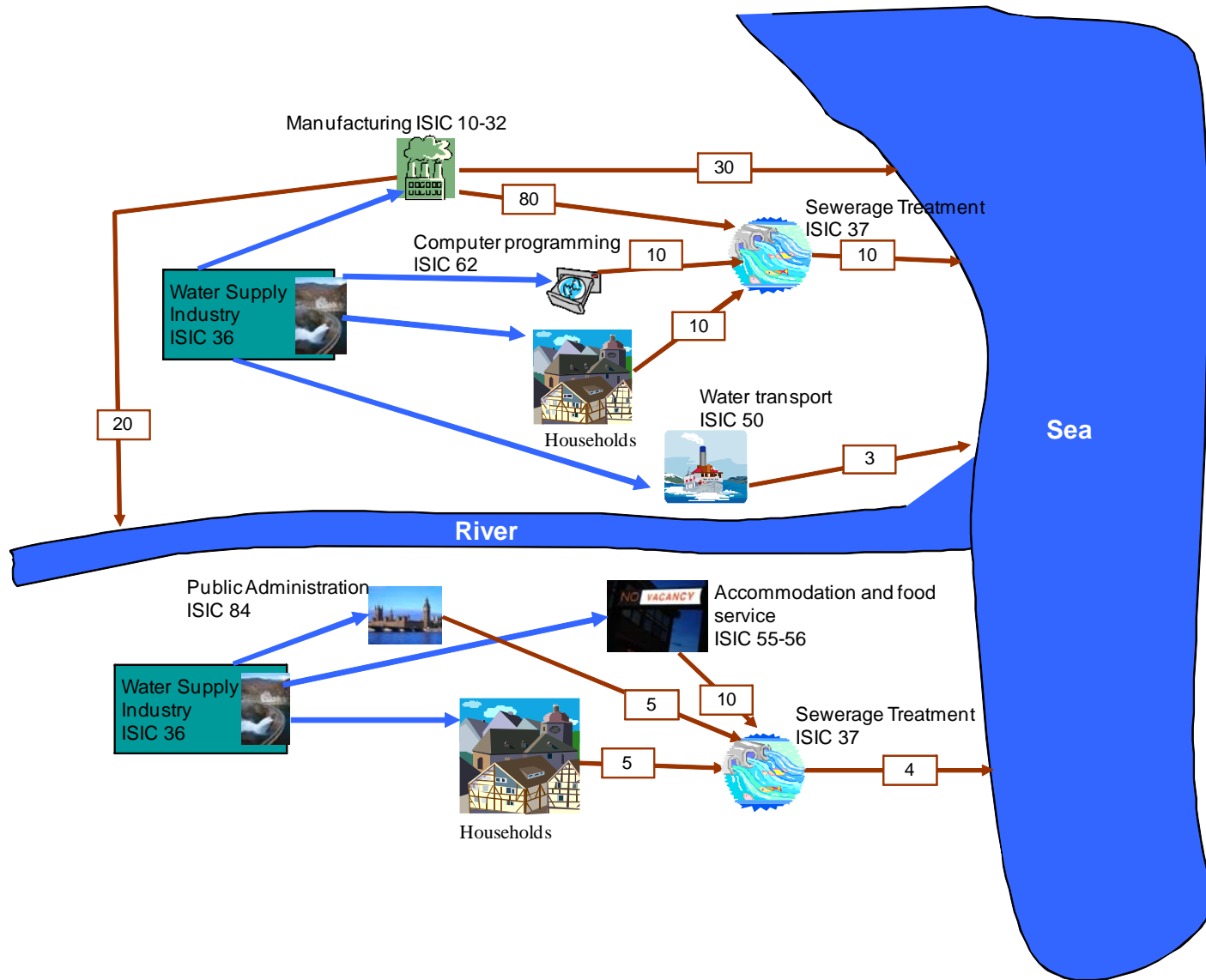


**Final emissions \_ Exercise \_ Answers**  
 Capital Harbor Emissions of Pollutant “x”



## ANSWERS FOR CAPITAL HARBOR

Pollutant	Industries (by ISIC categories)										Total Industry Households	Rest of the world	Total
	1 to 9	10 to 32	35	36	37	50	55-56	62	84	Total Industry Households			
1. Gross emissions (= a + b)	0	130	0	0	0	3	10	10	5	158	15	0	173
1.a. Direct emissions to water (= 1.a.1 + 1.a.2 = 1.a.i + 1.a.ii)	0	50	0	0	0	3	0	0	0	53	0	0	53
1.a.1. Without treatment		50				3				53			53
1.a.2. After on-site treatment										0			0
1.a.i. To water resources		20								20			20
1.a.ii. To the sea		30				3				33			33
1.b. To Sewerage (ISIC 37)	0	80	0	0	0	0	10	10	5	105	15		120
2. Reallocation of emission by ISIC 37	0	8	0	0	0	0	2	1	1	12	2	0	14
3. Net emissions (= 1.a + 2)	0	58	0	0	0	3	2	1	1	65	2	0	67

Physical units

Pollutant	ISIC 37
<b>4. Emissions to water (=4.a + 4.b)</b>	<b>14</b>
4.a. After treatment	14
To water resources	
To the sea	14
4.b.. Without treatment	
To water resources	
To the sea	

## NOTES TO ANSWERS.

### **Multiple locations of industry and households**

Household are located in two parts of the city and you need to add their gross emissions together (i.e.  $10+5=15$ )

### **Reallocation of emissions by ISIC 37.**

Reallocation of emissions by sewerage treatment plants (ISIC 37) to industry, necessary for calculating net emission needs to be calculated for each treatment plant. This is done using the abatement rate specific to each plant.

The plant in the top half of the city has an abatement rate of 0.1, which is derived by  $10/(80+10+10)$ . The 10 in the numerator is the amount emitted by ISIC 37, while the 80, 10 and 10 in the denominator are from ISIC 10-32, ISIC 62 and households, respectively.

Therefore in the reallocation the emissions by ISIC 37 you need to multiply the emissions by industry and households to this plant by 0.1. For ISIC 10-32 this is  $80*0.1=8$ , for ISIC 62 this  $10*0.1=1$  and for households it is  $10*0.1=1$  (as households are also located in the lower half of the city you need to add the emissions by households from the other sewerage treatment plant.

The other sewerage treat plant (found in the lower half of the city has a global abatement rate of 0.2. The sum here is  $4/(5+5+10)$ . Here the net emissions of households are:  $5*0.2=1$ ; for ISIC 55-56 are  $10*0.2=2$ ; and for ISIC 84 are  $5*0.2=1$ .

### **Emission direct to environment**

2 industries release emissions directly to the environment. They are: ISIC 10-32 (50 units, 30 to sea and 20 to water resource; and ISIC 50 (3 units all to sea).

### **Emissions by ISIC 37**

There are no gross emissions by ISIC 37.