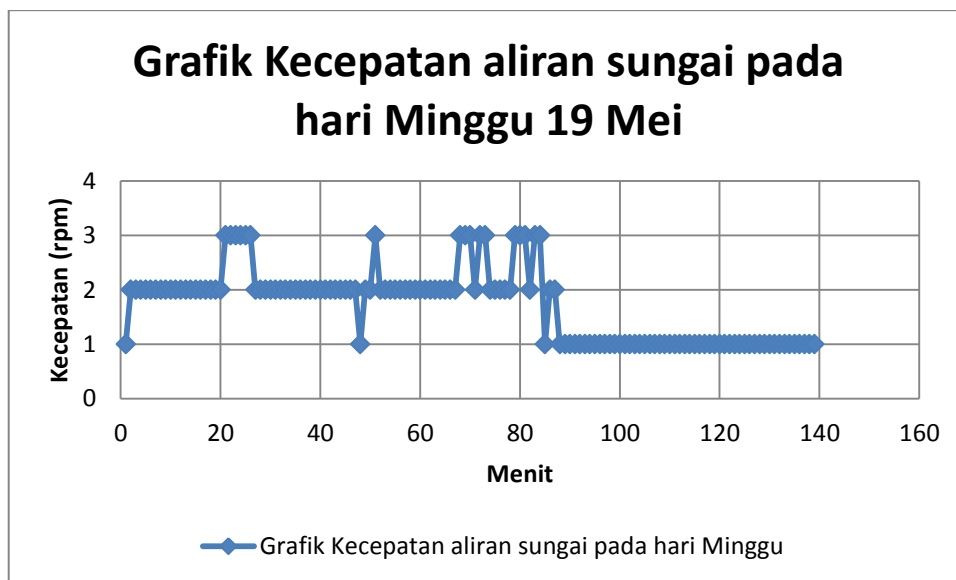


# LAMPIRAN

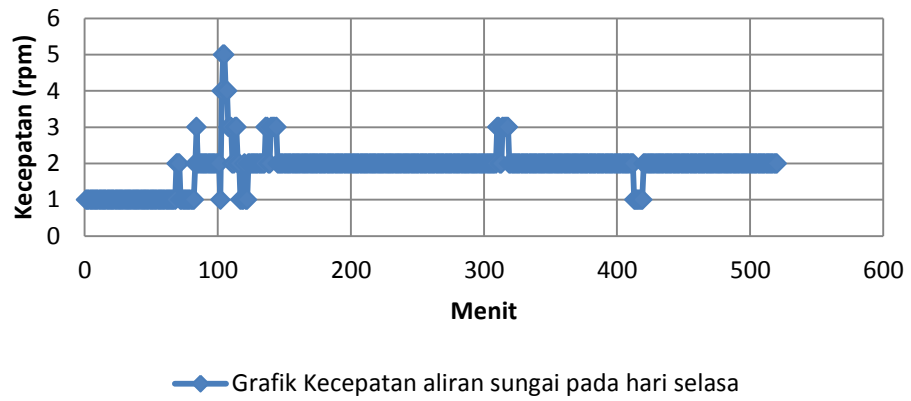
Lampiran 1. ALMAS (ALAT MONITORING ALIRAN ARUS SUNGAI)  
UNTUK PLTMH BERBASIS IoT DENGAN ARDUINO



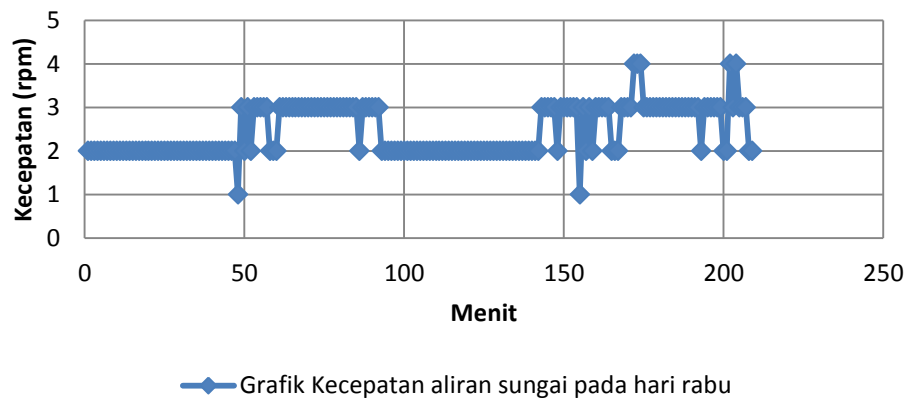
Lampiran 2. Grafik data percobaan kecepatan selama 6 hari



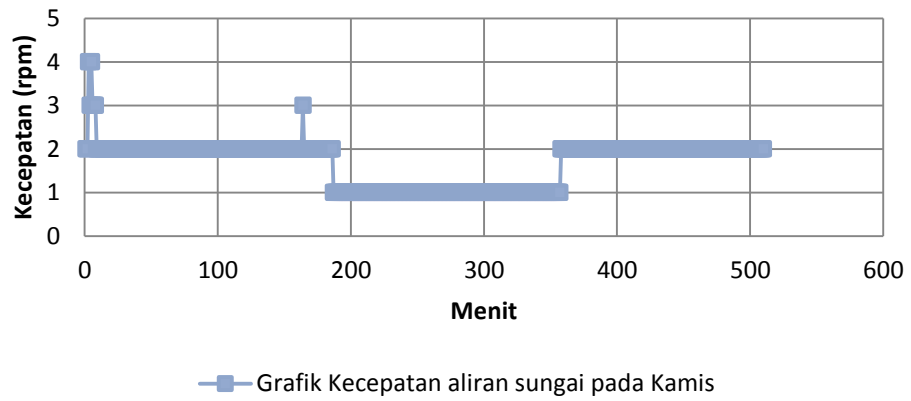
**Grafik Kecepatan aliran sungai pada hari Selasa 21 Mei**



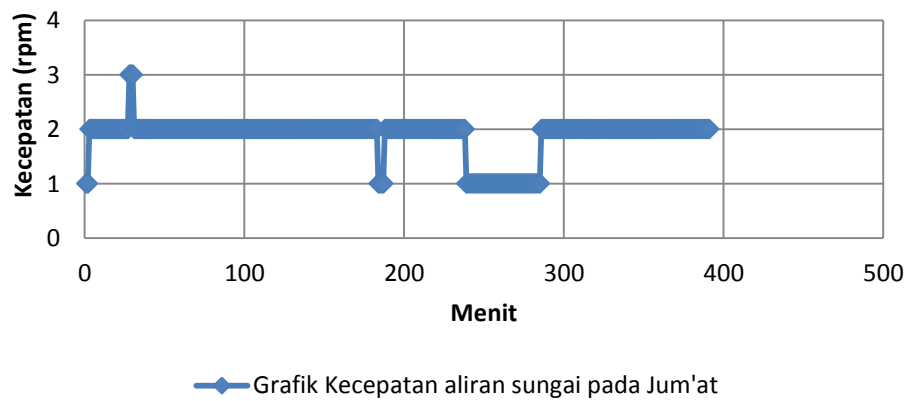
**Grafik Kecepatan aliran sungai pada hari Rabu 22 Mei**

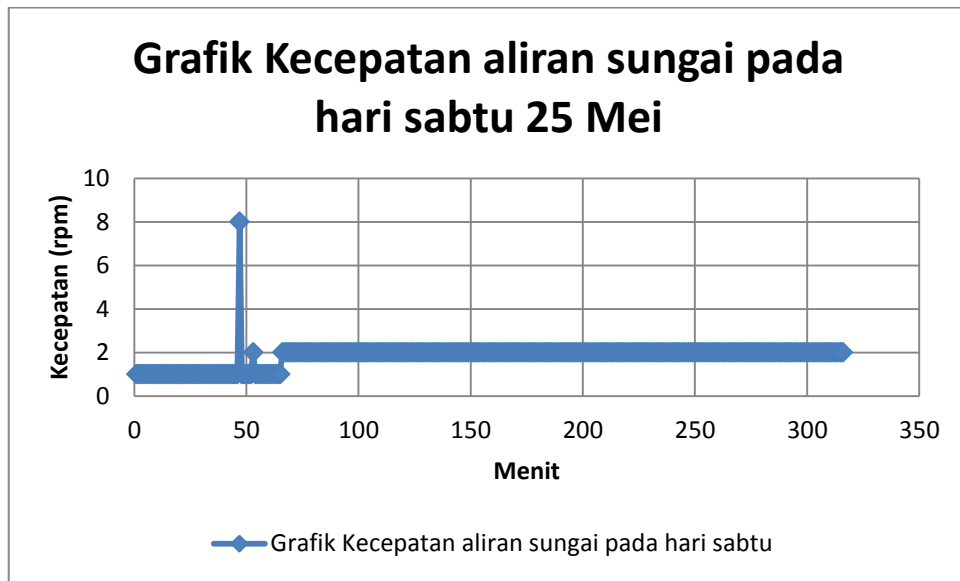


**Grafik Kecepatan aliran sungai pada hari Kamis 23 Mei**

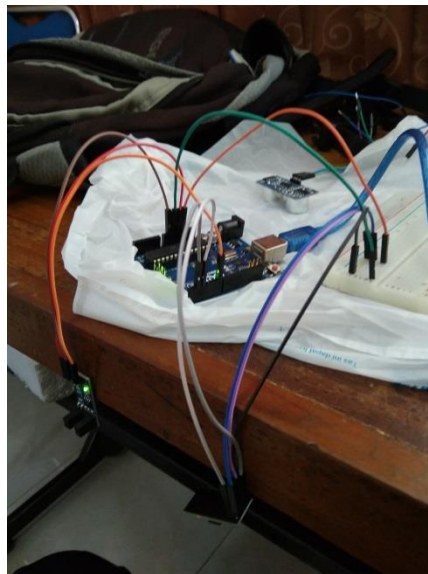


**Grafik Kecepatan aliran sungai pada hari Jum'at 24 Mei**





Lampiran 3. Proses perencanaan rangkaian dan program Arduino



Lampiran 4. Program Arduino R3:

```
#include <SoftwareSerial.h>
```

```
#define RX 2
```

```
#define TX 3
```

```
#define trigPin 5
```

```
#define echoPin 4

int pin_counter = 7;

String AP = "free hotsp";// CHANGE ME

String PASS = "satusampai9"; // CHANGE ME

String API = "OU6Y7291ILMLKKJ0"; // CHANGE ME

String HOST = "api.thingspeak.com";

String PORT = "80";

String field1 = "field1";

String field2 = "field2";

int countTrueCommand;

int countTimeCommand;

boolean found = false;

SoftwareSerial esp8266(RX,TX);

int counter = 0;

int kondisi_sekarang =0;

int kondisi_tadi =0;

int timer;

long rpm=0;

int x,y;
```

```

void setup() {

  pinMode(pin_counter, INPUT);

  pinMode(trigPin, OUTPUT);

  pinMode(echoPin, INPUT);

  Serial.begin(9600);

  esp8266.begin(115200);

  sendCommand("AT",5,"OK");

  sendCommand("AT+CWMODE=1",5,"OK");

  sendCommand("AT+CWJAP=\""+ AP +"\", \""+ PASS +"\"",20,"OK");

}

```

```

void loop() {

  //sensor kecepatan

  millis();

  x= millis()/1000;

  if (digitalRead(pin_counter)==HIGH)

  {

    kondisi_sekarang = 1;

```

```
}  
  
else  
  
{  
  
    kondisi_sekarang= 0;  
  
}  
  
if(kondisi_sekarang!=kondisi_tadi)  
  
{  
  
    if(kondisi_sekarang==1)  
  
    {  
  
        counter++;  
  
    }  
  
}  
  
kondisi_tadi=kondisi_sekarang;  
  
y= counter * 60;  
  
rpm = y/x;  
  
Serial.print(rpm);  
  
Serial.println (" rpm");  
  
delay(10);
```



```

//sensor jarak

long duration, distance;

digitalWrite(trigPin, LOW);

delayMicroseconds(2);

digitalWrite(trigPin, HIGH);

delayMicroseconds(10);

digitalWrite(trigPin, LOW);

duration = pulseIn(echoPin, HIGH);

distance = (duration/2) / 29.1;

Serial.print (distance);

Serial.println(" cm");

String getData = "GET /update?key="+ API +"&"+ field1 +"="+String(rpm)

+""+"GET /update?key="+ API +"&"+ field2 +"="+String(distance);

sendCommand("AT+CIPMUX=1",5,"OK");

sendCommand("AT+CIPSTART=0,\"TCP\", \"\"+HOST+"\", "+ PORT,15,"OK");

sendCommand("AT+CIPSEND=0," +String(getData.length()+4),4,">");

esp8266.println(getData);countTrueCommand++;

sendCommand("AT+CIPCLOSE=0",5,"OK");

}

```

```

void sendCommand(String command, int maxTime, char readReplay[]) {

    Serial.print(countTrueCommand);

    Serial.print(". UPLOAD DATA => ");

    Serial.print(command);

    Serial.print(" ");

    while(countTimeCommand < (maxTime*1))

    {

        esp8266.println(command);//at+cipsend

        if(esp8266.find(readReplay)//ok

        {

            found = true;

            break;

        }

        countTimeCommand++;

    }

    if(found == true)

    {

        Serial.println("DONE");

        countTrueCommand++;
    }
}

```

```
countTimeCommand = 0;

}

if(found == false)

{

Serial.println("FAIL");

countTrueCommand = 0;

countTimeCommand = 0;

}

found = false;

}
```

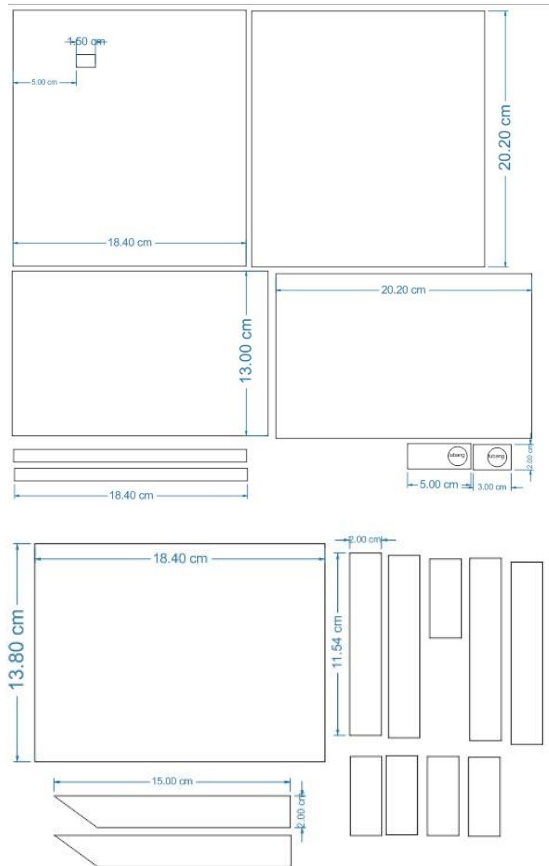
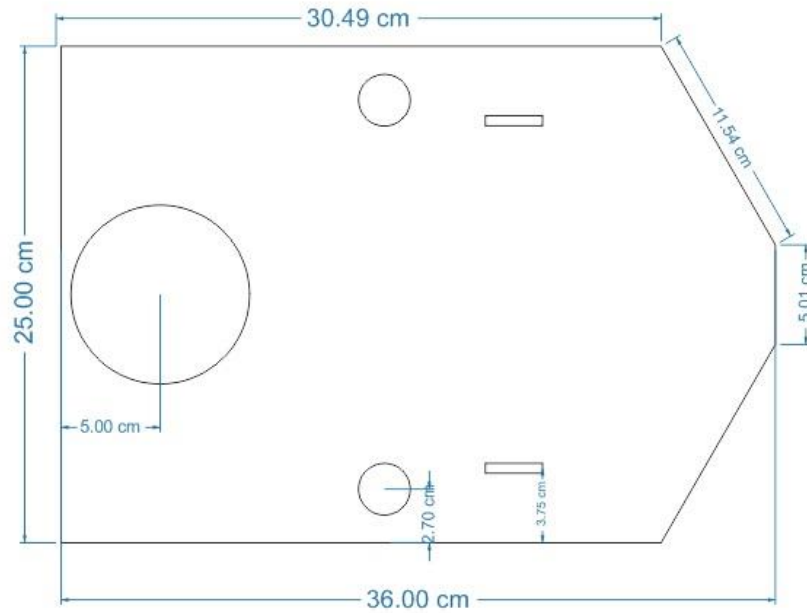
#### Lampiran 5. Proses pengujian Power Charging



Lampiran 6. Proses pembuatan pengapung



Lampiran 7. Desain Casing dan dimensi



Lampiran 8. Proses pengambilan data dan pengujian alat



Lampiran 9. Data Sampling Pengujian hasil rata-rata dari monitoring pada webservice Thingspeak

<b>created_at</b>	<b>entry_id</b>	<b>field1</b>
<b>2019/05/19 (08:49:47 WIB)</b> <b>- 2019/05/19 (21:48:35 WIB)</b>	1	1.726618705
<b>2019/05/21 (08:25:21 WIB)</b> <b>- 2019/05/21 (22:23:39 WIB)</b>	2	1.892307692
<b>2019/05/22 (09:31:04 WIB)</b> <b>- 2019/05/22 (21:59:53 WIB)</b>	3	2.282296651
<b>2019/05/24 (08:49:35 WIB)</b> <b>- 2019/05/24 (22:20:20 WIB)</b>	4	1.680392157
<b>2019/05/24 (08:49:35 WIB)</b> <b>- 2019/05/24 (22:20:20 WIB)</b>	5	1.877237852
<b>2019/05/25 (09:25:21 WIB)</b> <b>- 2019/05/25 (20:32:14 WIB)</b>	6	1.819620253

Link data Pengujian selama 6 hari pada thingspeak.com :

<https://drive.google.com/file/d/1n2aRnJDfJNoa3rV7R3Kt7VG7xFoSqTuV/view?usp=sharing>